PROGRAM BOOK

ARS 70th Annual Meeting

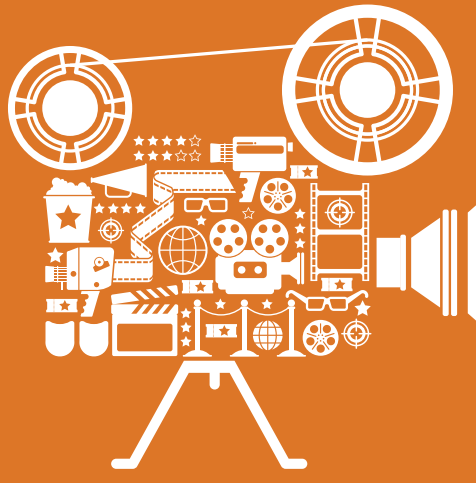
September 27-28, 2024 | Fontainebleau Miami Beach, Miami, FL

American Rhinologic Society | american-rhinologic.org | 973-545-2735

The ARS Welcomes the

AAO-HNS Guest Countries

Chile, Peru, Poland, Taiwan



American Rhinologic Society

FALL FILM FESSTIVAL

The ARS will again be featuring the **Fall Film Fesstival** *- a* ***video seminar*** *featuring the most educational, unique and impressive videos of cases, complications and challenges submitted by the membership.*

The videos were reviewed by an appointed committee and rated equally on rarity of pathology, technical complexity, novelty of procedure, educational value, and production quality. The top-rated videos (time-permitting) will be showcased at the meeting with an opportunity for the video editors to introduce each clip and respond to questions from the audience.

12:15 pm – 1:00 pm
Splash 9 & 10

Pete S. Batra, MD, FACS, FARS

Presidential Welcome

It was 70 years ago that Maurice Cottle and a group of visionaries founded the American Rhinologic Society with a clear mission: to foster exchange of knowledge, to promote research and education, and to elevate the standards of care for patients with sinonasal disorders. Over the decades, our society has grown, adapted, and thrived, becoming a beacon of excellence in sinonasal and skull base disorders in the global rhinologic community.

This milestone meeting will not disappoint. Dr. Kevin Welch, ARS Program Chair has developed a fantastic educational program that highlights cutting-edge rhinologic research. A key highlight of the ARS Annual Meeting is the David W. Kennedy Lectureship. This year, Dr. Robert Naclerio will deliver the annual address on “Drug Development: From Discovery to the Clinic.” 3rd Annual Hwang Family Lectureship will be given by Dr. Alexander Chiu who will share his experience on “A Disruptive Career Path: Lessons From Great Teachers, Personal Failures and Risky Career Choices.” The remainder of the program will be filled with insightful panels and targeted conversations covering current state of research and patient care in CRS, surgery and chemotherapy for sinonasal malignancies, treatment options for AERD, academic medicine and surgeon scientists, management of rhinitis, and several other important topics.

The city of Miami, with its vibrant culture and stunning views, provides the perfect backdrop for the gathering. Beyond the stimulating scientific meeting, please take the time to enjoy the city’s rich art scene, world-class dining, and beautiful beaches.

It has been a profound privilege to serve as your President over the past year. I look forward to seeing you in Miami.

Pete S. Batra, MD, FACS, FARS
President, American Rhinologic Society

Kevin C. Welch, MD, FACS, FARS

Welcome from the President Elect and 70th Annual Meeting Program Chair

On behalf of the Program Committee, I'd excited to welcome you to the 2024 and 70th Annual Meeting of the American Rhinologic Society.

We meet again in Miami after a wonderful Summer Sinus Symposium and a comprehensive ARS @ COSM gathering. I'm excited to present a 2-day forum showcasing top notch scientific research and provocative discussion panels to the members of the American Rhinologic Society. This meeting covers the gamut of rhinology, allergy, and anterior skull base surgery. There's something for everyone here.

Make sure you have your reservations and calendars set. The meeting will take place September 27-28, 2024 at the Fontainebleau Hotel on Miami Beach.

The program will highlight 82 scientific talks, including the Top 10 and Highly Rated abstracts, and over 220 poster presentations. With 304 abstracts submitted, the members of the Abstract Review Committee worked exceptionally hard this year to get abstracts graded by the deadlines, and I thank them immensely. I'd also like to thank the Scientific Session moderators, the panel moderators, and panelists. No one turned down an offer, and collectively they've built an impressive program.

I'm honored to have Dr. Robert Naclerio present the David W. Kennedy lecture this year. The title of his presentation is "Drug Development: From Discovery to the Clinic." I am equally honored to share that one of my mentors, Dr. Alexander Chiu, will deliver the 3rd Annual Hwang Family Lecture. Dr. Chiu's talk is entitled "A Disruptive Career Path: Lessons Learned from Great Teachers, Personal Failures, and Risky Career Choices."

Friday will feature the Top 5 Basic Science and Top 5 Clinical abstracts, and we will round out the first day with a combined ARS and NIH panel exploring where the field of rhinology is headed. I'm honored to feature Dr. Eugene Kern, as he will deliver a fine lecture about Dr. Maurice Cottle, the founder of our society. The President's Reception will follow.

On Saturday, we will need 4 breakout rooms to showcase the impressive assortment of talks. You'll have access to presentations covering skull base and orbital disease, medical and surgical outcomes, cellular mechanisms of CRS, management of polyps, the microbiome, asthma, olfaction, social determinants of health, nasal dynamics, and allergy. Key panels will highlight several thought-provoking topics within these breakout rooms. Look for panels covering rhinitis, skin prick testing v. in vitro testing, the future of ARS-initiated research, polyp management, the management of CRS in the immunosuppressed patient, AERD management, the role of induction chemotherapy, and evolving systemic therapies for sinonasal malignancies. I'm also pleased to announce a very germane DEI panel that will discuss the pursuit of inclusivity in this changing landscape. To wrap up the day, our International Committee has assembled world-wide experts who will discuss the management of non-Type 2 CRS Inflammation. Lastly, we reunite with the AAOA as they host and moderate the combined AAOA/ARS panel. This one is sure to be a hot ticket: Empty Nose Syndrome.

In summary, I think the 70th Annual Meeting of the ARS is going to be a great one, and I hope to see you there.

Kevin C. Welch, MD, FACS, FARS
President Elect and Program Chair

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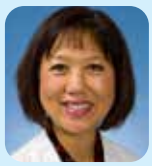
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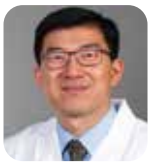

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ARS Mission Statement

The American Rhinologic Society's mission is to serve, represent and advance the science and ethical practice of rhinology. The Society promotes excellence in patient care, research and education in Rhinology and Skull Base Disorders. The American Rhinologic Society is dedicated to providing communication and fellowship to the members of the Rhinologic community through on-going medical education, patient advocacy, and social programs. The ARS continuing medical education activities serve to improve professional competence, performance, and promote research.

Business/ACCME

Continuing Education

Accreditation Statement
The American Rhinologic Society (ARS) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Credit Designation Statement
ARS designates this live activity for a maximum of 10.75 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Learning Objectives from Practice Gaps

At the conclusion of this meeting participants will be able to:

- Understand and discuss the current evidence-based recommendations for the treatment of disorders that affect the nose and the sinuses such as chronic rhinosinusitis, allergic rhinitis, nasal airway obstruction, smell loss, and benign and malignant tumors.
- Discuss the medical and surgical management of recurrent acute and chronic rhinosinusitis through research presentations, debates, and panel discussions.
- Improve the understanding of our members that social determinants of health are important variables that affect our patients' access to care and their outcomes and that these disparities affect not limited medical practitioners but all practitioners caring for patients of diverse backgrounds and means.
- Improve healthcare quality through our oral and poster presentations of cutting-edge research and by incorporating direct member/attendee and speaker involvement through question and answer sessions.
- Assess and explore how we evaluate successful outcomes in skull base surgery through the interaction of rhinologists, endocrinologists, and neurosurgeons.
- Identify state of the art research and research gaps in the field of chronic rhinosinusitis through multidisciplinary efforts involving NIH representatives.
- Understand and appreciate that matters of diversity, equity, and inclusion are critical to facilitating collaborative partnerships among practitioners
- Bring to light controversial topics, such as empty nose syndrome, that require multidisciplinary understanding

How to Obtain Your CME Certificate

At the conclusion of the meeting, you will be provided with a post-meeting link to claim your CME.

ARS 70th Annual Meeting - IFAR Peer Review

At IFAR, we aspire to peer review performed with fairness, rigor, and timeliness. Peer review is thankless work and voluntary. Peer reviewers offer criticism and/or praise to challenge thinking, provide honest feedback, and ultimately improve the scientific method. This is a great service to our specialty, the profession of medicine, and to humankind. The editorial board, Associate Editors, and Editors greatly appreciate the below-named individuals for the reviews they submitted in 2023.

*Top reviewers are in bold font. *Three to four reviews. **Five or more reviews.*

-- Timothy L. Smith, MD, *Editor, International Fourm: Allergy & Rhinology*

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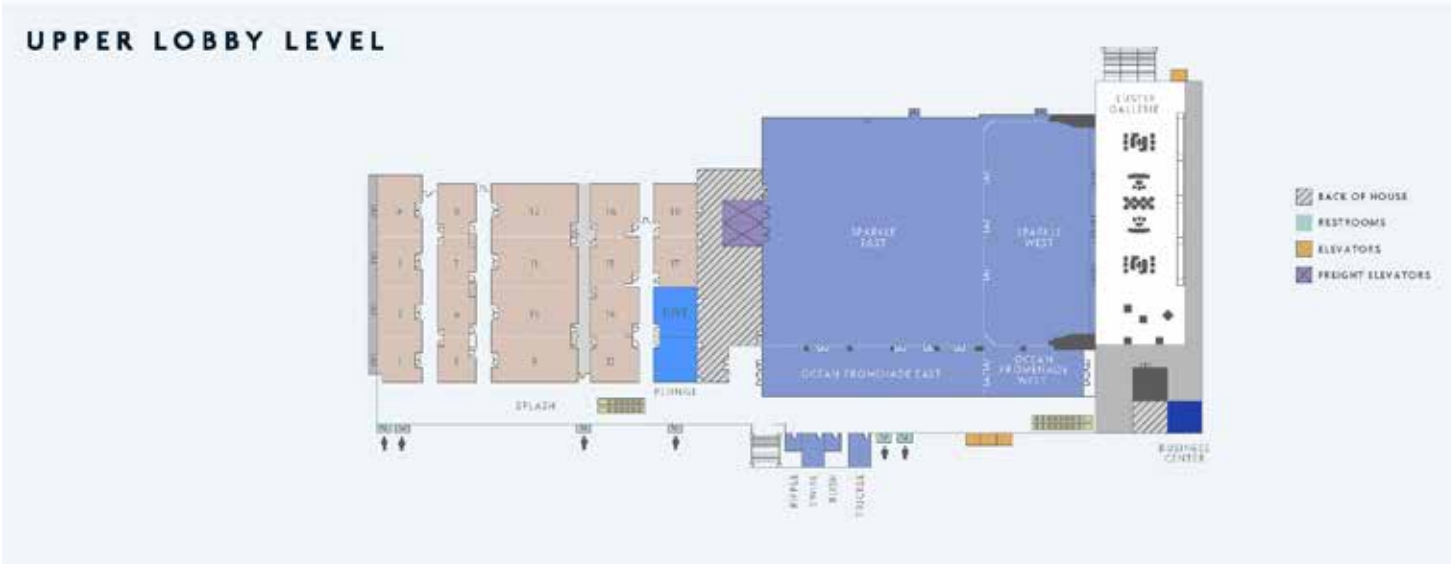

PROGRAM AT A GLANCE

Thursday, September 26, 2024

Residents Didactic Course
Splash 9 & 10
12:00 pm – 5:00 pm
By Invitation Only

Residents Dissection Lab
Off-Site Location
Details for Shuttle Service forthcoming
12:00 pm – 5:00 pm
By Invitation Only

Residents Reception
Splash 11 & 12
6:00 pm – 7:30 pm
By Invitation Only

Friday, September 27, 2024

Residents Didactic Course
Splash 15 & 16
7:30 am – 12:00 pm
By Invitation Only

Residents Dissection Lab
Off-Site Location
Details for Shuttle Service forthcoming
8:00 am – 12:00 pm
By Invitation Only

Friday, September 27, 2024

7:00 am – 12:00 pm
Splash 9-12

7:00 am – 8:00 am
ARS Board of Directors Breakfast

8:00 am – 12:00 pm
ARS Board of Directors Meeting

Friday, September 27, 2024

1:00 pm – 5:00 pm
General Session
Sparkle Ballroom West

1:00 pm – 1:05 pm
Welcome
Kevin Welch, MD, FARS

1:05 pm – 1:19 pm
President's Address
Pete Batra, MD, FARS

Top Rated Abstracts - Basic Science Presentations

Moderators: Kara Detwiller, MD, FARS; Michael Kohanski, MD

1:20 pm – 1:27 pm
Stem cell therapy to treat Cystic Fibrosis rhinosinusitis
Dawn Bravo, PhD

1:28 pm – 1:35 pm
Murine model of nose-to-brain delivery of antibodies using minimally invasive nasal depot (MIND)
Valentina Di Francesco, PhD

1:36 pm – 1:43 pm
Deletion of Nrf2 enhances susceptibility to type 2 inflammation after short term PM2.5 exposure
Murugappan Ramanathan, Jr., MD, FARS

1:44 pm – 1:51 pm
Sinus microbial community changes in chronic rhinosinusitis over one year
Tary Yin, MBChB, BMedSc(Hons), PhD

1:52 pm – 1:59 pm
Therapeutic efficacy of the Ciprofloxacin Azithromycin sinus stent for p.aeruginosa sinusitis
Do-Yeon Cho, MD

2:00 pm – 2:05 pm
Q&A

2:05 pm – 2:15 pm
Awards Ceremony/IFAR Top Reviewers Recognition
Jean Kim, MD, FARS and Timothy Smith, MD, FARS, (Editor in Chief, IFAR)

2:15 pm – 3:00 pm
20th Annual David Kennedy Lectureship
Guest Speaker: Robert Naclerio, MD
"Drug Development: From Discovery to the Clinic"

3:00 pm – 3:30 pm
Break with Exhibitors in Sparkle Ballroom East

Top Rated Abstracts – Clinical Abstracts

Moderators: Edward Kuan, MD, FARS; Patricia Loftus, MD, FARS

3:30 pm – 3:37 pm
Steroid-eluting sinus stent versus steroid rinse for maintaining frontal sinus patency
Maxime Fieux, MD, PhD

3:38 pm – 3:45 pm
Long term outcomes of PRP injections for post-viral olfactory loss
Maxime Fieux, MD, PhD

3:46 pm – 3:53 pm
Pathologic dural invasion is associated with regional recurrence in olfactory neuroblastoma
Anthony Tang, BS

3:54 pm – 4:01 pm
The effects of allergen immunotherapy (AIT) post-surgery in patients with central compartment atopic disease (CCAD)
Christian Meerwein, MD

PROGRAM AT A GLANCE

4:02 pm – 4:09 pm
AI prediction of IP conversion to SCC using a multi-institutional CT dataset
Farideh Hosseinzadeh, MD

4:10 pm – 4:15 am
Q&A

4:15 pm – 5:00 pm
Panel: CRS: Where are we Headed in Research and Patient Care?
Moderators: Robert Kern, MD, FARS, and Joshua Levy, MD, FARS
Panelists: Benjamin Bleier, MD, FARS; Amber Luong, MD, PhD, FARS; Bruce Tan, MD; Justin Turner, MD, FARS

5:00 pm – 5:10 pm
Maurice Cottle – Our Founder Tribute
Eugene Kern, MD

5:30 pm – 7:00 pm
President's Reception & Poster Reception
Ocean Promenade East and Sparkle Ballroom East

Saturday, September 28, 2024

8:00 am – 12:00 pm
Skull Base – Breakout 1
Sparkle Ballroom West

Session Chair: Satyan Sreenath, MD

8:00 am – 8:30 am
Panel: "Carve it Out or Melt it Away – Induction Chemotherapy versus Upfront Surgery for Sinonasal Malignancies"
Moderator: Edward Kuan, MD, FARS
Panelists: Nithin Adappa, MD, FARS; Raewyn Campbell, MD, FARS; Garret Choby, MD, FARS; Lauren North, MD

Moderators: Mindy Rabinowitz, MD, FARS; Kenneth Rodriguez, MD

8:30 am – 8:35 am
Validation of the sinonasal outcome test-22 in sinonasal malignancy
Cara Maya Fleseriu, BS

8:36 am – 8:41 am
Understanding endoscopy and imaging frequency for detection of sinonasal SCC recurrence
Saawan Patel, BBA

8:42 am – 8:47 am
Mutational burden assessment in sinonasal squamous cell carcinoma survival
Srivatsu Surya Vasudevan, MD, MS

8:48 am – 8:53 am
Orbital decompression in the biologic era: Is there still a need for surgery?
Daniel Gorelik, MD, MPH

8:54 am – 9:00 am
Q&A

Moderators: Mathew Geltzeiler, MD, FARS; Ashleigh Halderman, MD, FARS

9:00 am – 9:05 am
Retrobulbar amphotericin B injections versus orbital exenteration in AIFRS outcomes
Nikitha Kosaraju, BA

9:06 am – 9:11 am
Assessing complications of functional endoscopic sinus surgery in a large national database
Justin Lau

9:12 am – 9:17 am
Extended approaches to the maxillary sinus and empty nose syndrome
Oloruntobi Rotimi, MBBS

9:18 am – 9:23 am
Upfront Draf III – Cost-effective in the long run?
David Lerner, MD

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: Approaches to the Lateral Frontal Sinus
Moderator: Dennis Tang, MD, FARS
Panelists: Nyssa Farrell, MD; Sanjeet Rangarajan, MD, FARS; Raj Sindwani, MD, FARS; Bradford Woodworth, MD, FARS

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: David Gudis, MD, FARS; Kibwei McKinney, MD

10:15 am – 10:20 am
Maxillary antrostomy alone versus complete sinus surgery for odontogenic sinusitis
John Craig, MD, FARS

10:21 am – 10:26 am
Long-term implications of short-term outcomes after ESS in CRS patients
Aditi Agarwal, MD, MS

10:27 am – 10:32 am
The effect of anticoagulant therapy on endoscopic sinus surgery postoperative outcomes
Kevin Herrera, BS

10:33 am – 10:38 am
Assessing the impact of GLP-1R agonists in post-sinus surgery management
David Hoying, BS

10:39 am – 10:45 am
Q&A

Moderators: Elisa Illing, MD, FARS; Peter Papagiannopoulos, MD

10:45 am – 10:50 am
Autologous vs synthetic inlay grafts have comparable skull base reconstructive outcomes
Theodore Nguyen, MD

PROGRAM AT A GLANCE

10:51 am – 10:56 am
Social vulnerability and quality of life before and after endoscopic skull base surgery
Jonathan Pang, MS

10:57 am – 11:02 am
Factors influencing CSF leak timing after ESBS
Ashleigh Halderman, MD, FARS

11:03 am – 11:08 am
Unilateral versus bilateral resection of olfactory neuroblastoma
Arash Abiri, PhD

11:09 am – 11:15 am
Q&A

11:15 am – 12:00 pm
Panel: Evolving Principles for Systemic Therapies in Management of Sinonasal Malignancy
Moderator: Mathew Geltzeiler, MD, FARS
Panelists: Nabil Saba, MD; Shirley Su, MD; Eric Wang, MD, FARS

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

8:00 am – 12:00 pm
CRS – Mechanisms and Outcomes
Breakout 2
Splash 9 & 10

Session Chair: Michael Marino, MD, FARS

8:00 am – 8:30 am
Panel: CRS in the Immunosuppressed Patient: A Decision-Making Conundrum
Moderator: Angela Donaldson, MD, FARS
Panelists: Roy Casiano, MD, FARS; Jacqueline Squire, MD; Bobby Tajudeen, MD, FARS

Moderators: Angela Donaldson, MD, FARS; Bobby Tajudeen, MD, FARS

8:30 am – 8:35 am
Elevated serum uric acid levels correlate with CRSwNP recurrence
Shaobing Xie, PhD

8:36 am – 8:41 am
Predictors for class switching in eCRS
Peta-Lee Sacks, MD, FRACS

8:42 am – 8:47 am
Sequencing-based viral identification in CRSwNP
Martin Desrosiers, MD

8:48 am – 8:53 am
Eosinophils fluctuation in CRSwNP
Wirach Chitsuthipakorn, MD

8:54 am – 9:00 am
Q&A

Moderators: Charles Ebert, MD, FARS; Regan Bergmark, MD, FARS

9:00 am – 9:05 am
The crystal ball: Can we predict surgical outcomes for chronic rhinosinusitis patients?
Vijay Ramakrishnan, MD, FARS

9:06 am – 9:11 am
Outcomes of complete ESS for CRSwNP and AERD in the biologic era
Alan Workman, MD, MTR

9:12 am – 9:17 am
Early vs delayed functional endoscopic sinus surgery for patients with chronic rhinosinusitis
Radhika Duggal, MA

9:18 am – 9:23 am
17-year follow-up data of a randomized clinical trial on postoperative additive systemic steroids
Sarina Mueller, MD

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: AERD: ASA Desensitization vs. Biologics
Moderator: Elina Toskala, MD, FARS
Panelists: Regan Bergmark, MD, FARS; Kent Lam, MD, FARS

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: Do-Yeon Cho, MD; Anthony DelSignore, MD, FARS

10:15 am – 10:20 am
Long term outcomes of Dupilumab therapy for chronic rhinosinusitis with nasal polyposis
Samuel Shing, BS, BA

10:21 am – 10:26 am
Factors associated with switching biologics in CRSwNP: A multicenter Canadian experience
Marisa Dorling, BSc

10:27 am – 10:32 am
Budget impact analysis of biologics in CRSwNP
Maxime Fieux, MD, PhD

PROGRAM AT A GLANCE

10:33 am – 10:38 am
Cost utility analysis of EDS-FLU versus steroid nasal irrigation for nasal polyposis
Amber Luong, MD, PhD, FARS

10:39 am – 10:45 am
Q&A

Moderators: Jose Gurrola, MD; Devyani Lal, MD, FARS

10:45 am – 10:50 am
Long-term efficacy of add-on Verapamil in topical steroid refractory CRSwNP
Marcel Miyake, MD, PhD

10:51 am – 10:56 am
Disease control vs overall symptom severity as a global metric for CRS disease status
Ryan Cotter, BS

10:57 am – 11:02 am
Associations of pesticide proximity with cytokine levels in patients with/without chronic sinusitis
Melodyanne Cheng, MS

11:03 am – 11:08 am
Sinonasal outcomes of CFTR modulators for Cystic Fibrosis: A meta-analysis
Michael Werner, MD

11:09 am – 11:15 am
Q&A

11:15 am – 12:00 pm
Panel: Interdisciplinary Workflows and Tips to Optimize Recalcitrant CRS Outcomes
Moderator: Devyani Lal, MD, FARS
Panelists: Rakesh Chandra, MD, FARS; Cecilia Damask, DO; Claire Hopkins, MBChB, PhD; Diego Saldana Perez, MD; Jacqueline Squire, MD;

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

8:00 am – 12:00 pm
CRS – Microbiology, Virology, and Comorbidities
Breakout 3
Splash 11 & 12

Session Chair: Jacob Eide, MD

8:00 am – 8:30 am
Research/AiR Panel: "The Changing Face of Academic Medicine and Implications for Surgeon-Scientists"
Moderator: Vijay Ramakrishnan, MD, FARS
Panelists: Michael Kohanski, MD; Sandra Lin, MD, FARS; Murugappan Ramanathan, MD, FARS; Timothy Smith, MD, FARS; Michael Stewart, MD, FARS; Carol Yan, MD

Moderators: Stella Lee, MD; Carol Yan, MD

8:30 am – 8:35 am
Microbiome in patients with chronic rhinosinusitis: Exploring the role of obesity
Jorge Arpi, MD

8:36 am – 8:41 am
Metagenomics or metataxonomics: Best practice methods to uncover the truth of the sinus microbiome
Isabella Burdon, MBBS-V

8:42 am – 8:47 am
Microbiome and mycobiome abundance and cytokine profile in sinus mucosa of patients w/wo CRS
Hong-Ho Yang, BS

8:48 am – 8:53 am
Viral infection as an inciting event for chronic sinusitis
Najm Khan, MBS

8:54 am – 9:00 am
Q&A

Moderator: Victoria Lee, MD, FARS; Kevin Welch, MD, FARS

9:00 am – 9:05 am
Association of nasal mucus cytokines and clinical severity in CRS patients with comorbid asthma
Rory Lubner, MD

9:06 am – 9:11 am
Validation of AECRS definition
Katie Phillips, MD

9:12 am – 9:17 am
CRS eosinophil cut points and asthma
Wirach Chitsuthipakorn, MD

9:18 am – 9:23 am
Paradigms in treating eosinophilic granulomatosis with polyangiitis
Nitish Kumar, MS

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: Nasal Polyp Subtypes: Do We Need to Tailor Treatment Plans?
Moderator: Corinna Levine, MD, FARS
Panelists: Kara Detwiller, MD; Jessica Grayson, MD; Elisa Illing, MD, FARS; Rodney Schlosser, MD, FARS

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: Corinna Levine, MD, FARS; Kristine Smith, MD

10:15 am – 10:20 am
Olfactory ensheathing cell tumor culture model as a tool to study olfactory nerve biology
John Finlay, MD, PhD Student

10:21 am – 10:26 am
Impact of age on the accuracy of objective olfactory testing
Anil Patel, Mr.

PROGRAM AT A GLANCE

10:27 am – 10:32 am
Role of PRP in olfactory dysfunction treatment
Shreya Mandloi, BS

10:33 am – 10:38 am
Taste and flavor remix: The effect of Dupilumab on AERD patients' chemosensory experience
Emily Moldoff, FNP-C

10:39 am – 10:45 am
Q&A

Moderators: Angela Donaldson, MD, FARS; Erin O'Brien, MD, FARS

10:45 am – 10:50 am
Quantifying CRS health utility: Direct & indirect
Wirach Chitsuthipakorn, MD

10:51 am – 10:56 am
Impact of patient factors on MCID for SNOT-22 in chronic sinusitis
Felix E.Fernandez-Penny, BS

10:57 am – 11:02 am
Role of social determinants of health on quality of life in adult chronic rhinosinusitis
Ryan Ziltzer, MD, MPH

11:03 am – 11:08 am
Socioeconomic status and gender impact sinus disease severity in people with Cystic Fibrosis
Ethan Han, BS

11:09 am – 11:15
Q&A

11:15 am – 12:00 pm
Panel: Pursuing Inclusive Excellence in a Changing Landscape
Moderator: Jose Mattos, MD
Panelists: Tracy Downs, MD; Erin O'Brien, MD, FARS; Joan E. St. Onge, MD, MPH, FACP

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

8:00 am – 12:00 pm
Outpatient Rhinology and Allergy Practice - Breakout 4
Splash 14-16

Session Chair: Karen Bednarski, MD, FARS

8:00 am – 8:30 am
Panel: Rhinitis: How to Evaluate and Manage This Underappreciated Condition
Moderator: Anthony Del Signore, MD, FARS
Panelists: Mary Ashmead, MD; Karen Bednarski, MD, FARS; Seth Brown, MD, FARS; Christopher Davis, MD; Kathleen Tibbetts, MD

Moderators: Mary Ashmead, MD; Karen Bednarski, MD, FARS

8:30 am – 8:35 am
Rhinorrhea recurrence after intranasal cryoablation: A multicenter cohort study
Curtis Mack, Medical Student

8:36 am – 8:41 am
Cryoablation of the posterior nasal nerve in children
Nisreen Al-Musaileem, MD

8:42 am – 8:47 am
Impact of septal deviation in temperature-controlled radiofrequency treatment of the nasal valve
William Yao, MD, FARS

8:48 am – 8:53 am
Intranasal trigeminal function in aging adults
Noah Feit, MD

8:54 am – 9:00 am
Q&A

Moderators: James W. Mims, MD; Jennifer Villwock, MD

9:00 am – 9:05 am
Intralesional sclerotherapy more effective for epistaxis in HHT
Nitish Kumar, MS

9:06 am – 9:11 am
Selective neurovascular cautery during turbinoplasty reduces rhinitis symptoms
Alexander Zhang, MBBS

9:12 am – 9:17 am
Nasal outcomes of rhinitis medicamentosa: Validation of the NORM form
Brekel Kemp, MD, MPH

9:18 am – 9:23 am
Intranasal mucosal sensitivity to mechanical airjet stimulation among ENS and septoturb patients
Ahmad Odeh, BS

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: "Allergy Testing: Skin Testing v. In Vitro Testing
Moderator: Sandra Lin, MD, FARS
Panelists: James W. Mims, MD; Jennifer Villwock, MD

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: Greg Davis, MD, FARS; David Yen, MD

10:15 am – 10:20 am
Factors associated with high-risk ergonomic posture during office-based rhinology procedures
Orli Weiss, Medical Student

10:21 am – 10:26 am
Environmental impact of nasal endoscopy
Darpan Kayastha, MD

PROGRAM AT A GLANCE

10:27 am – 10:32 am
Perioperative pollen exposure affects chronic rhinosinusitis outcomes after endoscopic sinus surgery
Benton Tullis, BS

10:33 am – 10:38 am
Ambient particulate matter and frequency of outpatient visits for chronic rhinosinusitis in the US
Hong-Ho Yang, BS

10:39 am – 10:45 am
Q&A

Moderators: Jean Kim, MD, FARS; Elina Toskala, MD, FARS

10:45 am – 10:50 am
Generic competition and prices for azelastine-fluticasone nasal spray
Vinay Rathi, MD

10:51 am – 10:56 am
Persistent reduction of total serum IgE in CRSwNP after ESS with short course Dupilumab
Leandra Mfuna Endam, Coordinator, Clinical Affairs

10:57 am – 11:02 am
Dupilumab-associated adverse events in children vs adults: An analysis of the FAERS database
Elias Saba, MD

11:03 am – 11:08 am
The impact of sinonasal corticosteroid irrigations on glycemic control: A retrospective analysis
Anthony Botros, MD, MBA

11:09 am – 11:15 am
Q&A

11:15 am – 12:00 pm
RiPP Panel: "What's Your Side Gig? Capturing Additional Income
Moderator: David Yen, MD
Panelists: Greg Davis, MD, FARS; Douglas Reh, MD, FARS; Stacey Silvers, MD, FARS; Geoffrey Trenkle, DO

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

1:00 pm – 5:00 pm
General Session
Sparkle Ballroom West

1:00 pm – 1:15 pm
ARS Business Meeting and Presidential Citations
Pete Batra, MD, FARS; Michael Stewart, MD, FARS; Kevin Welch, MD, FARS

1:15 pm – 2:00 pm
3rd Annual Hwang Family Lectureship
Guest Speaker: Alexander Chiu, MD, FARS
"A Disruptive Career Path: Lessons From Great Teachers, Personal Failures and Risky Career Choices"

Moderators: Anthony Del Signore, MD, FARS; Kristine Smith, MD

2:00 pm – 2:05 pm
Prevalence of Cystic Fibrosis carrier status in chronic rhinosinusitis without nasal polyps
Do-Yeon Cho, MD

2:06 pm – 2:11 pm
Olfactory cleft opacification and outcomes improve with expanded intranasal steroid treatment
Alan Workman, MD, MTR

2:12 pm – 2:17 pm
Inflammatory endotypes in CRSwNP: Implications for postop outcomes
Christina Dorismond, MD, MPH

2:18 pm - 2:23 pm
Autonomic dysfunction and olfactory loss in long COVID
Eve Champaloux, MD, PhD

2:24 pm – 2:30 pm
Q&A

Moderators: Benjamin Bleier, MD, FARS; Stephanie Smith, MD

2:30 pm – 2:35 pm
Immunophenotyping invasive fungal sinusitis survival
Lauren Roland, MD

2:36 pm – 2:41 pm
Deep learning approach for automated frontal sinus opacification assessment on CT scan
Caio Athayde Neves, MD, PhD

2:42 pm – 2:47 pm
PAR2 activated IL13 Ra1 in eCRS
Ching-Chih Lee, MD, PhD

2:48 pm – 2:53 pm
Olfactory fossa opacification on CT scan is correlated to nasal IL-5 in chronic rhinosinusitis
Radhika Duggal, MA

2:54 pm – 3:00 pm
Q&A

3:00 pm – 3:30 pm
Break with Exhibitors in Sparkle Ballroom East

3:30 pm – 4:15 pm
International Panel: "Real World Management of Non-Type 2 CRS Inflammation: A Case-Based Discussion"
Moderator: Do-Yeon Cho, MD
Panelists: Hector de la Garza, MD; Islam Herzallah, MD, PhD; Jin-Young Min, MD, PhD; Rodolfo Nazar, MD

PROGRAM AT A GLANCE

4:15 pm – 5:00 pm
Panel: ARS/AAOA – Empty Nose Syndrome: Just a Bunch of Hot Air?
Moderator: Haidy Marzouk, MD
Panelists: Pete Batra, MD, FARS; Seth Brown, MD, FARS; Sandra Lin, MD, FARS; R. Peter Manes, MD, FARS; Jayakar Nayak, MD; Masayoshi Takashima, MD, FARS

5:00 pm
Meeting Concludes

POSTERS

Poster #A001
A case of orbital necrotizing fasciitis originating from sinonasal pathology
Nishat Momin, MD

Poster #A002
A descriptive analysis of characteristics of CRSwNP patients within US clinical practice
Joseph Han, MD

Poster #A003
A double dilemma: A novel case series of concomitant anterior and lateral cerebrospinal fluid leaks
Nathaniel Untch, BS

Poster #A004
A novel presentation of sinonasal seromucinous hamartoma
Shady Soliman, MD, MS

Poster #A005
A review of IIH management options after spontaneous CSF leak
Ahmad Odeh, BS

Poster #A006
WITHDRAWN

Poster #A007
Analyzing disparities in head and neck cancer among Hispanic populations and the role of HPV
Cristina Benites, MBS

Poster #A008
Anemia in nasal fracture
Aman Patel, BS

Poster #A009
Anterior ethmoid artery ligation for epistaxis: A systematic review
Wynne Zheng, MA

Poster #A010
Anterior skull base MRI framework for otolaryngologists
Thomas Scharfenberger, BS

Poster #A011
Antigen specific IgE in nasal secretion
Shoji Matsune, MD, PhD

Poster #A012
Apophysomyces elegans rhino-orbitocerebral infection in immunocompetent individuals
Gabriel Dayan, MD

Poster #A013
AR and VR in rhinology review
Shaun Edalati, BS

Poster #A014
Artificial intelligence driven automated performance metrics in endoscopic skull base surgery
David Grimm, MS

Poster #A015
Aspiration pneumonitis: An overlooked consequence of CSF rhinorrhea - A systematic review
Maria Armache, MD

Poster #A016
Assessing adult sinusitis guidelines: A comparative analysis of AAO-HNS and AI chatbots
Shaun Edalati, BS

Poster #A017
Assessment of TikTok as a patient education resource in chronic rhinosinusitis
Nima Derakhshan, BSc

Poster #A018
Association of nutritional vitamin intake and sinonasal infections
Stella Lee, MD

Poster #A019
Association of obesity with chronic adenoiditis and chronic rhinosinusitis in children
Erica McArdle, MD

Poster #A020
WITHDRAWN

Poster #A021
Association of race and insurance status with endoscopic anterior skull base surgery outcomes
Shvetali Thatte, BS

Poster #A022
Attitudes toward COVID-19 among patients with chronic rhinosinusitis
Richard Chiu, BS

Poster #A023
Baseline characteristics of patients with CRSwNP in the United States in the AROMA global registry
David W. Jang, MD

Poster #A024
Biologic Claims by Otolaryngologists
Ariana Shaari BA

Poster #A025
Carolyn's window Asian noses
Wirach Chitsuthipakorn, MD

Poster #A026
Case report and literature review of prostate cancer metastases to the sphenoid sinus
Jessa Miller, MD

Poster #A027
Characteristic CT findings in silent sinus syndrome
Nicholas Fung, MD

Poster #A028
Characteristics of patients initiating Dupilumab for CRSwNP by number of previous surgeries
Jayant Pinto, MD

PROGRAM AT A GLANCE

Poster #A029
Characteristics of patients with/without prior sinonasal surgery initiating Dupilumab for CRSwNP
Joseph Han, MD, FARS

Poster #A030
Cholesterol granuloma of the posterior ethmoid presenting as proptosis: Case presentation
Luis Fernando Macias-Valle, MD, FARS

Poster #A031
Chronic granulomatous invasive fungal sinusitis in the United States
Andrea Cespedes Zablah, BS

Poster #A032
Chronic rhinosinusitis diagnostic rates during the COVID-19 pandemic
Kevin Herrera, BS

Poster #A033
Chronic rhinosinusitis in endoscopic sinus surgery
Akash Patel, BS

Poster #A034
Clear cell carcinoma presenting in the nasal cavity
Margaret B. Mitchell, MD, MS-HPEd

Poster #A035
Clearing the air: The link between particulate matter exposure and the severity of AERD
Stella Lee, MD

Poster #A036
Clinical and radiographic characterization of central compartment atopic disease
Thomas Cyberski, BS

Poster #A037
WITHDRAWN

Poster #A038
Clinical predictors of endoscopic modified medial maxillectomy
Saad Alshammari, MD

Poster #A039
Comparative effectiveness of medical and surgical treatments for chronic rhinosinusitis
Amani Kais, MD

Poster #A040
Comparison of steroid implants to repeat ESS for recurrent NP on HCRU in CRSwNP patients
Xiaomin Deng, PhD

Poster #A041
Contemporary practice patterns for chronic rhinosinusitis with nasal polyposis
Noel Ayoub, MD

Poster #A042
Corticosteroid and antibiotic use before and after initiating Dupilumab: CRSwNP real-world practice
Stella E. Lee, MD

Poster #A043
Cost and carbon emissions analysis of a multidisciplinary complex airway clinic
Austin Heffernan, MD

Poster #A044
COVID's impact on sinus surgery
Ariana Shaari, BA

Poster #A045
CT angiography's role in characterizing vascular injury from sphenoid sinus fractures
Eugene Oh, BS, MSE

Poster #A046
CT scan findings in mucormycosis with proptosis
Mohsen Naraghi, MD, FARS

Poster #A047
Current menstruation/oral contraceptive use and serum allergen-specific immunoglobulin E levels
Khamis Suleiman, BS

Poster #A048
WITHDRAWN

Poster #A049
DEI in clinical research
Randall Ow, MD, FARS

Poster #A050
Detecting nasal endoscopy landmarks using a CNN
Vinayak Ganeshan, MD

Poster #A051
Development of a novel nasal microsampling device to standardize the analysis of protein biomarkers
Eldin Rostom, BEng

Poster #A052
Diabetes mellitus in endoscopic sinus surgery
Akash Patel, BS

Poster #A053
Diagnostic value of serum IgE levels for allergic fungal rhinosinusitis
Brian Cameron, MD

Poster #A054
Disparities in nasal fracture care & surgical outcomes
Daniel Karasik

Poster #A055
Disparities in sinonasal malignancy treatment
Daniel Karasik

Poster #A056
Does a validated patient-reported outcome measure exist for rhinosinusitis in children?
Isabelle Williams, MB Bchir

Poster #A057
WITHDRAWN

Poster #A058
Does Dupilumab therapy for chronic rhinosinusitis with nasal polyposis reduce nasal steroid use?
Samuel Shing, BS, BA

PROGRAM AT A GLANCE

Poster #A059
Double trouble: Synchronous HPV associated nasal carcinomas on an immune dysfunctional background
Jerin Thomas, BS

Poster #A060
WITHDRAWN

Poster #A061
Dural diverticula: Radiographic and clinical implications
Pooya Roozdor, MD, MPH

Poster #A062
Early intra-sinus migration of a long-term frontal sinus stent
Joshua Smith, MD

Poster #A063
Effect of lidocaine/oxymetazoline spray on endoscopically visualized secretions
Aatin Dhanda, BA

Poster #A064
Effect of Tezepelumab on sleep in patients with severe uncontrolled asthma and nasal polyps
Christopher S. Ambrose, MD

Poster #A065
Effects of steroid usage in diabetic COVID-19 patients on invasive fungal sinusitis incidence
Jenny Ji

Poster #A066
Efficacy and safety of LYR-210 for CRS from the pivotal Phase 3 ENLIGHTEN 1 trial
Vineeta Belanger, PhD

Poster #A067
Endoscopic combined antrostomies for odontogenic maxillary sinusitis
Yoichiro Narikawa, MD

Poster #A068
Endoscopic endonasal marsupialization of recurrent petrous apex cholesteatoma
Emily Hardy, BS

Poster #A069
Endoscopic management of medial and inferior orbital wall fractures: A systematic review
Jeremy Ruthberg, MD

Poster #A070
Endoscopic repair of nasal septal perforation with cadaveric costal cartilage
Parker Tumlin, MD

Poster #A071
Enhancing care in chronic rhinosinusitis with nasal polyposis
Mary Grecco

Poster #A072
Environmental exposure methods in rhinology
Conner Massey, MD

Poster #A073
Evaluation of olfactory disorders in COVID-19 patients
Mio Takeuchi, MD

Poster #A074
Evaluation of safety and effectiveness of Novapak™ in patients undergoing sinus surgery
Mark Tabor, MD

Poster #A075
WITHDRAWN

Poster #A076
Extradural pneumocephalus with subcutaneous emphysema following skull base surgery: Case report
Matthew Cheung, BS

Poster #A077
Extramedullary plasma cell neoplasm in the nasal cavity
Guillermo Ramirez Vazquez, MD

Poster #A078
Fluid and electrolyte disorders in closed nasal fractures
Akash Patel, BS

Poster #A079
Forever chemicals: PFAS exposure and effects on sinonasal health
Stella Lee, MD

Poster #A080
Frailty and its impact in rhinology patients
Guillermo Maza Malave, MD

Poster #A081
Frontal sinus IP
Alexis Kim

Poster #A082
Frontal sinus simulation training for practicing ENTs
Mackenzie Latour, MD

Poster #A083
Grades of PRNN guide endoscopic skull base surgery
Benjian Zhang, MD

Poster #A084
Gross total resection and margin status in very advanced (T4b) sinonasal adenoid cystic carcinoma
Derek Liu, MD

Poster #A085
High prevalence of sinonasal symptoms in untreated OSA patients
Yixuan Zheng, MD

Poster #A086
Hispanic Nose
Belen Terreros, MD

Poster #A087
HLA mismatch and chronic rhinosinusitis in kidney transplants
Estephania Candelo Gomez, MD, MSc

Poster #A088
Hospital region by closed nasal bone fractures
Shivani Mehta, BS

PROGRAM AT A GLANCE

Poster #A089
How likely are patients who receive a CT scan of the sinuses to progress to sinus surgery?
Jaime Yrastorza, BS

Poster #A090
Impact of age on outcomes of open orbital fracture repair
Aman Patel, BS

Poster #A091
Impact of anosmia on subsequent mental health disorders
Shahzeb Hasan, MD

Poster #A092
Impact of commission on cancer accreditation on survival outcomes in sinonasal malignancy
Yoni Sacknovitz, BA

Poster #A093
Impact of surgical cost awareness on surgical expenditure for endoscopic sinus surgery
Chase Kahn, MD

Poster #A094
Impact of topical Levaquin rinses on chronic rhinosinusitis
Ali Baird, MD

Poster #A095
Impact of topical Mupirocin rinses on chronic rhinosinusitis
Vidit Talati, MD

Poster #A096
Improving readability of patient education materials with ChatGPT
Austin Swisher, MD

Poster #A097
Inflammatory arthritis-associated chronic rhinosinusitis
Amrita Bhat, BS

Poster #A098
Intersection of demographic and academic productivity trends among American rhinology fellows
Morgan McCain

Poster #A099
Intractable epistaxis by "nontraumatic" ICA aneurysm
So Watanabe, MD, PhD

Poster #A100
Investigating the relationship between olfactory dysfunction and vitamin intake
Stella Lee, MD

Poster #A101
Lateral lamella of cribriform plate and risk of anterior skullbase injury
Urmila Gurung, MBBS, MS

Poster #A102
Left-digit bias in surgical management of chronic rhinosinusitis
Alexander Wang, BS

Poster #A103
Living with chronic rhinosinusitis: An arts-based study
Jenny Xiao, MSc

Poster #A104
Local anaesthetic sinus surgery: A patient experience
Miran Pankhania, MBChB

Poster #A105
Localization of mucus using machine learning
Vinayak Ganeshan, MD

Poster #A106
Low resource pituitary complications
Katherine Tai, MD

Poster #A107
Machine learning for sinonasal mass classification
Lirit Levi, MD

Poster #A108
Malignant transformation rate of sinonasal inverted papilloma in immunocompromised patients
Jason Crossley, MD

Poster #A109
Management of exophytic papillomas with malignant transformation into squamous cell carcinoma
Pranati Pillutla, MD

Poster #A110
Mental health in endoscopic sinus surgery
Shivani Mehta, BS

Poster #A111
Middle turbinate release with preservation versus MT sacrifice in expanded endonasal skull base surgery
Axel Renteria, MD, MS

Poster #A112
MIF drives macrophage M2 polarization facilitating CRSwNP recurrence
Shaobing Xie, PhD

Poster #A113
MMP1 predicts IP severity
Kush Panara, MD

Poster #A114
NAO and athletic performance
Randall Ow, MD, FARS

Poster #A115
Nasal cycling and nasal function
Michelle Kim

Poster #A116
Nasal nitric oxide in PCD after mucus debridement
John Henrich, MD

Poster #A117
WITHDRAWN

Poster #A118
Nasal septal abscess associated with ulcerative colitis
Masakazu Murayama, MD

Poster #A119
New device for management of epistaxis
Tanveer Janjua, MD

PROGRAM AT A GLANCE

Poster #A120
Noninvasive devices for congestion
Aurelia Monk, BA

Poster #A121
NP-related exacerbations and treatments in patients with CRSwNP treated with mepolizumab
Martin Maldonado-Puebla

Poster #A122
Obesity in septoplasty
Aman Patel, BS

Poster #A123
Office-based blue laser vs. coblation therapy for inferior turbinate hypertrophy
Anne Marie Daou, MD

Poster #A124
Olfaction and lifestyle after COVID-19
Jeremy Tervo, Medical Student

Poster #A125
Olfactory dysfunction in patients with allergic fungal rhinosinusitis
Eunice Im

Poster #A126
Olfactory neuroblastoma
Mohsen Naraghi, MD, FARS

Poster #A127
Orbital exenteration vs preservation: A meta-analysis of overall survival rate
Smile Kajal, MD

Poster #A128
Outcomes after pediatric functional endoscopic sinus surgery
Sofia Olsson, BS

Poster #A129
Outcomes of AIFRS with and without cranial nerve involvement
Maxwell Weng, BSE

Poster #A130
Outcomes using topical steroid suspended in Chitogel instead of post-operative systemic steroids
Alexander Zhang, MBBS

Poster #A131
Over-the-counter nasal sprays
Lily Trinh, MD

Poster #A132
Oxygenation outcomes in patients undergoing septoplasty
Margaret B. Mitchell, MD, MS-HPEd

Poster #A133
Paranasal sinus evolution and purpose
Landon Ebbert

Poster #A134
Perioperative antibiotic use in functional endoscopic sinus surgery in pediatric patients
Sofia Olsson, BS

Poster #A135
WITHDRAWN

Poster #A136
Persistence and adherence with Dupilumab in CRSwNP
Zhixiao Wang, PhD

Poster #A137
Pilot program for nasosinusal endoscopic surgery training
Daniela Vicencio, MD

Poster #A138
Pneumosinus dilatans with incidentally discovered septal meningioma
Pranati Pillutla, MD

Poster #A139
Postmarket safety profile of Orkambi: An analysis of FAERS database
Ashton Rogers, BS

Poster #A140
Postoperative oral steroid use for chronic rhinosinusitis: A systematic review and meta-analysis
Justina Shafik, BS

Poster #A141
Postoperative pain after functional endoscopic sinonasal surgery in chronic rhinosinusitis
Valeria Cepeda, MD

Poster #A142
Post-operative septal perforations among diabetic and non-diabetic patients
Drew Smith, MD, MS

Poster #A143
Predictors of hospital admission in CSF rhinorrhea repair: A national retrospective analysis
Shiven Sharma, JD

Poster #A144
Predictors of postoperative complications in pediatric transnasal microscopic pituitary surgery
Sofia Olsson, BS

Poster #A145
Prevention of the frontal sinus ostium restenosis after endoscopic extended frontal sinus surgery
Naruo Shoji, MD, PhD

Poster #A146
PROMs report sclerotherapy to be effective and beneficial in HHT-epistaxis
Pedro Lanca Gomes, MD

Poster #A147
Proposed algorithm for spontaneous cerebrospinal fluid leaks
Shreya Mandloi, BS

Poster #A148
Pyogenic granulomas in the head and neck
Michael Werner, MD, PhD

Poster #A149
Race in airway foreign bodies
Shivani Mehta, BS

PROGRAM AT A GLANCE

Poster #A150
Race in CRSwNP
Arthur Wu, MD, FARS

Poster #A151
Rare fungal sinusitis in a 61-year-old female
Ariana Shaari, BA

Poster #A152
Readability of AI generated rhinology patient education materials
Amani Kais, MD

Poster #A153
Real-time nasal endoscopic analysis with machine learning
Vinayak Ganeshan, MD

Poster #A154
Real-world impact of Mepolizumab on CRSwNP in biologic-naïve patients
Juan Carlos Cardet

Poster #A155
Recommendations for post-operative surveillance after resection of uncommon benign sinonasal tumors
Iulia Tapescu, PhD

Poster #A156
Recurrent inverted papilloma requiring rhinectomy, anterior skull base resection, & reconstruction
Joshua Smith, MD

Poster #A157
Regional density of and neuropeptide expression in cadaveric nasal submucosal glands
Madeline Goosmann, MD

Poster #A158
Resolution of pulmonary symptoms following CSF leak repair: A case report and literature review
Ann Birmingham, BA

Poster #A159
Revision rates in sinonasal endoscopic surgery
Daniel Karasik

Poster #A160
Rhinitis medicamentosa - RM10 questionnaire to assess symptoms and withdrawal treatment protocol
Tom Raz Yarkoni, MD

Poster #A161
Rhinologic procedural volume trends during and after the COVID-19 pandemic
Kevin Herrera, BS

Poster #A162
Rhinology open payments
Aatin Dhanda, BA

Poster #A163
Risk and outcomes of chronic rhinosinusitis after COVID-19 Infection
Miti Parikh, BA

Poster #A164
Risk factors associated with prolonged length of stay in CSF rhinorrhea repair
Tony Chung, MS

Poster #A165
Risk factors for inpatient treatment of orbital cellulitis
Amani Kais, MD

Poster #A166
Risk factors for mental health disorders in sinonasal malignancies
Rahul Guda, AB

Poster #A167
Risk of nasal septal perforation following nasal packing for epistaxis in the emergency department
Radhika Duggal, MA

Poster #A168
Role of the weekend effect in patients admitted for facial fractures
Aman Patel, BS

Poster #A169
Running on fumes: Volatile organic compounds (VOCs) and sinonasal symptomatology
Stella Lee, MD

Poster #A170
Saddle nose deformity and nasal septal perforation in GPA vs. non-GPA
Nitish Kumar, MS

Poster #A171
Sex in facial fractures
Akash Patel, BS

Poster #A172
SII in CRS: Investigating prognostic efficacy
Abdullah Memon, BS

Poster #A173
Sinonasal and ear malignancies and socioeconomic status
Henrique Ochoa Scussiatto, MD, PhD

Poster #A174
Sinonasal inverted papilloma – relevance of radiological anatomy in disease recurrence
Lalee Varghese, MS, DLO, DNB

Poster #A175
Sinonasal malignancies with orbit invasion
Seung Cheol Han, MD

Poster #A176
WITHDRAWN

Poster #A177
Sinus surgery and stroke in chronic rhinosinusitis
Anthony Saad, BA

Poster #A178
SinusMAP: A national peer mentorship program
Martin Desrosiers, MD

Poster #A179
SNOT-22 questionnaire completion trends
Luv Amin, BS

PROGRAM AT A GLANCE

Poster #A180
Society membership preferences of rhinology fellowship graduates: An educational survey
Corinna Levine, MD, MPH

Poster #A181
Socioeconomic deprivation and the incidence and healthcare utilization for chronic rhinosinusitis
Hong-Ho Yang, BS

Poster #A182
Socioeconomic impact of AIFRS
Jakob Fischer, MD

Poster #A183
Structured histopathology reporting in chronic rhinosinusitis
Giovanni Lampasona, MD

Poster #A184
Subjective outcomes after EMLP
Ying Piao Wang, MD, PhD

Poster #A185
Surgical management of moderate to severe epistaxis in HHT: System
Ezer Benamin, MD

Poster #A186
Surgical outcomes in combined rhinoplasty and endoscopic sinus surgery
Soraya Fereydooni

Poster #A187
SVI in sinonasal disease
Theresa Dickerson, MS

Poster #A188
The effect of BMI on treatment outcomes in chronic rhinosinusitis
Samuel Shing, BS, BA

Poster #A189
The first reported pediatric free flap reconstruction for advanced maxillary sinus osteoblastoma
Anthony Botros, MD, MBA

Poster #A190
The impact of bacterial infection and high tissue eosinophilia on outcomes of revision ESS
Catherine Policina, MD

Poster #A191
The impact of neo-osteogenesis on outcomes of revision ESS: A single-center experience
Catherine Policina, MD

Poster #A192
The ophthalmologic crescent blade in endonasal surgery
Firas Sbeih, MD

Poster #A193
The role of perceived social support in chronic rhinosinusitis
Anahita Nourmahnad, MD

Poster #A194
The tubes, an endoscopic technique for the comprehensive assessment
Osama Marglani

Poster #A195
Time is money: An analysis of cost drivers in ambulatory sinus surgery
David Lerner, MD

Poster #A196
To evaluate multiple clinical complications and management of chronic suppurative otitis media
Sheikh Sajjad Ali, MBBS, FCPS, FACS

Poster #A197
WITHDRAWN

Poster #A198
Transnasal endoscopic sphenopalatine artery ligation (TESPAL) in the Medicare population
Jake Stenzel, MS

Poster #A199
Treatments and outcomes in early-stage olfactory neuroblastoma
Minju Kim, MD

Poster #A200
Trends in number of women speakers
Soroush Farsi

Poster #A201
TRPM8 and rational inferior turbinate surgery
Francesca Viola, MD

Poster #A202
Tuning in: Synchrony of eustachian tube dysfunction and sinus disease severity in AERD patients
Stella Lee, MD

Poster #A203
Update on rhinitis of pregnancy
Randall Ow, MD, FARS

Poster #A204
Use of artificial intelligence to develop novel research ideas in chronic rhinosinusitis
John Behnke, MD

Poster #A205
Utility of modified frailty index for functional endoscopic sinus surgery outcomes
Trisha Shang, BA

Poster #A206
Utilization of biologics in US patients with CRSwNP in 2018-2023
Sandra Sze-jung Wu, MD

Poster #A207
Validating a cadaveric training model for endoscopic orbital tumor resection
Nada Ali, MD, MPH

Poster #A208
Validation of the trilayer graft technique for closure of anterior skull base defects
Jacquelyn Callander, MD

Poster #A209
Variability of spray characteristics of intranasal corticosteroids
Bingkai Chen

Poster #A210
Variation in national postoperative debridement patterns
Christopher Roxbury, MD, FARS

PROGRAM AT A GLANCE

Poster #A211
Weight loss in sinonasal malignancy
Aman Patel, BS

Poster #A212
World Trade Center exposure levels and incidence of sinonasal surgery
Horacio Romero Castillo, MD/MSCR Candidate

PROGRAM ABSTRACTS

Thursday, September 26, 2024

Residents Didactic Course
Splash 9 &10
12:00 pm – 5:00 pm
By Invitation Only

Residents Dissection Lab
Off-Site Location
12:00 pm – 5:00 pm
By Invitation Only

Residents Reception
Splash 11 & 12
6:00 pm – 7:30 pm
By Invitation Only

Friday, September 27, 2024

Residents Didactic Course
Splash 15 & 16
7:30 am – 12:00 pm
By Invitation Only

Residents Dissection Lab
Off-Site Location
8:00 am – 12:00 pm
By Invitation Only

Friday, September 27, 2024

7:00 am – 12:00 pm
Splash 9-12

7:00 am - 8:00 am
Board of Directors Breakfast

8:00 am - 12:00 pm
Board of Directors Meeting

Friday, September 27, 2024

1:00 pm – 5:00 pm
General Session
Sparkle Ballroom West

1:00 pm – 1:05 pm
Welcome
Kevin Welch, MD, FARS

1:05 pm – 1:19 pm
President's Address
Pete Batra, MD, FARS

Top Rated Abstracts – Basic Science Presentations

Moderators: Kara Detwiller, MD, FARS; Michael Kohanski, MD

1:20 pm – 1:27 pm
Stem cell therapy to treat Cystic Fibrosis rhinosinusitis
Dawn Bravo, PhD
Sriram Vaidyanathan, Institute at Nationwide Children's Hospital, Columbus, OH
Jeannette Baker, Scientist
Esmond Tsai, Research Assistant
Pooya Roozdor, Visiting Scholar
Zara M. Patel, MD, FARS
Peter H. Hwang, MD, FARS
Matthew H. Porteus, Professor
Jayakar V. Nayak, MD, PhD
Stanford University School of Medicine

Introduction:
Cystic fibrosis (CF) is a debilitating disease from mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene. Our group has shown successful restoration of CFTR function and cell differentiation using gene correction (gc) technology in ex vivo isolated upper airway basal stem cells (UABCs). We now share our progress with ex vivo to in vivo transplant (placement) and engraftment (survival) of human UABCs into the upper airways (UA) of mouse models, as a prelude to a human clinical trial of this candidate CF therapy.

Methods:
Recipient mice underwent approved methods of UA epithelial injury to create niches for UABC engraftment. UABCs from reporter mice co-expressing green fluorescent protein (GFP)

and luciferase (Luc) were tracked in vivo via bioluminescence imaging (BLI) and in vitro via confocal microscopy with quantitative histology. Gene corrected human UABCs (gc-UABCs) were isolated and tracked in vivo following transplant using an engineered CD19 tag.

Results:
UA epithelial disruption promoted stable mouse:mouse transplant of GFP/Luc UABCs, with durable engraftment via BLI over 9 months ($p=0.0001$). Transplanted mouse UABCs formed architecturally appropriate UA epithelium with all major cell types seen via histology. Importantly, human gcUABCs also showed stable engraftment, with ~90% of cells expressing CD19 and appropriate airway biomarkers. CFTR function was 42% relative to non-CF controls ($p=0.0085$).

Conclusions:
We share our experience with durable engraftment of murine and human CFTR-corrected UABCs into recipient animal models following airway stem cell transplant. Investigational new device (IND) discussions towards clinical trial are now underway with regulatory agencies.

1:28 pm – 1:35 pm
Murine model of nose-to-brain delivery of antibodies using minimally invasive nasal depot (MIND)
Valentina Di Francesco, PhD
Andy Chua, MD, FARS
Mansoor Amiji, University Distinguished Professor
Benjamin Bleier, MD, FARS
Northeastern University

Introduction:
Central nervous system (CNS) disease treatment is challenging due to the limited permeability of the blood-brain barrier (BBB). Neuroinflammation plays a crucial role in the etiology and progression of neurodegenerative diseases. We describe a Minimally Invasive Nasal Depot (MIND) technique leveraging endoscopic guided intranasal drug implantation to deliver an anti-IL-1b antibody for the treatment of neuroinflammation in a lipopolysaccharide (LPS) induced mouse model.

Methods:
An anti-IL-1b antibody (152 kDa) depot was delivered to the olfactory submucosa in a LPS induced neuroinflammation CD-1 mouse model (n=6/group). Pharmacodynamic endpoints were studied 2-12 hr post-LPS injection to determine the progression of inflammation and compared with IV controls.

Results:
LPS induced IL-1b upregulation within 2 hrs (Naïve vs LPS stimulation pg of IL-1b/mg tissue; Striatum: 4.0±0.7 vs 13.9±1.9, Hippocampus: 5.5±0.9vs16.1±2.3, $p\leq0.05$). MIND delivery of anti-IL-1b demonstrated a dose-dependent effect, with a maximal reduction of inflammatory markers at 10 mg/kg (MIND vs Control pg of IL-1b/mg tissue; Striatum 10.4±3.1vs3.4±0.9, Hippocampus 16.6±2.3 vs 4.3±1.1; $p\leq0.05$). Notably, no reduction in inflammation was observed with IV controls.

Conclusion:
Antibody delivery to the CNS represents a holy grail of neurodegenerative disease treatment but remains challenging as demonstrated by the controversial FDA of approval of several novel antibodies for Alzheimer's disease. Our data suggest that the MIND technique offers a highly translatable novel method to successfully and safely deliver high molecular weight therapeutics, including antibodies, directly to the brain for both neuroinflammatory and neurodegenerative disease.

1:36 pm – 1:43 pm
Deletion of Nrf2 enhances susceptibility to type 2 inflammation after short term PM2.5 exposure
Murugappan Ramanathan, Jr., MD
Asiana Gurung
Anuj Tharakan
Jayant Pinto, Dr.
Mengfei Chen
Johns Hopkins

Background:
Particulate Matter 2.5 (PM2.5) has been identified as one of the most pathogenic components of air pollution and has been associated with Chronic Rhinosinusitis (CRS) and Type 2 cytokine production. Nuclear erythroid 2-related factor 2 (Nrf2), an antioxidant transcription factor, is critical for protective responses against environmental exposures such as PM2.5. The goal of this study was to elucidate the role of Nrf2 in a short-term PM2.5 induced murine model of CRS.

PROGRAM ABSTRACTS

Methods:
C57BL/6 Wildtype (n=12) and Nrf2 deficient (n=12) mice were intranasally challenged with 400ug of PM2.5 or saline alone for 2 weeks. Heads were harvested and sectioned to perform IHC and sinonasal mucosa was dissected to perform qPCR.

Results:
Wildtype mice exhibited elevated IL5 sinonasal mucosal mRNA levels following short-term PM2.5 exposure ($p<0.05$). However, mice deficient in Nrf2 demonstrated higher levels of type 2 cytokines via qPCR: 4-fold increase in IL-5 and 11-fold increase in IL-13($p<0.005$). Nrf2 deficient mice also exhibited higher levels of epithelial derived cytokines IL25 and IL33 via qPCR ($p<0.05$). IHC demonstrated significantly higher levels of CD45 positive cells in the sinonasal and olfactory epithelium. Lastly, Giemsa staining also demonstrated higher expression of sinonasal eosinophils in the Nrf2 deficient mice.
Conclusion: This study demonstrates that the Nrf2 antioxidant pathway is critical in controlling short-term PM2.5 induced sinonasal Type 2 cytokine production and eosinophilia and may represent a potential therapeutic target to modulate the inflammatory response induced by air pollution. This is the first study to our knowledge to demonstrate that Nrf2 regulates PM2.5 induced rhinosinusitis in vivo.

1:44 pm – 1:51 pm
Sinus microbial community changes in chronic rhinosinusitis over one year
Tary Yin, MBChB, BMedSc(Hons), PhD ORL-HNS Resident
Brett Wagner Mackenzie, Honorary Lecturer
Fiona Radcliff, Senior Research Fellow
David Broderick, Research Assistant
Kristi Biswas, Senior Research Fellow
Richard Douglas, Professor
University of Auckland

The stability of the sinonasal microbiome over time in CRS yet to be described. This would have implications for designing and interpreting studies that seek to alter the microbiome for therapeutic purposes. We sought to define the changes in CRS bacterial communities by sampling middle meatus swabs on multiple occasions over one year. Swabs underwent DNA and RNA extraction, bacterial amplicon sequencing, and quantitative PCR (ddPCR).

Twenty two CRS patients completed follow-up, during which 166 samples were taken. These were categorised into pre-operative, recovery (within three months after surgery), and postoperative (three or more months after surgery) groups. These results were compared with those from four healthy controls sampled over two years in a previous study by our group.

The most abundant amplicon sequence variants (ASVs) in CRS were Corynebacterium accolens, Staphylococcus capitis, and Neisseriaceae. Beta diversity within subjects over time measured by mean Bray Curtis dissimilarity was 0.53 in pre-operative CRS patients and 0.45 in healthy controls, with no significant difference between groups. However, bacterial absolute abundance was significantly higher in CRS ($p < 0.001$). Corynebacterium dominated the healthy sinonasal microbiota and higher relative abundances of Corynebacterium macginleyi were seen in CRS samples associated with mild SNOT-22 scores compared to severe scores ($p < 0.0001$).

The CRS and healthy microbiota showed marked variation throughout the study. These results suggest that designing and interpreting intervention studies may be more complicated than anticipated, as the underlying microbiome may be less stable than previously thought.

1:52 pm – 1:59 pm
Therapeutic efficacy of the ciprofloxacin azithromycin sinus stent for P. aeruginosa sinusitis
Do Yeon Cho, MD
Dong Jin Lim, PhD
Justin Turner, MD, FARS
Jessica Grayson, MD
Bradford Woodworth, MD, FARS
Daniel Skinner, BS
University of Alabama at Birmingham

Introduction:
Topical therapeutic delivery of antibiotics by placing the high-dose ciprofloxacin azithromycin sinus stent (CASS) is an important strategy for treating recalcitrant CRS, bypassing systemic absorption. This study aims to evaluate the efficacy of the CASS in the rabbit model of sinusitis infected with Pseudmonas aeruginosa.

PROGRAM ABSTRACTS

Methods:
As described previously, a high-dose CASS (ciprofloxacin 2mg/azithromycin 5mg) was created. A total of 8 CASSs (4 shams, 4 CSSs) were placed unilaterally in rabbit maxillary sinuses via dorsal sinusotomy after inducing infection for one week with a PA14 strain of P. aeruginosa. Infected sinuses were irrigated with saline solutions (x3/week), and rabbits were assessed two weeks after stent insertion with nasal endoscopy, CT scan, histopathology, and sinus epithelial function.

Results:
After inducing PA14 infection for one week, significantly increased neutrophil counts ($p<0.01$) were noted in all rabbits with complete opacification of infected sinuses. Insertion of the CASSs in PA14-infected rabbits for two weeks resulted in significant improvement in sinusitis according to endoscopy scoring ($p< 0.05$) and CT scoring ($p-=0.02$). Histology revealed marked improvement in the submucosal thickness(um) in the CASS cohort compared to the sham cohort (Sham=137.6+/-3.7, CASS=89+/-5.0 $p<0.005$). No statistical difference was noted in epithelial thickness and function between the two cohorts.

Conclusions:
PA14-infected rabbit maxillary sinusitis significantly improved after the CASS was inserted for two weeks. The CASS is an exciting new method of topical delivery of two antibiotics that should translate well to human clinical trials based on the findings in this study.

2:00 pm – 2:05 pm
Q&A

2:05 pm – 2:15 pm
Awards Ceremony/IFAR Top Reviewers Recognition
Jean Kim, MD, FARS and Timothy Smith, MD, FARS, (Editor in Chief, IFAR)

2:15 pm – 3:00 pm
20th Annual David Kennedy Lectureship
Guest Speaker: Robert Naclerio, MD
“Drug Development: From Discovery to the Clinic”

3:00 pm – 3:30 pm
Break with Exhibitors in Sparkle Ballroom East

Top Rated Abstracts – Clinical Abstracts

Moderators: Edward Kuan, MD, FARS; Patricia Loftus, MD, FARS

3:30 pm – 3:37 pm
Steroid-eluting sinus stent versus steroid rinse for maintaining frontal sinus patency
Maxime Fieux, MD, PhD
Julia Noel, Dr.
Pooya Roozdor, Visiting Scholar
Caio Athayde Neves, Dr.
Carol Yan, MD
Matt Tyler, MD
Aakanksha Rathor, Dr.
Michael Chang , MD
Jayakar V. Nayak, MD, PhD
Peter Hwang, MD, FARS
Zara M. Patel, MD, FARS
Stanford University School of Medicine

Introduction:
Steroid rinses and steroid-eluting stents are both options for preventing postoperative stenosis after frontal sinus surgery. This study aimed to assess whether steroid-eluting stents offer added benefit over steroid rinses alone in postoperative healing and long-term frontal sinus patency.

Methods:
A randomized controlled trial enrolled patients with CRSwNP who underwent surgery for bilateral and equal frontal sinusitis after failing prior medical therapy. Each patient served as their own control, with each patient randomized to stent placement in either right or left frontal sinuses. Exclusion criteria included unequal frontal sinusitis, AERD, CF, PCD and immunocompromise. All patients used steroid rinses postoperatively. Scarring, edema, patency, and the need for additional treatments were assessed at 1 week, 3 weeks, 3 months, and 6 months postoperatively. Univariate and multivariate analyses were performed.

Results:
62 patients were enrolled. Postoperatively, scarring, edema, patency, and the need for further treatment were similar in both groups at 6 months ($p=0.878$; $p=0.688$; $p=0.817$; $p=1.00$ and $p=1.00$ respectively). Multivariable regression analysis identified time as an independent risk factor for scarring (OR=1.32, [1.03-1.71]) and patency (OR=1.39, [1.10-1.82]), while it was an independent protective factor for edema (OR=0.40, [0.32-0.49]). The steroid-eluting stent did not significantly affect this.

PROGRAM ABSTRACTS

Conclusion:
For CRSwNP without underlying disease factors, steroid-eluting stents may not add benefit over steroid rinses in reducing postoperative scarring and edema, improving long-term frontal sinus patency, or reducing the need for additional treatments, as long as patients know how to rinse effectively.

3:38 pm – 3:45 pm
Long-term outcomes of PRP injections for post-viral olfactory loss
Maxime Fieux, MD, PhD
Zara M. Patel, MD, FARS
Bruna Rafaela Castro, MD
Sophie Jang
Carol Yan, MD
Stanford University School of Medicine

Background:
Platelet-rich plasma (PRP) injections have previously been shown to benefit COVID-19 induced smell loss. It is unknown if that benefit is stable over time. The aim of this study was to assess outcomes at one year post-intervention.

Methods:
Prospective cohort study. Sixteen patients (10 PRP and 6 placebo) from the original PRP RCT, and a further sixteen patients from smell clinic who were a year out from initial treatment (6 PRP patients and 10 non-PRP) were enrolled. University of Pennsylvania Smell Identification Tests (UPSITs) and Visual Analog Scale (VAS) subjective scores were compared to initial scores.

Results:
There was no difference between groups with respect to age, gender, race, duration of smell loss prior to intervention, smoking or diabetes status, Charlson Comorbidity Index, presence of phantosmia or parosmia, specific virus, or baseline UPSIT score. The PRP group had a significantly higher change in UPSIT score at one year (p=0.001), a higher number of patients who met the MCID for the UPSIT (p=0.004), and a significantly greater change in VAS at one year (p=0.001), compared to those who did not receive injections. On multivariate logistic regression analysis no factors appeared to have a significant effect on these findings.

Conclusion:
PRP injections into the olfactory cleft now have both short term and long term data suggesting benefit in both subjective and psychophysical measures of smell, and improvements in both realms appear to continue to improve over time more significantly than in those who do not receive the injections.

3:46 pm – 3:53 pm
Pathologic dural invasion is associated with regional recurrence in olfactory neuroblastoma
Anthony Tang, BS
Nicholas Fung, MD
Joao Paulo Almeida
Pierre-Olivier Champagne
Peter Hwang, MD, FARS
Chirag Patel, MD, FARS
Carlos Pinheiro-Neto, MD, PhD
Brian Thorp, MD, FARS
Nathan Zwagerman
Mathew Geltzeiler, MD Garret Choby, MD, FARS
University of Pittsburgh School of Medicine

Objective:
Neck metastases are a poor prognostic factor in olfactory neuroblastoma (ONB). Pathologic evidence of dural invasion (pathDI) has been suggested to increase the risk of neck metastases, potentially due to invasion of dural lymphatics. We aim to evaluate the prognostic value of pathDI in predicting rates of neck recurrence using a large, multi-center database of ONB patients.

Data Sources:
This modern-era multi-center data originated from the retrospective review of electronic health records (EHRs) of all patients who presented with ONB between 2005 and 2021 at nine academic, tertiary care centers within North America.

Review Methods:
Clinicopathologic features including pathologic and MRI evidence of dural invasion, modified Kadish staging systems, margin status, treatment modalities, Hyams grading, follow-up time, and survival were collected for analysis.

Results:
Out of a total of 258 ONB patients, 189 patients met our inclusion criteria with reported pathologic data regarding dural invasion status. The 10-year neck recurrence-free survival (neck-RFS) was

85.7% (75.6-97.3) and 61.8% (47.9-79.8) for patients without and with pathDI, respectively (p=0.018). Cox multivariate analysis found pathDI to have a hazard ratio (HR) of 9.44 (95% CI; 1.01 – 88.1, p=0.049) for neck-RFS and 7.02 HR for any-site recurrence-free survival (95% CI 0.055 – 51.6, p=0.055).

Conclusion:
Patients with pathDI were more likely to recur regionally in the neck. Future studies exploring the benefit of elective neck dissection or radiation for patients with pathDI could improve disease management.

3:54 pm – 4:01 pm
The effects of allergen immunotherapy (AIT) post surgery in patients with central compartment atopic disease (CCAD)
Christian Meerwein, MD
Peta-Lee Sacks, Dr
Richard Harvey, MD, PhD

Objective:
Assess the effects of allergen immunotherapy (AIT) on patients with central compartment atopic disease (CCAD) and house dust mite (HDM) sensitization.

Material and Methods:
Retrospective cohort study of surgically treated allergically sensitized CRSwNP patients fulfilling the definition of CCAD. All patients were at least sensitized for HDM. Patients were divided into 2 groups based on whether they had AIT commenced as part of their surgical care. The primary endpoint was reformation of middle turbinate edema 12 months post-surgery. Secondary endpoint was the rhinologic domain of SNOT-22. Concomitant asthma, serum eosinophils (cellx10^9/L), tissue eosinophilia (%>100/HPF) and serum IgE (IU/mL) were also recorded.

Results:
86 CCAD patients were assessed (41±14yrs, 64% female). Allergen immunotherapy was applied in 37% (n=32) for 19±10 months. Reformation of middle turbinate edema was less common in patients with AIT compared to patients without AIT (41% v 76%, p=0.002). According to a preliminary analysis patients undergoing AIT showed a greater improvement in the rhinologic subdomain at 12 months. Age and sex was similar between AIT and non-AIT groups (41±14yrs v 44±13yrs, p=0.33, 69% v 65%, p=0.45). Other features of disease were also similar between groups (AIT v No-AIT): asthma (41% v 48%, p=0.33), SNOT-22 (43±21 v 45±23 p= 0.7), rhinologic domain (16±7 v 17±7 p=0.7), serum eosinophils (0.32±0.2 v 0.47±0.3 p=0.32), tissue eosinophilia (>100HPF, 46% v 38%, p=0.17) and IgE ((313±465 v 280±360, p=0.72).

Conclusion:
Concomitant AIT reduced reformation of middle turbinate edema post surgery in patients with presumed CCAD.

4:02 pm – 4:09 pm
AI prediction of IP conversion to SCC using a multi-institutional CT dataset
Farideh Hosseinzaden
Zara M. Patel, MD, FARS
Esmond Tsai, Research Assistant
George Liu
Maxime Fieux, MD, PhD
Lirit Levi, MD
Michael Chang, MD
Jayakar V. Nayak, MD, PhD
Peter Hwang, MD, FARS
Angela Yang, Medical Student
Dayoung Kim, Research Assistant
Stanford University School of Medicine

Background:
Sinonasal inverted papilloma (IP) has the potential to undergo malignant transformation to squamous cell carcinoma (IP-SCC), which is important to identify pre-operatively. We aimed to extend the prior development of deep learning models for predicting malignant transformation using a significantly larger multi-institutional dataset of computational tomography (CT) images.

Methods:
Patients at fifteen collaborating institutions with history of IP or IPSCC confirmed via pathology reports and available preoperative CT imaging. Representative axial cross sections from CT images were extracted and labeled as 2D images and used to train a 2D image classifier using Google Vertex AI's AutoML image classification tool. The model was evaluated on a holdout test dataset of images from patients whose data were not used for training.

PROGRAM ABSTRACTS

Results:
While in the process of still collecting and uploading several hundred patient datasets, CT image data from the first 112 patients (34 IPSCC, 78 IP) across 15 institutions were labeled to train and validate a deep learning image classification model. Evaluation on a hold-out test dataset demonstrated a test accuracy of 91%, sensitivity of 86%, and specificity of 95%.

Conclusion:
Automated ML prediction using pre-operative CT imaging alone predicted malignant transformation within IP with excellent accuracy, far exceeding prior predictions based on traditional machine learning and human expert prediction using CT alone, and approximating human expert prediction incorporating both CT+MRI. Further expansion of our multi-institutional dataset will continue to improve the model's performance, democratizing access to this highly accurate prediction algorithm to surgeons around the world.

4:10 pm – 4:15 am
Q&A

4:15 pm – 5:00 pm
Panel: CRS: Where are we Headed in Research and Patient Care?
Moderators: Robert Kern, MD, FARS, and Joshua Levy, MD, FARS
Panelists: Benjamin Bleier, MD, FARS; Amber Luong, MD, PhD, FARS; Bruce Tan, MD; Justin Turner, MD, FARS

5:00 pm – 5:10 pm
Maurice Cottle – Our Founder Tribute
Eugene Kern, MD

5:30 pm – 7:00 pm
President's Reception & Poster Reception
Ocean Promenade East and Sparkle Ballroom East

Saturday, September 28, 2024

8:00 am – 12:00 pm
Skull Base – Breakout 1
Sparkle Ballroom West

Session Chair: Satyan Sreenath, MD

8:00 am – 8:30 am
Panel: "Carve it Out or Melt it Away – Induction Chemotherapy versus Upfront Surgery for Sinonasal Malignancies"
Moderator: Edward Kuan, MD, FARS
Panelists: Nithin Adappa, MD, FARS; Raewyn Campbell, MD, FARS; Garret Choby, MD, FARS; Lauren North, MD

Moderators: Mindy Rabinowitz, MD, FARS; Kenneth Rodriguez, MD

8:30 am – 8:35 am
Validation of the sinonasal outcome test-22 in sinonasal malignancy
Cara Maya Fleseriu, BS
Garret Choby, MD, FARS
Daniel Beswick, MD, FARS
Sabrina L. Maoz, PhD
Peter Hwang, MD, FARS
Edward Kuan, MD, FARS
Nithin Adappa, MD, FARS
Mathew Geltzeiler, MD, FARS
Waleed Abuzeid MD
Carlos Pinheiro-Neto, MD, PhD
Eric W. Wang, MD, FARS
University of Pittsburgh

Background:
Quality of life(QOL) is impaired in patients with sinonasal malignancies(SNM). While the University of Washington Quality of Life(UWQOL) is a validated instrument in head and neck cancers including SNM, the Sinonasal Outcome Test(SNOT-22) has primarily been validated in inflammatory sinonasal disorders. This pilot study aims to validate SNOT-22 QOL in the SNM population.

Methods:
Through a prospective multicenter observational study(2007-2023) of patients with untreated SNM, baseline, pre-treatment and follow up every 3-6 months QOL instruments(SNOT-22, UWQOL) were obtained. Pearson correlations were calculated between UWQOL and SNOT-22 scores at multiple time points(baseline, 3, 12, 36 months) to analyze survey validity; missing scores were excluded.

PROGRAM ABSTRACTS

Results:
302 patients included. With all times points incorporated, SNOT-22 scores had moderate correlation with Overall(R=-0.58) and Physical(R=-0.58) UWQOL scores, and weak correlation with Health(R=-0.345) and Social(R=-0.316) UWQOL. We observed the same pattern across timepoints with SNOT-22 at baseline with Overall(R=-0.528), Physical(R=-0.502), Health(R=-0.378), Social(R=-0.321) UWQOL and strengthening at 12mo with Overall(R=-0.687), Physical(R=-0.668), Health(R=-0.314), Social(R=-0.297) UWQOL scores. All associations were significant($p<0.001$).

Conclusions:
In this first validation study, we show that Overall SNOT-22 has a moderate to strong correlation with Overall and Physical UWQOL across all time points analyzed, but a relatively weak correlation with UW Health and Social subdomains. Our findings demonstrate that Overall SNOT-22 has validity for assessing QOL in patients with SNM, however, use of both instruments is desirable to provide complementary information.

8:36 am – 8:41 am
Understanding endoscopy and imaging frequency for detection of sinonasal SCC recurrence
Saawan Patel, BBA
Isha Thapar, BA
Alan Workman, MD
David Lerner, MD
Jadyn Wilensky, BA
Jennifer Douglas, MD
Ching Lick Tong, MD
James Palmer, MD, FARS
Nithin Adappa, MD, FARS
Edward Kuan, MD, FARS
Michael Kohanski, MD, PhD

Background:
Recurrence of squamous cell carcinoma (SCC) of the sinonasal cavity follows an aggressive course, and early detection is paramount. This study analyzes patterns of recurrence and the impact of surveillance modalities in detection.

Methods:
We conducted a retrospective analysis of sinonasal SCC patients at two academic institutions from November 2009 to January 2023. Patient records were reviewed for demographics, tumor characteristics, and imaging/endoscopy frequency. Multivariable analyses were performed in RStudio.

Results:
Our multi-institutional cohort comprises of 98 patients with a median age of 63 years. 24 patients (24%) experienced recurrence, 19 of which occurred within 14.8 months post-treatment. Higher Charlson Comorbidity Index scores were associated with recurrence ($p=0.016$). Orbital, dural, or perineural involvement and p16 status were not associated with recurrence ($p=0.92$; $p=0.19$). Suspicious findings on imaging were strongly linked to confirmed recurrence ($p<0.001$). Patients with recurrence had undergone more endoscopies (Hazard Ratio [HR] 1.058, $p=0.001$), CT scans (HR 1.174, $p<0.001$), and PET scans (HR 1.951, $p<0.001$) annually compared to those without recurrence. The length of time between the most recent normal result and the detection of recurrence was a median of 8 months for PET/CT, contrasted with endoscopy (Mdn: 2.1 months) and MRI (Mdn: 4 months).

Conclusion:
Most sinonasal SCC recurrences were detected within 15 months post-treatment, indicating the importance of surveillance beyond the NCCN's 6-month guideline for symptom-free patients. Endoscopic examination had the shortest interval from normal to suspicious findings, followed by MRI and then PET/CT.

8:42 am – 8:47 am
Mutational burden assessment in sinonasal squamous cell carcinoma survival
Srivatsa Surya Vasudevan, MD, MS
Amber Cradeur, Medical Student
Madeline Polson, Medical Student
Cherie-Ann O. Nathan, Professor
Michael Yim, MD, FARS
LSU Health Sciences Center Shreveport

Background:
Survival rates for various histological types of sinonasal carcinoma have been reported. However, the mutational burden on sinonasal squamous cell carcinoma (SNSCC) survival is yet to be discerned.

Methods:
A comprehensive search was conducted across PubMed, Embase, Web of Science, and ScienceDirect databases from their inception to March 17, 2024, to identify studies examining survival outcomes in sinonasal squamous cell

carcinoma in relation to mutations. A meta-analysis using random-effects models was performed to estimate hazard ratios (HRs) and corresponding 95% confidence intervals (CIs) for survival rates.

Results:
Out of 1175 articles, 6 studies with a total of 365 SNSCC patients met the selection criteria. Of these, 30.9% of patients have confirmed mutational association. EGFR mutation was found to be significantly associated with decreased 5-year (HR: 1.47, 95% CI: 1.10 - 1.95, p = 0.008) and 10-year (HR: 1.32, 95% CI: 1.02 - 1.70, p = 0.037) overall survival (OS) in comparison to non-mutation SNSCC patients. Furthermore, TP53 mutation was significantly associated with a decreased 5-year OS (HR: 4.03, 95% CI: 1.02 - 15.41, p = 0.042). Sensitivity analysis revealed no significant changes in the overall survival rates. There was no significant difference in 1-year, 2-year, and 3-year OS between mutation and non-mutation groups.

Conclusion:
This systematic review and meta-analysis highlight the prognostic value of EGFR and TP53 mutation, showing an association with decreased 5-year and 10-year overall survival. Future cohort studies exploring the impact of other mutations on SNSCC survival rates can enrich prognostic models and tailor therapeutic interventions in the management of SNSCC.

8:48 am – 8:53 am
Orbital decompression in the biologic era: Is there still a need for surgery?
Daniel Gorelik, MD, MPH
Najm Khan, Clinical Research Fellow
Masayoshi Takashima, MD, FARS
Amina Malik, Associate Professor
Omar Ahmed, MD, FARS
Houston Methodist Hospital

Introduction:
Thyroid eye disease (TED) is an autoimmune condition of the orbit that can lead to proptosis and vision loss. In severe disease, surgical decompression may be required. In January 2020, teprotumumab became the first medication approved by the FDA specifically for the treatment of TED. This study explores changes in the incidence of surgery for TED patients following teprotumumab approval.

Methods:
A cross-sectional analysis was performed using 2014-2023 data from TriNetx, a population database made up of 63 large healthcare organizations. Patients with ICD-10 codes related to TED were included. Univariate analysis evaluated trends in orbital decompression pre- and post-approval.

Results:
18,844 patients were included, of which 8,740 (46.4%) were in the post-approval period. The prevalence of orbital decompression over the study period was 11.9%. Patients were significantly less likely to undergo surgery in the post-approval period (RR=0.59, 95% CI [0.54-0.64]; p<.0001). To account for decreased incidence related to COVID-19 restrictions, patients undergoing cataract surgery were also examined and found to have an overall increase in incidence over the two time periods. There were no significant demographic differences between study groups except age (p>0.05). Compared to patients pre-approval, those undergoing surgical decompression after approval were younger (57.5 vs. 59.7), and less likely to have glaucoma or be smokers (p<0.05).

Conclusion:
Although surgical incidence decreased significantly following teprotumumab approval, there is still a role for orbital decompression. This is the first population-based study to evaluate incidence in decompression following the introduction of directed biologic therapy.

8:54 am – 9:00 am
Q&A

Moderators: Mathew Geltzeiler, MD, FARS; Ashleigh Halderman, MD, FARS

9:00 am – 9:05 am
Retrobulbar amphotericin B injections versus orbital exenteration in AIFRS outcomes
Nikitha Kosaraju, BA
Jakob Fischer, MD
Connie M. Sears
Manwel T. Labib
Reem Karmouta
Ashley S. Shirriff
Maxwell Weng
Katherine M. Lucarelli
Jeffrey Suh, MD, FARS
Daniel B. Rootman

PROGRAM ABSTRACTS

Marilene Wang, MD, FARS
David Geffen School of Medicine at UCLA

Background:
Acute invasive fungal rhinosinusitis (AIFRS) is a rare, life-threatening disease. Transcutaneous retrobulbar amphotericin B (TRAMB) is a treatment that may prevent AIFRS from invading the orbit, sparing the need for orbital exenteration.

Methods:
Patients treated for a diagnosis of AIFRS between 2014 and 2024 at a tertiary rhinology center underwent retrospective chart review examining demographic data, disease extent, treatment course, and outcomes. The primary objective was to evaluate differences in patient outcomes based on the decision to pursue TRAMB vs orbital exenteration.

Results:
53 patients were included, 20 (37.7%) were treated with TRAMB and 9 (17.0%) with orbital exenteration. Three (33.3%) of orbital exenteration patients received TRAMB injections prior to the decision to proceed with exenteration. The TRAMB cohort was 56.6±17.8 years, mostly female (12,60%) and diabetic (13,65%). TRAMB patients received an average of 4.7±4.4 injections of 3.5mg of amphotericin B. The mortality rate for this cohort was 50%(n=10). The orbital exenteration cohort was 59.2±11.7 years, predominately male (6,66.6%) and diabetic (7,77.7%). The mortality rate for this cohort was 55.6%(n=5). Among surviving patients with TRAMB, 4 (40%) had at least light perception in the affected eye. Patients treated with TRAMB, compared to exenteration, had lower mortality (OR0.80, 95%CI:0.16-3.88).

Conclusions:
TRAMB demonstrated no worse mortality outcomes than orbital exenteration in the management of AIFRS invading the orbit. Additionally, 40% of patients were able to retain at least light perception in the affected eye. TRAMB should be considered in the management of AIFRS. Further analysis with a larger patient cohort is warranted.

9:06 am – 9:11 am

Assessing complications of functional endoscopic sinus surgery in a large national database

Justin Lau
David Kaelber, Professor of Internal Medicine
Mohamad Chaaban, MD, FARS

Introduction:
Functional endoscopic sinus surgery (FESS) is a relatively safe procedure with low rates of complications. The goal of this study is to evaluate the risk of FESS complications in chronic rhinosinusitis (CRS) patients in a large national database in patients with associated medical comorbidities.

Methods:
TriNetX was queried for patients ≥18 years with a diagnosis of CRS and FESS with and without hypertension (HTN), type 2 diabetes (DM), and obesity on 1/27/24. The 90-day post-surgical outcomes recorded were general anesthetic risks, sinus surgery specific risks including orbital, skull-base, and epistaxis. We conducted our analysis on the obesity cohort with and without propensity matching for obesity related comorbidities (HTN, DM, obstructive sleep apnea).

Results:
The HTN, DM, and obesity cohorts contained 22516, 8436, and 8849 patients respectively. Compared to control, the HTN, DM, and obesity cohorts had increased risk for any sinus surgery specific complications (OR: 1.50, CI: 1.34-1.67), (OR: 1.61, CI: 1.36-1.92), and (OR: 1.43, CI: 1.19-1.72), and increased risk for mortality (OR: 2.65, CI: 2.09-3.38), (OR: 3.91, CI: 2.66-5.74), and (OR: 2.38, CI: 1.56-2.63), respectively. Adjusted odds ratio after propensity matching for the three related comorbidities in the obesity cohort showed increased risk for skull base comorbidities (OR: 1.70, CI: 1.07-2.72) and arrhythmia (OR: 1.44. CI: 1.05-1.97).

Conclusion:
CRS patients with medical comorbidities have increased risk of sinus specific surgical complications. Patients with obesity had increased risk of skull base complications from FESS even after controlling for obesity related comorbidities. Further studies are needed to expand on these findings.

PROGRAM ABSTRACTS

9:12 am – 9:17 am

Extended approaches to the maxillary sinus and Empty Nose Syndrome

Oloruntobi Rotimi, MBBS
Isabelle Williams
Catherine Rennie
Rishi Sharma
Saleh Okhovat, Mr.
Peter J. Wormald, Professor
Neil Tan, MBBS, PhD
University College London Hospitals NHS Foundation Trust

Introduction:
Empty nose syndrome (ENS) is an acquired condition that is associated with overzealous resection of the inferior turbinates. The purpose of this study was to examine for evidence of ENS in patients undergoing extended endoscopic approaches to the maxillary sinus.

Methods:
This retrospective study included 90 patients who underwent endoscopic surgery in 5 tertiary centres within the UK and Australia; 41 extended approaches for benign neoplastic disease (31 radical medial maxillectomy (RMM), 10 modified medial maxillectomy (MMM)/ prelacrimal (PLA)) and a control cohort of 49 patients who underwent Endoscopic Sinus Surgery (ESS) for Chronic Rhinosinusitis with no turbinate resection. Outcome measures include the Empty Nose Syndrome 6-item Questionnaire (ENS6Q) and 22-Item Sino-Nasal Outcome Test (SNOT-22).

Results:
There was no statistically significant difference in ENS6Q scores in patients who underwent extended approaches to the maxillary sinus compared to those undergoing turbinate preserving ESS. Furthermore, there was no difference in ENS6Q scores in patients who underwent RMM versus inferior turbinate preserving MMA or PLA. (Mean ENS6Q scores: RMM vs MMM/PLA 3.2 vs 3.9, p=0.69; FESS vs RMM 3.6 vs 3.2, p= 0.78; ESS vs MMM/PLA 3.6 vs 3.9, p=0.93). There was no statistically significant difference in SNOT-22 scores between any of the cohorts.

Conclusion:
Extended approaches to the maxillary sinus do not lead to an increased risk of ENS, even with turbinate resection approaches. They can be safely performed for the resection of benign neoplastic disease.

9:18 am – 9:23 am

Upfront Draf III – Cost-effective in the long run?

David Lerner, MD
Chau Phung
Alan Workman, MD
Saawan Patel
Jennifer Douglas, MD
Michael Kohanski, MD, PhD
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
University of Pennsylvania

Introduction:
Draf III procedures are generally considered to be time- and supply-intensive compared to standard functional endoscopic sinus surgery (FESS). We seek to quantify the cost of an upfront Draf III procedure compared to standard FESS and targeted Draf III procedures, as well as examine time- and supply-related cost factors.
Methods: We performed a retrospective analysis of inflammatory sinus surgeries at a tertiary care medical center from July 2021 to July 2023. The medical record was reviewed for patient factors and cost variables, and multivariable analysis was performed.

Results:
Three hundred and fifty patients were included in analysis with a mean age of 50.6 years. One hundred and twenty-nine patients underwent a Draf III, 99 of whom (76.7%) underwent a Draf III as part of a full FESS whereas 30 (23.3%) underwent a targeted Draf III during a revision FESS. The average total cost for a full FESS with Draf III (n=67) was $10866.1, compared to $9923.1 for a targeted Draf III (n=18), and $9954.8 for a standard FESS (n=221). Among Draf III procedures, operating room and supply costs represented 62.4% ($5972.6) and 17.3% ($1653.3) of total costs, respectively, compared to 54.8% and 26.8% for standard FESS. Direct costs are significantly associated with operating room time (p<0.001, $20.9/minute).

Conclusions:
Hospital costs associated with a Draf III FESS are driven primarily by operating room time costs, to a greater degree even than for a standard FESS. Costs associated with targeted Draf III procedures are similar to those for a full FESS with Draf III, suggesting that an upfront Draf III may represent a relatively cost-effective treatment approach for patients at high risk of recurrent frontal disease.

PROGRAM ABSTRACTS

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: Approaches to the Lateral Frontal Sinus
Moderator: Dennis Tang, MD, FARS
Panelists: Nyssa Farrell, MD; Sanjeet Rangarajan, MD, FARS; Raj Sindwani, MD, FARS; Bradford Woodworth, MD, FARS

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: David Gudis, MD, FARS; Kibwei McKinney, MD

10:15 am – 10:20 am
Maxillary antrostomy alone versus complete sinus surgery for odontogenic sinusitis
John Craig, MD, FARS
Alberto Saibene, MD
Nithin Adappa, MD, FARS
Jennifer Douglas, MD
Jacob Eide, MD
Michael Kohanski, MD, PhD
Rijul Kshirsagar, MD
Daniel Lee, MD
Chadi Makary, MD, FARS
Amrita Ray, MD, FARS
Edward Kuan, MD, FARS
Henry Ford Hospital

Background:
Endoscopic sinus surgery (ESS) is often necessary when managing odontogenic sinusitis (ODS), but ESS extent for ODS with extramaxillary sinus involvement has been incompletely studied. This study compared outcomes after maxillary antrostomy (MA) alone versus complete ESS for ODS with frontal sinus involvement.

Methods:
A multicenter prospective cohort study was conducted on ODS patients who underwent ESS when computed tomography demonstrated maxillary, ethmoid, and frontal sinus opacification. Multiple preoperative and postoperative variables were recorded, including 22-item sinonasal outcome tests (SNOT-22) and endoscopic findings. Ultimate and time to SNOT-22 and endoscopic resolution were compared between patients who underwent MA versus complete ESS. A prospective power analysis was also performed for sample size determination.

Results:
Of 70 patients, mean age was 59.2 years, and 55.7% were male. Thirty-five underwent MA, and 35 had complete ESS. At first postoperative visits (mean 9.2 days), ethmoid sinus purulence was less likely with complete ESS compared to MA (2.9% versus 28.6%, p=0.006). However, time to purulence resolution became non-significantly different by 6 weeks postoperatively (p=0.158). Both groups achieved significant reductions in SNOT-22 at first and final postoperative visits ($p<0.05$), with no significant difference in time to SNOT-22 reduction between groups (p=0.175).

Conclusions:
For ODS with frontal sinus involvement, MA and complete ESS both resulted in rapid and long-term symptomatic resolution, and sinus purulence ultimately resolved in all patients. Complete ESS is not necessary for all ODS cases with frontal sinus extension, though may speed resolution in some cases.

10:21 am – 10:26 am
Long-term implications of short term outcomes after ESS in CRS patients
Aditi Agarwal, MD, MS
Zhidi Luo, Biostatistician
Siyuan Dong, Statistical Analyst
Julia Huang, Research Study Coordinator
David Conley, MD, FARS
Kevin Welch, MD, FARS
Robert Kern, MD, FARS
Stephanie Smith, MD
Lutfiyya Muhammad, Assistant Professor
Bruce Tan, MD
Northwestern University

Rationale:
While studies show improvement in radiographic and symptom measures 6-12 months after ESS, impact of short-term outcomes on long-term outcomes remains unclear. We investigate stability and prognostic ability of short term radiographic and symptom outcomes on long term outcomes.

Methods:
113 radiographic Lund-Mackay (LM) and patient-reported SNOT22 scores were collected from CRS patients at two time points, short term (6-12 months, V1) and long term (18-60 months, V2)

after ESS. Longitudinal analyses were done using Spearman correlations and Wilcoxon paired rank tests of matched V1 and V2 outcomes. We utilized published normative thresholds LM<4 and SNOT22<17 to ascertain radiographic and symptomatic normalization and compared frequency of categorization using chi-square test. $p<0.05$ was considered statistically significant.

Results:
V1 LM and SNOT-22 had significant positive moderate correlation with V2 LM and SNOT22($r=0.49$, $p<0.0001$; $r=0.59$, $p<0.0001$ respectively) but mean LM and SNOT22 scores were stable. There were no significant correlations between V1 LM and V2 SNOT22. Of patients who achieved SNOT22 normalization at V1, 67% stayed remained symptom-free and 38% transitioned to symptomatic group ($X2$ 14.91, $df=1$, $p<0.0001$). Similarly, for patients with normal LM scores at V1, 67% stayed in their group and 33% switched to presence of radiographic severity group ($X2$ 21.22, $df=1$, $p<0.0001$). Patients who achieved normal SNOT22 and LM at V1 significantly predicted symptom score at V2 with 68% staying within their group at V2. ($X2$ 15.50, $df=3$, $p<0.0014$).

Conclusion:
Short term radiographic and patient reported outcomes are reasonably stable and predictive of long-term radiographic and patient reported outcomes respectively

10:27 am – 10:32 am
The effect of anticoagulant therapy on endoscopic sinus surgery postoperative outcomes
Kevin Herrera, BS
Miti Parikh, Medical Student
Kevin Hur, MD
Keck School of Medicine of USC

Background:
Anticoagulant therapy (ACT) is known to increase the risk of unfavorable surgical outcomes. However, how ACT specifically impacts endoscopic sinus surgery (ESS) is currently unknown. We aimed to elucidate the impact of ACT on postoperative ESS outcomes.

Methods:
Using the TriNetX US collaborative database, patients 18 years and older undergoing ESS for chronic rhinosinusitis were stratified by ACT history and retrospectively followed for 5 years postoperatively. Patients with a history of sinonasal malignancy or hereditary coagulation defects were excluded. Cohorts were propensity-score matched by demographics, polyp status, history of any malignancy, liver cirrhosis, hypertension, and antiplatelet therapy. Outcomes included hospital admission, emergency department (ED) visit, CSF leak, epistaxis, epistaxis control procedure, anemia, and revision ESS. Measures of association and cohort statistics were calculated.

Results:
Propensity score matching yielded 7,288 patients into two statistically similar cohorts. At 1 week post-ESS the ACT cohort had a higher risk of hospital admission [OR 2.01; 95%CI (1.82,2.21)], CSF leak [OR 9.90; 95%CI (5.70,17.20)], and anemia [OR 12.1; 95%CI (8.65,16.93)] when compared to the non-ACT cohort. At one month post-ESS, ACT patients were at higher risk of presenting to the ED [OR 2.95; 95%CI (2.31,3.75)], epistaxis [OR 1.91; 95%CI (1.52,2.40)], and subsequent epistaxis control procedures [OR 2.28; 95%CI (1.49,3.50)]. The ACT cohort was also at a higher risk for revision ESS within five years [OR 2.07; 95%CI (1.77,2.41)].

Conclusion:
ACT is associated with higher healthcare utilization and postoperative complications after ESS for chronic rhinosinusitis.

10:33 am – 10:38 am
Assessing the impact of GLP-1R agonists in post-sinus surgery management
David Hoying, BS
Kaelan Wong, Medical Student
David Kaelber, Professor of Internal Medicine
Mohamad Chaaban, MD, FARS
Case Western Reserve University School of Medicine

Introduction:
Emerging evidence suggests a potential association between CRS and obesity. With the increasing utilization of weight loss medications in the management of obesity, we aimed to assess the incidence of revision functional endoscopic sinus surgery (FESS) and first-time biologic prescriptions in CRS patients with obesity who have undergone at least one prior FESS with or without a GLP-1R agonist prescription.

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Methods:
We queried the TriNetX Analytics platform for all adult CRS patients with obesity who have undergone at least one prior FESS. The incidence of revision surgery and first-time biologic prescriptions (dupilumab, mepolizumab, omalizumab) in this population within a 1 and 5-year follow-up period were assessed, comparing those with and without GLP-1R agonist prescriptions. The GLP-1R agonist had to be prescribed at least one day after primary FESS. We performed 1:1 propensity score matching between cohorts for age at index, female sex, and Type 2 diabetes mellitus.

Results:
After 1:1 propensity matching, there was a total of 1,182 patients in each patient group. The GLP-1R cohort had a significantly reduced incidence of revision FESS compared to the non-GLP-1R cohort at 1-year (RR: 0.522, 95% CI: 0.321-0.848) and 5-year (RR: 0.513, 95% CI: 0.352-0.748) follow-up periods. Conversely, the GLP-1R cohort had a reduced number of first-time prescriptions of biologics compared to the non-GLP-1R cohort at 1 and 5 years; however, these results were not statistically significant.

Conclusion:
Our results indicate that a GLP-1R agonist prescription after sinus surgery in CRS patients with obesity is associated with a reduced risk of revision FESS within one and five years of the prescription.

10:39 am – 10:45 am
Q&A

Moderators: Elisa Illing, MD, FARS; Peter Papagiannopoulos, MD

10:45 am – 10:50 am
Autologous vs synthetic inlay grafts have comparable skull base reconstructive outcomes
Theodore Nguyen, MD
Arash Abiri, PhD
Saawan Patel
Thomas Truong, MD
David Lerner, MD
Alan Workman, MD
Nithin Adappa, MD
John Craig, MD
James Palmer, MD
Peter Papagiannopoulos, MD
Edward Kuan, MD, FARS
University of California, Irvine

Background:
Skull base reconstruction commonly utilizes grafting material to reconstitute dura and mucosa to prevent postoperative cerebrospinal fluid (CSF) leak. These materials may be classified as autologous (those originating from the patient), or synthetic (man-made or processed grafts). There is currently a paucity of literature studying skull base reconstruction outcomes between autologous vs synthetic grafts.

Methods:
Data was collected from patients undergoing endoscopic skull base surgery resulting in high-flow intraoperative CSF leaks with primary reconstruction at seven academic centers. Outcomes related to inlay reconstruction using autologous vs synthetic grafts were compared. Logistic regression on propensity score-matched (PSM) patients were performed to identify the effect of graft type on postoperative CSF leak rates.

Results:
188 patients (59.0% female) with an average age of 53.8 ± 15.0 years were included for analysis. The most common pathologies were pituitary adenoma (30.0%), craniopharyngioma (21.6%), and meningioma (20.9%). 90 (55.9%) patients had inlay reconstructions utilizing only synthetic grafts. 18 (9.6%) patients experienced a postoperative CSF leak. Following PSM and controlling for defect site and size, pathology, and nasoseptal flap use, there was no difference in postoperative CSF leak rates between autologous

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vs synthetic inlay reconstructions (p>0.05). However, multivariate regression demonstrated that synthetic graft use was an independent predictor of reconstructive success (OR 0.216, p=0.049).

Conclusion:
Autologous vs. synthetic inlay grafts appear to afford comparable rates of reconstructive success, which highlights the importance of meticulous technique as opposed to specific graft.

10:51 am – 10:56 am
Social vulnerability and quality of life before and after endoscopic skull base surgery
Jonathan Pang, MS
Alicia Wells, BS
Zoe Hsiao, BA
Arash Abiri, PhD
Theodore Nguyen, MD
Frank Hsu, MD, PhD
Edward Kuan, MD, FARS
University of California, Irvine

Background:
Neighborhood-level characteristics correlating with social vulnerability may affect the pre- and postoperative course in endoscopic skull base surgery (ESBS). We evaluate quality of life (QoL) per Sinonasal Outcome Test (SNOT-22) scores in ESBS patients and identify sociodemographic influences via the Social Vulnerability Index (SVI).

Methods:
SNOT-22 surveys were collected pre- and postoperatively at <1 month (ST), 1-3 months (MT), and 6-9 months (LT) for consecutive adult patients undergoing ESBS and primary repair between July 2018 and December 2023 at a single tertiary academic center. Independent variables included patient race/ethnicity, insurance status, and statewide composite and subtheme SVI where higher percentile scores indicated greater social vulnerability.

Results:
270 patients were included—55.9% (151/270) identified of nonwhite race, 35.6% (96/270) identified as Hispanic/Latinx, and 53.3% (138/259) held governmental insurance. Mean composite SVI percentile was 0.501±0.285. Preoperative and postoperative ST, MT, and LT mean SNOT-22 scores were 23.95±19.16, 31.33±19.56, 21.74±18.80, and 17.95±16.31, respectively. Higher minority status/language SVI percentile associated with lower preoperative overall (Kendall's τb=-0.135, p=0.025) and sleep domain (-0.146, p=0.016) SNOT-22 scores. However, higher composite SVI associated with higher MT nasal domain scores (0.104, p=0.045) and higher household characteristics SVI correlated with higher LT emotion domain scores (0.171, p=0.045).

Conclusion:
Patient-reported symptomatic burden may vary by social vulnerability composite and subtheme metrics, warranting further investigation into the impact of neighborhood-level characteristics on ESBS QoL outcomes.

10:57 am – 11:02 am
Factors influencing CSF leak timing after ESBS
Ashleigh Halderman, MD
Nathaniel Breslin
Alan Workman, MD
Theodore Nguyen, MD
David Lerner, MD
Edward Kuan, MD, MBA, FARS
Sei Chung, MD
Garret Choby, MD, FARS
Mathew Geltzeiler, MD, FARS
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
University of Texas Southwestern Medical Center

Introduction:
Considerable work has been done to delineate risk factors for cerebrospinal fluid (CSF) leak after endoscopic skull base surgery (ESBS). Little work has been done to evaluate factors that influence the timing of CSF leaks after ESBS. The timing of when CSF leaks may occur has important implications on nasal care and activity restrictions. The aim of this study was to evaluate all CSF leaks after ESBS to determine factors that influence timing of post-op CSF leak.

Methods:
Data were collected retrospectively on patients with CSF leak after ESBS at 3 institutions from 2010-current. Variables including demographics, tumor/defect dimensions, pathology, defect location, reconstruction, timing of CSF leak, management of leak, and rates of meningitis were collected.

Results:
68 leaks in 65 patients were analyzed. The median post-operative day (POD) CSF leak occurred was 3. Early leaks were defined as 0-3

PROGRAM ABSTRACTS

(n=36) days and late >3 days (n=32) post-op. Timing of leak was not influenced by age, gender, BMI, tumor size, or pathology. The POD leak in patients with elevated intracranial pressure (ICP) was significantly later than those with normal ICP (12 vs 4.98, p=0.008, 95% CI 1.86 to 12.2). High grade intraop leaks were associated with late post-op leaks versus low grade leaks (p= 0.011) except for sellar defects where high grade leaks were more likely to occur early than late (p=0.018). Overall, sellar leaks presented significantly earlier than non-sellar leaks (p=0.0008) and suprasellar leaks presented significantly later than non-suprasellar leaks (0.0021).

Conclusion:
Intraoperative grade of leak, defect location, and elevated ICP appear to influence the timing of post-op CSF leak occurrence after ESBS.

11:03 am – 11:08 am
Unilateral versus bilateral resection of olfactory neuroblastoma
Arash Abiri, PhD
Theodore Nguyen
Arifeen Rahman,AB
Haidee Chen, Medical Student
Brandon Rosvall, MD
Michael Sabbaj
Shannon Wu
Alan Workman MD
David Lerner, MD
Edward Kuan, MD, FARS
University of California, Irvine

Background: Olfactory neuroblastoma (ONB) is a rare sinonasal malignancy primarily treated with surgery. For primaries arising from the olfactory area, traditional surgical treatment has involved transcribriform resection of the anterior cranial fossa. Surgery can be performed through a unilateral or bilateral approach; however, there are currently no studies comparing outcomes between the two.
Methods: Prospective and retrospective data on patients diagnosed with primary ONB were collected from a multicenter registry involving eight academic sites. Multivariable Cox proportional hazards regression assessed for overall survival. Logistic regression on propensity score-matched (PSM) patients identified the effect of surgical approach (unilateral vs. bilateral resection) on tumor recurrence and postoperative CSF leak.

Results: 168 ONB patients (50.6% female) with an average age of 53.6 ± 15.9 years were analyzed. 133 (82.6%) patients had a unilateral tumor and 77 (48.4%) underwent unilateral resection. 31.1% were Kadish A/B, 58.3% were Kadish C, and 10.6% were Kadish D. On multivariable Cox regression, unilateral resection did not significantly affect survival (HR 2.237; p=0.566). Following PSM of age, sex, and Kadish stage, logistic regression showed that unilateral resection was not significantly associated with tumor recurrence (OR 1.199; p=0.704) or postoperative CSF leak (OR 3.231; p=0.319).
Conclusions: The decision for unilateral vs bilateral resection for unilateral ONB showed no significant effect on survival, recurrence, or the incidence of postoperative CSF leaks. Oncologic outcomes may be comparable even when resection is tailored based on individual patient and tumor characteristics.

11:09 am – 11:15 am
Q&A

11:15 am – 12:00 pm
Panel: Evolving Principles for Systemic Therapies in Management of Sinonasal Malignancy
Moderator: Mathew Geltzeiler, MD, FARS
Panelists: Nabil Saba, MD; Shirley Su, MD; Eric Wang, MD, FARS

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

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Saturday, September 28, 2024

8:00 am – 12:00 pm
CRS - Mechanisms and Outcomes
Breakout 2
Splash 9 & 10

Session Chair: Michael Marino, MD, FARS

8:00 am – 8:30 am
Panel: CRS in the Immunosuppressed Patient: A Decision-Making Conundrum
Moderator: Angela Donaldson, MD, FARS
Panelists: Roy Casiano, MD, FARS; Jacqueline Squire, MD; Bobby Tajudeen, MD, FARS
Moderators: Angela Donaldson, MD, FARS; Bobby Tajudeen, MD, FARS

8:30 am – 8:35 am
Elevated serum uric acid levels correlate with CRSwNP recurrence
Shaobing Xie, MD, PhD
Hua Zhang, Professor
Zhihai Xie, Professor
Weihong Jiang, Professor
Peisong Gao, Professor
Xiangya Hospital of Central South University

The specific metabolic alterations in the serum of recurrent chronic rhinosinusitis with nasal polyps (CRSwNP) patients remain unknown. This study aims to explore the serum metabolomic profiles of recurrent CRSwNP and identify potential predictive biomarkers. A prospective, single-center study was conducted on CRSwNP patients, serum samples were subjected to untargeted metabolomic profiling. Patients were followed up for over 2 years and categorized into recurrence and non-recurrence groups. Metabolite differences between the two groups were compared, and the identified differentially regulated metabolites were subsequently validated. A total of 67 CRSwNP patients completed the follow-up schedule, with 47 patients classified into the non-recurrence group and 20 patients categorized into the recurrence group. Significant differences were found in the metabolomic profiles between the two groups, and serum uric acid (SUA) showed promising predictive potential for postoperative recurrence. A validation cohort comprising 398 non-recurrent and 142 recurrent CRSwNP patients was recruited, and a significant elevation in SUA levels was observed in the recurrent cases. Patients were stratified into tertiles based on the distribution of baseline SUA levels. Multivariate Cox regression analysis showed that higher tertiles of SUA were associated with an increased risk of CRSwNP recurrence compared to lower tertiles, even after adjusting for potential confounding factors. Serum metabolic signatures might predict postoperative recurrence in CRSwNP patients. Increased SUA concentrations were found to be associated with a higher risk of future postoperative recurrence in CRSwNP, independent of traditional risk factors.

8:36 am – 8:41 am
Predictors for class switching in eCRS
Peta-Lee Sacks, MD, FRACS
Christian Meerwein, Rhinology Fellow
Larry Kalish, A/Prof
Raewyn Campbell, MD, FARS
Christine Choy
Richard Harvey, MD, PhD

Type 2 inflammation dominates eosinophilic CRS (eCRS) and adult onset asthma. IL4, 5 and 13 are prominent disease mediators. Disease control can be achieved with biologic therapies. However, despite some patients entering remission others experience poor control.

Aim:
Describe eCRS patients treated with anti-IL-5 antibody(benralizumab) and assess characteristics between responders and those requiring class switching to anti-IL-4/13(dupilumab).

Method:
A retrospective cohort study was performed on consecutive adult patients with eCRS and asthma who had commenced benralizumab. EPOS2020 disease control was defined and partly control/uncontrolled were switched to Dupilumab. Baseline and post-treatment characteristics including age, sex, SNOT22, ACQ score and serum/tissue eosinophilia were assessed. Disease control post-class switching was reassessed. Prognostic factors to predict incomplete response to anit-IL5 therapy were sought.

Result:
54 patients were assessed(49.6±11.9yrs,43.2%female). Incomplete response to anti-IL-5 and dupilumab change was required in 54.1%. Incomplete responders were younger(45.9±11.1v54.0±12.0yrs,p=0.04) and had higher baseline SNOT22(2.8±0.8v2.2±1.1,p=0.07). Baseline ACQ

scores and eosinophil count (0.6±0.3v0.7±0.5,p=0.30) and were similar between groups. Despite incomplete responders, all patients had reduction of eosinophils(0.7±0.1v 0.0±0.0,p<0.01). For incomplete responders, on dupilumab, 92% responded with improved ACQ(2.7±0.7v0.9±0.7,p<0.01).

Conclusion:
Eosinophilia nor its reduction predicted a non-responder group to anti-IL5 therapy.While the eosinophil population may be a good marker for the CRS phenotype seen in nasal polyps its unlikely to be the cell population driving the disease process.

8:42 am – 8:47 am
Sequencing-based viral identification in CRSwNP
Martin Desrosiers, MD
Audrey Pelletier, Scientist
Leandra Mfuna Endam, Coordinator, Clinical Affairs
Emmanuel Gonzales Metagenomics Team Lead
University of Montreal

Introduction:
Reduction in viral exposure during the SARS-CoV-2 pandemic was associated with reduction in airway disease, but implicated viruses remain unknown. Viral identification using sequencing has facilitated detection of viruses and might permit identification of viruses implicated in CRS. We wished to determine whether viruses could be detected in CRSwNP samples obtained via brushing to explore this.

Method:
Endoscopically obtained sinus brushings were collected using gastric cytology brushes from fourteen patients with recurrent CRSwNP scheduled for sinus surgery. After RNA extraction, bulk sequencing was performed using the Illumina platform and viral candidates identified using ViroMatch pipeline. Taxonomy, virus read counts and percentage contribution to total RNA and were based on nucleotide and translated nucleotide reference alignments.

Results:
Despite the small quantity of non-human RNA present in samples (5.45%), viral sequences were identified in all fourteen subjects, with an average 36.9 viruses/subject (range: 8-73). Each contributed an average 0.037% to total RNA sequenced (range 0.0001-0.823%). 439 species of bacteriophages were recovered, for an average of 28.8 bacteriophages/subject (range 8-73; average contribution: 0.494%; range 0.00001% - 0.494%). Nine different eukaryotic viruses were identified in 9/14 subjects (average contribution: 0.160%; range 0.823-0.00001%). Of these, only Rhinovirus A would have been detected with current multiplex respiratory panels.

Conclusion:
Sequencing performed on epithelial bushings assesses the CRSwNP virome. Unexpected human viruses are detected which may be implicated in development and persistence of CRSwNP.

8:48 am – 8:53 am
Eosinophils fluctuation in CRSwNP
Wirach Chitsuthipakorn, MD
Kornkiat Snidvongs, MD, PhD
Kunjira Sombutpiboonphon

Introduction:
Tissue eosinophil count (TEC) is recommended for defining type II chronic rhinosinusitis with nasal polyps (CRSwNP). TEC is usually assessed by a one-time polyp biopsy. As TEC possibly changes over time, its reliability for diagnosing type II CRSwNP has never been assessed. This study aimed to explore whether TEC fluctuates across different time points.

Methods:
Adult patients with CRSwNP were prospectively recruited at Rajavithi Hospital, Thailand. Participants who had been using any form of steroids within 4 weeks were excluded. A polyp was taken for TEC evaluation at recruitment and repeated at 3 and 6 months. Participants were assessed for a 22-item sinonasal outcome test (SNOT-22), Lund-Kennedy endoscopic score (LKES), serum eosinophil level, and its percentage at every time point.

Results:
Twenty-seven participants were enrolled. The medians (interquartile range) of TEC were 15 (3-57), 13 (5-34), and 8 (4-34) cells/high-power field at 0, 3, and 6 months, respectively. Friedman's two-way analysis of variance showed no statistical difference across the three time points for TEC (p=0.89), SNOT-22 (p=0.10), LKES (p=0.23), serum eosinophil count (p=0.86),

and serum eosinophil percentage (p=0.25).

Conclusion:
The study showed that TEC did not significantly fluctuate over time, aligning with SNOT-22, LKES, and serum eosinophil level. TEC at one-time assessment can be used for endotyping evaluation.

8:54 am – 9:00 am
Q&A

Moderators: Charles Ebert, MD, FARS; Regan Bergmark, MD, FARS

9:00 am – 9:05 am
The crystal ball: Can we predict surgical outcomes for chronic rhinosinusitis patients?
Vijay Ramakrishnan, MD, FARS
University of Indiana

Background:
Endoscopic sinus surgery (ESS) for CRS is often successful, but almost 30% of patients do not improve after ESS, as established in multiple publications and prior clinical trials. Some risk factors for surgical failure are known, but these are complex and interrelated, resulting in a limited ability for clinical synthesis and risk calculation for CRS patients considering surgery.

Objective: To assess the abilities of expert Rhinologists to prognosticate outcomes for surgical candidates with refractory CRS.

Methods:
We used an established dataset of ESS outcomes in CRS, with thoroughly documented clinical features, objective disease scores, and patient reported outcomes. Six expert Rhinologists, with backgrounds in surgical outcomes, were asked to predict likelihood for achievement of >1 MCID in SNOT-22 after surgery. 30 cases were presented to each expert through a custom Graphical User Interface (GUI), and they were asked to predict the surgical outcome and report their degree of certainty using a five-point confidence rating scale.

Results:
There was a combined overall predictive accuracy of 74% among the six experts. The experts struggled to identify surgical failures when compared to surgical success, where their predictions were generally excellent. Confidence in their predictions did not correlate with correctness of the surgical outcome.

Discussion/Conclusion:
These benchmark observations are valuable for clinical application in shared decision-making for ESS pursuit in CRS, and to guide further investigation in modeling treatment outcomes. These data emphasize the importance of continued research that may be used to inform new guidelines aligned with the evolution of precision medicine in CRS.

9:06 am – 9:11 am
Outcomes of complete ESS for CRSwNP and AERD in the biologic era
Alan Workman, MD, MTR
Krithika Kuppusamy
David Lerner, MD
John Bosso, MD
Jennifer Douglas, MD
Michael Kohanski, MD, PhD
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
University of Pennsylvania

Background:
CRSwNP and AERD patients often have severe sinonasal symptomatology and expensive biologic therapies are increasingly being prescribed for these subjects as an alternative to surgery, possibly in inappropriate settings.

Methods:
We examined consecutive CRSwNP and AERD patients who underwent ESS maximized for postoperative irrigation in 2021, with subsequent 6-month, 1-year, and 2-year follow up. All patients were started on steroid irrigations following surgery. SNOT-22 scores and biologic utilization was examined.

Results:
100 consecutive surgically-treated patients were studied, 76 with CRSwNP and 24 with AERD, 21 of whom underwent aspirin desensitization. Preoperative SNOT-22 scores were 42.5+/-2.5 and anosmia sub-scores were 3.0+/-0.2 (1-5 scale). 6 months following surgery, SNOT-22 scores were 14.0+/-1.8, and this effect was durable at 24 months (16.3+/-2.1, p<0.001). Anosmia scores improved to an average of 1.3+/-0.2 (p<0.001), and did not differ between patients receiving Draf 3 frontal sinusotomy (n=47) or not (n=53, p=0.9). 8 patients were on preoperative

biologic therapy, 3 of whom stopped their biologic in the postoperative period. 6 subjects started a new biologic therapy period for refractory symptoms, and SNOT-22 score improvement was attenuated for these patients as early as 6-months postoperatively ($p<0.05$).

Conclusion:
The vast majority of CRSwNP and AERD patients who receive complete sinus surgery maximized for subsequent steroid irrigations have durable improvement in sinonasal quality of life over a multi-year follow up period. The small subset of patients with refractory symptoms following complete surgery may receive benefit from biologics, and these patients can be identified early on.

9:12 am – 9:17 am
Early vs delayed functional endoscopic sinus surgery for patients with chronic rhinosinusitis
Radhika Duggal, MA
Mohamad Chaaban, MD
Trisha Shang, Medical Student
David Hoying, Medical Student
David Kaelber, Professor of Internal Medicine
Cleveland Clinic Lerner College of Medicine, Case Western Reserve University School of Medicine

Introduction:
Previous studies have suggested a clinical benefit to early surgical intervention following chronic rhinosinusitis (CRS) diagnosis. With the approval of new therapies for CRS, it is important to re-evaluate the impact of functional endoscopic sinus surgery (FESS) timing.

Methods:
The TriNetX platform was queried to identify all adult patients with one or more encounter diagnoses of CRS. Among this cohort, we identified subgroups of individuals who underwent early (within 1 year of initial encounter) or delayed (> 5 years after initial encounter) FESS based on CPT codes. Pertinent outcomes, including the need for revision FESS and first-time biologic prescription, were compared between groups at 2 and 5 years postoperatively.

Results:
After 1:1 propensity matching, our analysis included 6,964 patients in each cohort. When followed up for 2 years, the delayed surgery cohort had 73% greater odds of new biologic prescription (OR 1.73, 95% CI 1.35-2.23), but had 20% lower odds of revision FESS (OR 0.80, 95% CI 0.70-0.92). Followed for 5 years, the delayed surgery cohort had a greater odds of needing further management of CRS through a biologic prescription or revision FESS (OR 1.17 95% CI 1.06-1.31). The delayed surgery cohort also had 64% greater odds of new biologic prescription (OR 1.64, 95% CI 1.34-2), but had similar odds of revision FESS (OR 0.93, 95% CI 0.82-1.05).

Conclusions:
Our findings suggest that the delayed FESS cohort had a higher biologic prescription rate. Additional investigations are necessary to determine if these results are due to the recent introduction of biologics or a consequence of heightened disease severity necessitating long-term biologic use when surgery is delayed.

9:18 am – 9:23 am
17-year follow-up data of a randomized clinical trial on postoperative additive systemic steroids
Sarina Mueller, MD
Friedrich-Alexander-University Erlanger-Nurnberg

Objective:
Chronic rhinosinusitis with nasal polyps (CRSwNP) is characterized by a high recurrence rate with decreased quality of life. Long-term follow-up data after randomized controlled trials are rare. Therefore, the objective of this study was to analyze long-term outcomes after functional endoscopic sinus surgery (FESS) and topical steroids with or without systemic steroids.

Methods:
This was a prospective study analyzing the follow-up of 106 CRSwNP patients who were included in a prospective randomized controlled multicenter study on the effect of postoperative additive systemic steroids between 2005-2010. Various outcome measures including quality of life (SF-36, RSDI), Lund-Kennedy Score, Nasal Polyp Score and symptom burden were assessed during the original study and again 12-17 years after completing the study.

Results:
67.9% of all patients showed a CRSwNP recurrence. The total RSDI decreased significantly (48.7 ± 24.3 vs. 67.8 ± 24.3; $p<0.05$). A subgroup analysis identified patients with

aspirin exacerbated respiratory disease and allergies to show the worst quality of life. SD-36 values improved in all subcategories ($p<0.05$). There was no significant difference in quality of life between patients with and without a recurrence ($p>0.05$). There was no significant difference between patients in the original systemic steroid or the placebo group ($p>0.05$).

Conclusion:
CRSwNP patients seems to benefit long-term from FESS plus medical therapy in terms of quality of life and symptom burden. However, recurrence rates are high. Interestingly, no association between recurrence and quality of life could be seen.

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: AERD: ASA Desensitization vs. Biologics
Moderator: Elina Toskala, MD, FARS
Panelists: Regan Bergmark, MD, FARS; Kent Lam, MD, FARS

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: Do-Yeon Cho, MD; Anthony DelSignore, MD, FARS

10:15 am – 10:20 am
Long-term outcomes of Dupilumab therapy for chronic rhinosinusitis with nasal polyposis
Samuel Shing, BS, BA
Shreya Mandloi, BS
Vani Mulkareddy, MD
Praneet Kaki, BS
Damaris Pena-Evertz, MD
Peter A. Benedict, MD
Marc Rosen, MD, FARS
Mindy Rabinowitz, MD, FARS
Elina Toskala, MD, PhD, FARS
Jessica Most, MD
Gurston Nyquist, MD, FARS
Thomas Jefferson University

Introduction:
No prior studies have investigated the efficacy of dupilumab therapy for chronic rhinosinusitis with nasal polyposis (CRSwNP) with or without asthma beyond one year. The aim of the study is to report long-term objective and subjective outcomes of patients being treated with dupilumab for at least one year.

Methods:
A retrospective review of patients at a single tertiary medical center treated with dupilumab for CRSwNP from 2019 onward was performed. CRSwNP outcomes were measured via SNOT-22 scores, nasal polyp scores (NPS), number of exacerbations requiring steroids, and number of patients prescribed antibiotics and long-term oral steroids. Well, not-well, and poorly controlled asthma cohorts were determined based on ACT and AIRQ scores and reported symptoms.

Results:
80 patients met inclusion criteria. Median baseline SNOT-22 decreased from 32.0 to 17.0 after 1 year of dupilumab ($p<0.0001$) and to 20.0 at 4 years ($p=0.047$). Bilateral mean NPS decreased from 3.69 at baseline to 0.61 at 1 year and 0.33 at 4 years ($p<0.0001$). The mean number of CRSwNP exacerbations requiring oral steroids decreased from 1.4 to 0.2 at 4 years ($p<0.001$). The number of patients prescribed antibiotics decreased from 36 (45.0%) at baseline to 14 (19.2%) and 4 (19.0%) at 1 year and 4 years, respectively ($p<0.001$). The number of patients on chronic oral steroids decreased from 7 (8.8%) to 3 (4.1%) and to 2 (3.0%) at 1 and 2 years, respectively ($p=0.046$). Dupilumab sustained improved asthma control at 2 years ($p=0.046$).

Conclusion:
Dupilumab therapy beyond one year continues to effectively reduce SNOT-22 scores, polyp burden, antibiotic, and chronic and burst steroid use, as well as improve asthma control.

10:21 am – 10:26 am
Factors associated with switching biologics in CRSwNP: A multicenter Canadian experience
Marisa Dorling, BSc
Beatrice Voizard, MD
Masih Sarafan, Research, Coordinator
Yousif Ahmed Alammar, MBBS
Arif Janjua, MD, FARS
Amin Javer, MD, FARS
Doron D. Sommer, MD
John Lee, MD
Yvonne Chan, MD, FARS
Andrew Thamboo, MD
University of British Columbia

Background:
Biologics have been used increasingly for the

treatment of chronic rhinosinusitis with nasal polyps (CRSwNP). However, established guidelines for switching or simultaneous use of biologics do not exist.

Objective:
We aimed to identify the clinical characteristics of patients with CRSwNP who switched biologics.

Methods:
This is a Canadian multicenter retrospective study of real-world patient data. Patients were included if they have a diagnosis of CRSwNP and have undergone at least one endoscopic sinus surgery. Patients who remained on their initial biologic comprised the continuous group. Patients with sequential or simultaneous use of >1 biologic comprised the switched group. We compared the characteristics of patients who continued and switched biologics. Time to switch biologics was assessed by type 2 inflammatory biomarkers and the presence of comorbidities using the Kaplan–Meier method and a multivariate Cox proportional hazards model.

Results:
131 consecutive patients were included. 33 (25%) patients switched biologics at least once, and 4 patients (3%) switched twice. Patients who switched biologics were characterized by significantly higher IgE levels and older age. Time to switch biologics was shorter in subgroups with comorbid asthma and autoimmune disease. The most common reason for switching was inefficacy for either the upper or lower airway (33% of switchers), followed by development of an adverse event (15% of switchers).

Conclusions:
Higher IgE levels may be a risk factor for switching biologics in CRSwNP. The most common reason for switching is inefficacy for the upper or lower airway. This study may help identify patients who may benefit from sequential or simultaneous use of biologics.

10:27 am – 10:32 am
Budget impact analysis of biologics in CRSwNP
Maxime Fieux, MD, PhD
Thibault Savary, Dr.
Jennifer Margier, Dr.
Stanford University School of Medicine

Introduction:
Biologics are a new standard of care for severe CRSwNP, recommended in CRSwNP refractory to medical and surgical treatment in France and other european countries. On the other hand, the need for surgical intervention is not mandatory in other countries (Europe and USA). Surgery and biologics are efficient in terms of symptom control but differ in terms of cost, complication, and patient quality of life. Our aim was to compare the estimated mean costs per patient over 5 years of 1st line surgery vs 1st line biologics for the treatment of CRSwNP.

Methods:
This economic evaluation analyzed French data and worldwide published data on CRSwNP management to build economic models. The analysis was conducted in March 2024. Two care pathways were considered in the treatment of CRSwNP, either biologics or surgery in 1st line. Costs were studied over 5 years using Markov models to simulate these 2 care pathways and a budget impact analysis was performed to model the financial impact from both National health care system and patients' perspectives if 15 % of an incident cohort of 5500 patients per year received biologic in 1st line.

Results:
Over 5 years, the estimated mean cost per patient was significantly lower in the surgery group compared with the biologics group (US$5,831 vs US$75,375 respectively with a mean difference of US$69,544 [95% CI : US$44,461-US$88,319]). The extra cost for the health care system would be over US$100,000,000 over 5 years, if biologics were used in 15% of patients as a first line treatment. Sensitivity analyses showed that both these results were robust.

Conclusion:
If biologics were used as a first-line treatment in patients with refractory CRSwNP the extra cost would be overwhelming.

PROGRAM ABSTRACTS

10:33 am – 10:38 am
Cost utility analysis of EDS-FLU versus steroid nasal irrigation for nasal polyposis
Amber Luong, MD, PhD, FARS
Daniel Xiao
Martin Citardi, MD, FARS
William Yao, MD, FARS
McGovern Medical School

Background:
Symptoms of chronic rhinosinusitis with nasal polyps (CRSwNP) are managed after sinus surgery with topical corticosteroids. Given limited distribution of nasal steroid sprays, patients may opt for either steroid nasal irrigation (SNI) or an exhalation delivery system with fluticasone (EDS-FLU). This study evaluates the cost-effectiveness of EDS-FLU compared to SNI.

Methods:
A cohort-style Markov decision-tree economic model with a 35-year time horizon was developed in TreeAgePro. Costs were calculated from the patient perspective. Given the cost disparity of EDS-FLU for patients with and without insurance, two separate analyses with were conducted: patients with (1) private insurance or (2) no insurance/Medicare as Medicare does not pay for EDL-FLU at this time. A willingness-to-pay threshold of $50,000/quality adjusted life year (QALY) was used to determine cost-effectiveness. One-way and probabilistic sensitivity analysis was conducted using 10,000 Monte Carlo simulations.

Results:
EDS-FLU had an incremental benefit of 0.33 QALYs compared to SNI. In base case analysis for insured patients, EDS-FLU had an incremental cost over SNI of $4,762, yielding an incremental cost-effectiveness ratio (ICER) of $14,429/QALY. Probabilistic sensitivity analysis reported EDL-FLU as the cost-effective strategy in 65.0% of simulations with insured patients. In uninsured patients, EDS-FLU had an incremental cost of $138,532, yielding an ICER of $419,794/QALY.

Conclusions:
EDL-FLU is cost-effective for treating CRSwNP in insured patients while SNI is cost-effective in uninsured patients. Changes in drug pricing may cause continued adjustments in the most cost-effective strategy for CRSwNP management.

10:39 am – 10:45 am
Q&A

Moderators: Jose Gurrola, MD; Devyani Lal, MD, FARS

10:45 am – 10:50 am
Long-term efficacy of add-on verapamil in topical steroid refractory CRSwNP
Marcel Miyake, MD, PhD
Agata Ogonowski Bizos, MD
Benjamin Bleier, MD, FARS
Sarina Mueller, MD
Darlene Lubbe, MD
Santa Casa de São Paulo School of Medical Sciences

Introduction:
P-glycoprotein (P-gp) is an epithelial efflux pump which is overexpressed in CRSwNP and contributes to both type 2 inflammation and steroid resistance. Verapamil HCl is a P-gp inhibitor which has been shown to reduce polyp size and improve symptoms in CRSwNP. The purpose of this study was to determine the a) efficacy of adding Verapamil in steroid refractory CRSwNP and b) whether these effects diminish over long-term treatment.

Methods:
Retrospective, single institutional analysis of patients with CRSwNP refractory to sinus surgery and topical steroid sprays were treated with add-on oral Verapamil HCl. Nasal polyp score (NPS) and Loss-of-smell scores (LOS) were collected in all patients pre and post-treatment. Patientswere stratified by greater or less than 2 years or treatment. Changes in NPS and LOS were compared using Wilcoxon signed rank test.

Results:
Thirteen patients were treated for a mean duration of 2.6 years (950 days, range 385 to 2546 days, SD 675.3) with no significant systemic side effects. The mean improvement in NPS and LOS was 1.46 (SD 0.87, $p < 0.05$) and 2.15 (SD 1.46, $p < 0.05$), respectively. There was no observable decrement in improvement between patients on treatment greater or less than 2 years.

Discussion:
Topical steroid resistance in CRSwNP may be reversed by inhibiting P-gp. The addition of Verapamil resulted in statistically significant improvements in NPS and LOS in subjects who had previously failed surgery and topical steroid sprays with no major side effects. The effect was sustained over 2 years suggesting that Verapamil

may be a viable add-on treatment for severe CRSwNP.

10:51 am – 10:56 am

Disease control vs overall symptom severity as a global metric for CRS disease status

Ryan Cotter, BS
Ahmad Sedaghat, MD
Katie Phillips, MD
Robby Boparai
Julia Eckl-Dorna
Ahmed Alsayed, MBBS
Saad Alsaleh, Associate Professor
Sven Schneider
David Liu, MD
Josh Meier, MD, FARS
Jack Garcia
University of Cincinnati College of Medicine

Background: Overall symptom severity (OSS) and patient-reported chronic rhinosinusitis (CRS) control are two global measures recently identified as consensus essential criteria for assessment of CRS disease control. Our objective was to determine functional overlap between these two outcome measures.
Methods: Using an international, multicenter design, 260 patients with CRS were recruited. OSS score was measured using a visual analog scale. Patient-reported CRS control was measured as “controlled”, “partly controlled” and “uncontrolled”. CRS-specific quality of life was measured using a 22-item Sinonasal Outcome Test (SNOT-22). Twelve participants underwent semi-structured interviews to discuss differences between OSS and patient-reported CRS control.
Results: Most interviewed participants felt OSS and patient-reported CRS control measured different constructs—while OSS only measured symptoms, patient-reported CRS control was more global, including concepts such as medication usage, activity impairment and exacerbations. Nevertheless, OSS score was strongly correlated with (rho=0.67, p<0.001) patient-reported CRS control. OSS score of >4 had 74.7% sensitivity and 93.2% specificity for identifying patients reporting their CRS as not controlled. An OSS score of >6.6 had 77.0% sensitivity and 75.9% specificity for identifying patients reporting their CRS as uncontrolled. Although both were predictive of patient-reported disease control, the OSS was significantly more predictive than SNOT-22 score.
Conclusions: Patients view patient-reported CRS control as a more global measure of disease that subsumes OSS. However, OSS is highly correlated with and predictive of patient-reported CRS control, possibly reflecting their redundancy.

10:57 am – 11:02 am

Associations of pesticide proximity with cytokine levels in patients with/without chronic sinusitis

Melodyanne Cheng, MS
Kimberly Paul
Myles Cockburn
Hong-Ho Yang, Medical Student
Jeffrey Suh, MD, FARS
Marilene Wang, MD, FARS
Laura Thompson
Jivianne Lee, MD, FARS
David Geffen School of Medicine

Aim:
This retrospective cohort study evaluates associations of residential proximity to a commercial pesticide application site (predictor) with cytokine levels (outcome) within a population of patients with chronic rhinosinusitis (CRS) with nasal polyps (CRSwNP), CRS without nasal polyps (CRSwoNP), and controls.

Methods:
Binomial pesticide exposure status (exposed or not) was determined using a validated computational geographic information system (GIS) algorithm based on California Pesticide Use Report System data (within 2000m of residential location in 2017). Sinonasal tissue samples were analyzed by an immune assessment core for 38 cytokine levels. Multivariable linear regressions assessing cytokine levels and logistic regressions assessing presence/absence of cytokine were conducted with disease status, age, gender, country, and race/ethnicity as covariates of interest. The 55 total patients included 20 CRSwNP, 19 CRSwoNP, and 16 controls; mean (SD) age was 50 (15) years.

Results:
Pesticide exposure was associated with higher levels of eotaxin (ß=0.70SD, SE=0.27, p=0.01), MCP-3 (ß=0.70SD, SE=0.29, p=0.02), TNFß (ß=0.70SD, SE=0.28, p=0.02), IL-1a (ß=0.67SD, SE=0.30, p=0.03), sCD40L (ß=0.61SD, SE=0.28, p=0.04), IP-10 (ß=0.58SD, SE=0.28, p=0.04), and IL-4(ß=0.57SD, SE=0.28, p=0.05). When modeling binomial cytokine presence (detected or not), exposure status was also associated with increased odds of GCSF (OR=15.85).

PROGRAM ABSTRACTS

Conclusion:
This study revealed historic residential proximity to commercial pesticide application is related to an increased proinflammatory/mitogenic state across disease states, with associations of pesticide exposure status with certain cytokine levels stronger among CRS patients.

11:03 am – 11:08 am
Sinonasal outcomes of CFTR modulators for Cystic Fibrosis: A meta-analysis
Michael Werner, MD
Felisha Li, Medical Student
Jacob Schneider, Medical Student
Zucker School of Medicine at Hofstra/Northwell

Objective:
To determine the efficacy of the CFTR modulator Elexacaftor/Tezacaftor/Ivacaftor (ETI) on sinonasal outcomes in patients with cystic fibrosis (CF).

Background:
To our knowledge, this is the first meta-analysis reporting the sinonasal outcomes of CFTR modulators, specifically ETI, for CF patients.

Methods:
English full-text articles were searched in PubMed, Embase, and Scopus databases. Two reviewers screened articles and a third reviewer resolved disagreements. Articles were included if they reported functional or radiological sinonasal outcomes in patients with CF before and after CFTR modulator therapies. Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were followed and the Risk of Bias in Non-randomized Studies of Interventions tool was used for quality assessment. The generic inverse variance method with random effects model was used for meta-analysis. Standardized mean difference (SMD) and mean difference (MD) were used as effect measurements.

Results:
Seven prospective studies, representing a total cohort of 222 patients were included in this analysis. There was a significant improvement in SNOT-22 scores for patients on ETI (MD=12.80 [95% CI: 10.46-15.13], P<0.00001). There was also a significant improvement in Lund-Mackay scores after CFTR modulator therapy (SMD=1.25 [95% CI: 0.58-1.91], P=0.0002). There was no heterogeneity in the SNOT-22 analysis (I2=0%, P=0.82) but there was heterogeneity in the Lund-Mackay analysis (I2=67%, P=0.03).

Conclusion:
CFTR modulators improve functional and radiologic sinonasal outcomes, as seen in the improvement of SNOT-22 and Lund-Mackay scores. Given the utility of CFTR modulators, the treatment paradigm for chronic sinusitis promises to evolve.

11:09 am – 11:15 am
Q&A

11:15 am – 12:00 pm
Panel: Interdisciplinary Workflows and Tips to Optimize Recalcitrant CRS Outcomes
Moderator: Devyani Lal, MD, FARS
Panelists: Rakesh Chandra, MD, FARS; Cecilia Damask, DO; Claire Hopkins, MBChB, PhD; Diego Saldana Perez, MD; Jacqueline Squire, MD

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

8:00 am – 12:00 pm
CRS - Microbiology, Virology, and Comorbidities
Breakout 3
Splash 11 & 12

Session Chair:

8:00 am – 8:30 am
Research/AiR Panel: "The Changing Face of Academic Medicine and Implications for Surgeon-Scientists" Moderator: Vijay Ramakrishnan, MD, FARS
Panelists: Michael Kohanski, MD; Sandra Lin, MD, FARS; Murugappan Ramanathan, MD, FARS; Timothy Smith, MD, FARS; Michael Stewart, MD, FARS; Carol Yan, MD

Moderators: Stella Lee, MD; Carol Yan, MD

8:30 am – 8:35 am
Microbiome in patients with chronic rhinosinusitis: Exploring the role of obesity
Jorge Arpi, MD
Mohamad Chaaban, MD, FARS
Cleveland Clinic

PROGRAM ABSTRACTS

Bacteria may play a crucial role in sinus mucosal inflammation, leading to persistent inflammation of sinus cavities in Chronic rhinosinusitis (CRS). Similarly, obesity has been shown to contribute to its pathogenesis. To date, no studies have investigated the CRS microbiome composition in the obesity setting, yet being able to identify taxa associated with disease phenotype or long-term outcomes. We described the sinus mucosa microbiome composition in patients with CRS and concurrent obesity. An IRB-approved protocol was used for a prospective specimen collection of patients with CRS diagnosis treated with sinus surgery between 2021 and 2022. Metagenomic DNA analysis was performed to characterize taxa. We analyzed 41 samples from paranasal sinus mucosa, including five control subjects and 35 patients with CRS, including 10 CRS patients without nasal polyps and 26 with nasal polyps. Patients were classified as obese (BMI ≥ 30 kg/m2)(51%) and non-obese (49%). Sinus mucosal dysbiosis in CRS was observed at genus levels. Taxa in the obese population show an increased abundance of Xanthomonas, Burkholderia, Streptomyces, and Cupriavidus, and a decreased abundance of Staphylococcus and Pseudomonas species compared to the non-obese cohort. An increase in the abundance of gram-negative taxa was found in the CRSsNP cohort with concurrent obesity. An increase in certain taxa was linked to lower levels of nasal interleukins. Conversely, nasal dysbiosis correlated with changes in the systemic inflammatory profile; specific taxa increase in obese individuals was associated with higher systemic interleukin levels. In conclusion, obesity contributes to sinus nasal dysbiosis in CRS, highlighting potential therapeutic targets for this condition.

8:36 am – 8:41 am

Metagenomics or metataxonomics: Best practice methods to uncover the truth of the sinus microbiome

Isabella Burdon, MBBS-V
George Bouras, Mr.
Kevin Phoenix
Kenny Yeo
James Connell
Clare Cooksley, Dr.
Emma Barry
Sarah Vreugde, Professor
Peter J. Wormald, Professor
Alkis Psaltis, Professor

Dysbiosis of the human microbiome has been linked to many chronic diseases including chronic rhinosinusitis (CRS). At present, the gold-standard method used by most researchers to analyse the sinonasal microbiome is 16s rRNA sequencing. However, significant discrepancies in microbiome results are reported in the literature. Although differences in demographics, sample size, sampling techniques, library preparation and bioinformatic analysis may in-part explain this, the reliability of 16s sequencing remains to be examined.

This study creates the first sinus-relevant mock-community and uses this as a positive control to benchmark genomic methods of analysis for microbiome study. Using linear regression models of the growth of 9 strains of bacteria common to the sinuses, the mock community was assembled with equal proportions of each strain. Five library preparation/sequencing methods were employed to make 29 unique samples. Taxonomic profiles were generated with emu for long read (LR) 16S datasets, dada2/SILVA for short read (SR) 16s datasets and sourmash for SR and LR metagenomic datasets.

We believe the results of this study mark a turning point in sinus microbiome research. Our work shows that 16s sequencing produces unrecognisable results when compared to the ground truth. We find that 16S rRNA PCR amplification introduces excessive bias and thus, subsequent taxonomic profiles are misrepresentative of the input microbiome. By contrast, shotgun metagenomic sequencing was able to accurately represent the mock community. When we applied these methods to a CRS patient sample, we saw dramatic differences in the microbiome based on sequencing method. This work is the first to prove a validated workflow for sinus metagenomics.

8:42 am – 8:47 am

Microbiome and mycobiome abundance and cytokine profile in sinus mucosa of patients w/wo CRS

Hong-Ho Yang, BS
Carra Simpson, PhD
Meera Srivastava, PhD
Alakesh Bera, PhD
Tom Maxim, MD
Saroj Basak, PhD
Eri Srivatsan, PhD
Jeffrey Suh, MD, FARS
Marilene Wang, MD, FARS
Jonathan Jacobs, MD, PhD
Jivianne Lee, MD, FARS

PROGRAM ABSTRACTS

David Geffen School of Medicine at UCLA

Introduction:
Recent evidence has underscored the pivotal role of microbiome dysbiosis in the pathogenesis of chronic rhinosinusitis (CRS). This study investigates the relationship between microbiota abundance and cytokine concentration in the sinus mucosa of CRS and non-CRS cases.

Methods:
Mucosal specimens from the ethmoid sinus were procured during endoscopic sinus surgery (CRS) and skull base surgery (control). Proteins were isolated from sinus tissue samples. Bacterial and fungal abundance was characterized using 16S rRNA gene and internal transcribed spacer sequencing. Cytokine analysis was performed using flow cytometry. The association between microbiota abundance and cytokine concentration was assessed in fixed-effect regression models.

Results:
Specimens from 92 patients (30 control, 31CRSwNP, 31 CRSsNP) were procured. Compared to controls, higher levels of IL-5, IL-6, IL-8, IL-13, IL-1RA, TNF-a, and MIP-1b were detected among CRSwNP specimens and IL-6, IP-10, IL-13, and MIP-1b among CRSsNP specimens ($P<0.05$ for all). Increased abundance of specific bacterial genera, families, and phyla correlated with elevated cytokine concentrations. Notably, Anaerostipes abundance at the genus level correlated with heightened levels of IL-8, IL-13, IL-5, and MIP-1b, Nocardioidaceae at the family level with IL-5 and TNF-a, and Verrucomicrobia at the phylum level with IL-1RA. Fungal abundance did not correlate with cytokine concentrations.

Conclusions:
Dysbiosis-driven emergence of specific bacterial genera, families, and phyla may contribute to inflammation in CRS patients. The lack of correlation between fungal abundance and inflammation may suggest distinct pathophysiology driven by mycobiome and microbiome dysbiosis.

8:48 am – 8:53 am

Viral infection as an inciting event for chronic sinusitis

Najm Khan, MBS
Vincent Provasek
Aatin Dhanda, Clinical Research Fellow
Masayoshi Takashima, MD, FARS
Jeffrey Vrabec, Professor
Edward McCoul, MD, FARS
Omar Ahmed, MD, FARS
Houston Methodist Hospital

Background:
Viruses have been associated with acute sinusitis, but little evidence exists for their role in developing chronic sinusitis. Clinically, patients recall developing chronic sinusitis after a single upper respiratory tract infection including COVID-19. Herein, we quantify the risk of developing chronic sinusitis following three common viral infections of the upper respiratory tract.

Methods:
The TriNetX Research Network was queried from January 1st, 2020 to December 31st, 2022 for viral infections including COVID-19, respiratory syncytial virus (RSV), and influenza. Patients were propensity score matched with controls for demographics and comorbidities. The primary outcome was chronic sinusitis at least 90 days after infection.

Results:
A total of 2,167,578 patients with viral infections were compared to matched controls. Viral infection led to an increased risk of chronic sinusitis over a 1-year period (HR 2.20, 95% CI 2.12 – 2.28). The highest risk was observed between days 90 and 180 following infection (HR 2.35, 95% CI 2.21 – 2.50). When examining COVID-19, these patients were at an increased risk over a 1-year period (HR 2.11, 95% CI 2.03 – 2.19). Compared to influenza and RSV, COVID-19 patients were at a decreased risk of chronic sinusitis over a 1-year period (HR 0.76, 95% CI 0.69 – 0.83; HR 0.72, 95% CI 0.57 – 0.89, respectively).

Conclusion:
Patients with viral infections, including COVID-19, are at a greater risk of developing chronic sinusitis (HR >2) in the year after initial infection. Viral infection may alter the immune environment of the sinonasal cavities, predisposing a proinflammatory state. Although seen clinically,

this is the first study to establish this relationship for chronic sinusitis.

8:54 am – 9:00 am
Q&A

Moderators: Victoria Lee, MD, FARS; Kevin Welch, MD, FARS

9:00 am – 9:05 am
Association of nasal mucus cytokines and clinical severity in CRS patients with comorbid asthma
Rory Lubner, MD
Christina Dorismond
Mason Krysinski
Katherine Cahill
Rakesh Chandra, MD, FARS
Justin Turner, MD, PhD, FARS
Naweed Chowdhury, MD, MPH
Vanderbilt University Medical Center

Background:
Lower airway diseases such as asthma are commonly comorbid with chronic rhinosinusitis (CRS). While a morphological and pathophysiological link between these diseases have been proposed via the “united airway concept,” the biological underpinnings of this interaction remains understudied. The aim of this study was to examine the association between nasal mucus cytokine levels and pulmonary function testing (PFTs) in CRS patients with asthma.

Methods:
We performed a cross sectional analysis of CRS patients undergoing endoscopic sinus surgery. Cytokines were quantified in intraoperative mucus specimens using a multiplex flow cytometric bead assay. Clinical data including asthma diagnosis at time of surgery and PFT metrics were extracted, and Spearman correlation, univariate, and multivariate linear regression analyses were performed.

Results:
Of the 137 CRS patients with a diagnosis of asthma, 72 had PFT data available. Fifty-nine (82%) had CRSwNP and 29 (40%) had AERD. Overall, interleukin-7 (IL-7) was positively associated with %FEV1 (p=.004) and %FVC (p=.018). This result was durable after adjusting for AERD, AR, and polyp status. Additionally, granulocyte-macrophage colony-stimulating factor (GM-CSF) was negatively associated with FEV1/FVC (p=.024). In the AERD and CRSwNP subsets, FEV1/FVC ratios were negatively associated with IL-8 (p=.026 and .004 respectfully), TNF-a (p=.002 and p=.019, respectfully), and GMCSF (p=.003 p=.049 respectfully).

Conclusion:
CRS patients with asthma demonstrate differential cytokine signatures based on endotype. Nasal mucus IL-7 concentration is positively associated with a decreased severity of airway obstruction in CRS patients with comorbid asthma.

9:06 am – 9:11 am
Validation of AECRS definition
Katie Phillips, MD
Ahmad Sedaghat, MD
Firas Houssein
University of Cincinnati

Background:
A patient-centered and directly measurable definition for acute exacerbations of chronic rhinosinusitis (AECRS) has been developed as “a flare up of symptoms beyond day-to-day variation, lasting at least 3 days, and to which a distinct negative impact on a patient’s quality of life (QOL) or functionality can be attributed”. How this new definition correlates with previously used indirect metrics of AECRS is unknown.

Methods:
Using this AECRS definition, we performed a cross-sectional study of AECRS frequency in the past 6 months in 237 chronic rhinosinusitis (CRS) patients. The number of courses of CRS-related systemic antibiotics and corticosteroids (reflecting indirect metrics of AECRS) and asthma exacerbation number in the same timeframe were queried.

Results:
In the last six months, the mean number of AECRS was 4.2 (standard deviation [SD] =4.8) while the mean number CRS-related systemic antibiotic or corticosteroids needed was 1.6 (SD = 1.9). The number of AECRS was correlated with number of systemic medications (rho=0.27) and disease-specific QOL (rho=0.29). For asthmatic CRS patients, numbers of AECRS and asthma exacerbations were correlated (rho=0.25). Finally, comorbidities were associated with higher AECRS frequency by 27% in allergic rhinitis, 29% in

migraine and 41% higher in active tobacco users.

Conclusions:
This new AECRS definition correlates with previous indirect metrics of AECRS including systemic medication usage, disease-specific QOL and asthma exacerbations. Our results demonstrate that indirect measures of AECRS may not capture all AECRS. Furthermore, allergic rhinitis, migraine and tobacco use may play a role in AECRS pathophysiology.

9:12 am – 9:17 am
CRS eosinophil cut-points and asthma
Wirach Chitsuthipakorn, MD
Kornkiat Snidvongs, MD, PhD
Patlada Kowatanamongkon
Kittichai Mongkolkul

Objective:
This study aims to identify the optimum cut point of eosinophils in nasal mucosal tissue that correlates with asthma.

Material and methods:
This research is a cross-sectional study conducted on patients with chronic rhinosinusitis (CRS) who met the criteria for surgery. Nasal tissue samples were collected during endoscopic sinus surgery and evaluated for eosinophil presence. Subsequently, the patients were assessed by a pulmonologist for asthma diagnosis. Data on eosinophil levels in nasal tissue and comorbid asthma in patients were obtained. ROC analysis was employed to determine the optimal cut-off points of tissue eosinophil levels associated with asthma.

Results:
A total of 103 CRS patients were included in the study. Ten (9.7%) patients had underlying asthma, while eleven (10.7%) patients were first diagnosed with asthma by a pulmonologist. Eosinophil counts in nasal mucosal tissue of 35 cells/HPF or more exhibited a significant correlation with asthma (AUC = 0.753, $p<0.001$). The sensitivity of this cut-off point was 76.2 (95%CI = 52.8-91.7), with a specificity of 67.1 (95%CI = 55.8-77.1). The PPV, NPV, and accuracy were 37.2%, 91.7%, and 68.9%, respectively.

Conclusion:
Nasal mucosal tissue eosinophil count can be utilized to predict asthmatic comorbidity in CRS patients. A threshold of 35 cells/HPF in nasal mucosal tissue eosinophil count can serve as a reliable screening tool for asthma due to its high sensitivity.

9:18 am – 9:23 am
Paradigms in treating eosinophilic granulomatosis with polyangiitis
Nitish Kumar, MS
Devyani Lal, MD, FARS
Pedro Lanca Gomes, Fellow in Rhinology
Michael Marino, MD, FARS
Amar Miglani, MD
Savannah Jett
Mayo Clinic

Background:
Paradigms in treating eosinophilic granulomatosis with polyangiitis (EGPA) have evolved with use of FDA-approved biologics. We conducted a real-world study to examine patterns of biologics use, impact on chronic rhinosinusitis (CRS) control and usage of sinus surgery.

Methods:
Data on EGPA patients treated with biologic agent(s) at a multi-hospital system (01/2010 to 01/2024) was collected from the unified medical record.

Results:
80 subjects were identified; sinus surgery was performed in 73 (91.25%). The biologics used (as single/dual therapy) were: Mepolizumab (81.25%), rituximab (25%), benralizumab (22.5%) and dupilumab (16.25%). Dual biologics for CRS control was used in 10% of subjects [mepolizumab + dupilumab (3.75%), mepolizumab + benralizumab (2.5%), rituximab + benralizumab (1.25%), rituximab + mepolizumab (1.25%)]. Single agent therapy was used in 90% of patients (n=72) with mepolizumab (n=59, 81.9%) and benralizumab (n=15; 20.8%) most often, followed by rituximab (n=15; 17.6%) and dupilumab (n=10; 13.8%). 62 patients (77.5%) underwent 131 episodes of sinus surgeries prior to biologic use. After initiating biologics, 47 procedures in 38 patients were performed [33/65 (50.76%) of patients on mepolizumab, 13/20 (65%) on rituximab, 6/18 (33.3%) on benralizumab and 8/13 (61.5%) on dupilumab].

Conclusion:
The FDA approved biologics, mepolizumab and benrazilumab, were used most often for EGPA.

PROGRAM ABSTRACTS

Dual biologic therapy, including with rituximab, was used in 10% of patients with refractory disease. A significant 47.5% of patients required sinus surgery subsequent to biologic treatment. Multimodality treatment using combinations of biologics and sinus surgery appeared to be the mainstay of controlling CRS in EGPA.

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: Nasal Polyp Subtypes: Do We Need to Tailor Treatment Plans?
Moderator: Corinna Levine, MD, FARS
Panelists: Kara Detwiller, MD; Jessica Grayson, MD; Elisa Illing, MD, FARS; Rodney Schlosser, MD, FARS

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

Moderators: Corinna Levine, MD, FARS; Kristine Smith, MD

10:15 am – 10:20 am
Olfactory ensheathing cell tumor culture model as a tool to study olfactory nerve biology
John Finlay, MD, PhD
Ralph Abi Hachem, MD
Patrick Codd, Associate Professor
Bradley Goldstein, MD
Duke University School of Medicine

Olfactory ensheathing cell tumor is a rare, benign neoplasm of the anterior skull base . Olfactory ensheathing cells (OECs), unique specialized non-myelinating Schwann-like cells, play important roles in the maintenance and guidance of olfactory sensory neuron axons from the olfactory epithelium to the olfactory bulb. Given their ability to help facilitate regeneration of axonal projections from the periphery into the central nervous system, OECs have been studied within the context of spinal cord and nerve repair. However, mechanisms of OEC-mediated axon guidance remain incompletely understood, in part due to the difficulty of culturing OECs in vitro for experimental assays. Here, we generated the first to our knowledge, culture model of an OEC tumor from a newly diagnosed 23-year-old male, utilizing a 3D organoid system. Organoids remarkably maintained the biology of the original tumor over the span of months, as confirmed by immunostaining for key markers including SOX10 and S100B, which are also established markers of normal OECs. The low-grade nature of this tumor paired with its expression of key OEC genes prompted us to assess the validity of this culture model in studying OEC biology. Co-culturing OEC tumor organoids with purified mouse olfactory sensory neurons interestingly led to the emergence of elongated neuronal projections, absent in controls. Mass spectrometry performed on OEC tumor conditioned culture media revealed the presence of important neural growth and guidance cues such as semaphorins and platelet-derived growth factors. Together, these findings support the use of our OEC tumor culture model as a tool to further investigate the molecular mechanisms of normal OEC-directed nerve regeneration.

10:21 am – 10:26 am
Impact of age on the accuracy of objective olfactory testing
Anil Patel, Mr.
Jeb Justice, MD, FARS
Jennifer Mulligan, PhD
Nikita Chapurin, MD
Brian Lobo, MD, FARS

Background:
Current objective olfactory assessments (OOA) were designed based on research in the 1980's and 90's using odors encountered frequently by a generational cohort. Disuse of odor products such as turpentine may then lead to generational unfamiliarity. In this study, we examined the impact of age on the ability to accurately identify odors.

Methods:
From 02/2021 to 12/2023, 385 patients who had OOA using UPSIT-40 were analyzed. Study exclusions included those with incomplete UPSIT data and malingering. Specific attention was placed to the odors musk and turpentine, with data subdivided by control-subjects and diagnosis groups of CRSsNP and CRSwNP further analyzed by age.

Results:
In questions containing the odors turpentine or musk, age was a statistically significant factor in correct vs incorrect (C/I) response. Two questions with turpentine as an answer choice revealed a statistically significant difference: C/I age

distribution means of 54.1/48.8 with P = 0.002, and 49/53.6 with P = 0.007. When stratified by diagnoses, CRSsNP demonstrated a significant age distribution for C/I, with averages of 54.9 and 48.1 (P = 0.01). In the control group, musk demonstrated a significant age distribution difference in C/I with 54.2 and 63.2 respectively P = 0.02.

Conclusion:
Significant age-related OOA differences exist specifically related to the odors turpentine and musk. While challenging to suggest a correction, it is important to consider age related variability of these two odors in OOA. In situations where OOA reveals borderline results, it may be useful to consider the specific response related to these odors and if it may have adversely affected the validity of the diagnostic outcome.

10:27 am – 10:32 am
Role of PRP in olfactory dysfunction treatment
Shreya Mandloi, BS
Alexander Duffy, MD
Samuel Shing, BS
Riyana Doshi, BS
Stephanie Hunter, PhD
Peter A. Benedict, MD
Elina Toskala, MD, PhD, FARS
Marc Rosen, MD, FARS
Mindy Rabinowitz, MD, FARS
Gurston Nyquist, MD
David Rosen, MD
Thomas Jefferson University

Introduction:
Patients with olfactory dysfunction (OD) have decreased quality-of-life. Recent studies evaluating injected and topical endonasal platelet-rich plasma (PRP) have demonstrated modest benefit for post-COVID OD. This is the first study to investigate the impact of topical endonasal PRP on OD of multiple etiologies.

Methods:
OD was measured via Brief Smell Identification Test (BSIT) in all patients and with Sniffin Sticks in ten patients with post-COVID OD. Patients with long term OD that were hyposmic/anosmic on BSIT (<10) or Sniffin Sticks (<30.75) were included. Patients were treated with three topical endonasal applications of PRP-impregnated SurgifoamTM into bilateral olfactory clefts once a month for 3 months duration.

Results:
77 patients were included in this study and olfactory etiologies were combined for analysis. 85% of patients had post-COVID OD with an average duration of 18 months. BSIT score increased at three months when accounting for age, gender, race, etiology, and OD duration (Δ=1.21;p=0.04) meeting the MCID (n=77). 29% of patients had a ≥ 2-point improvement in BSIT score. Patients with a lower BSIT score were more likely to respond to PRP than patients with a higher BSIT score (p=0.03). There was no significant improvement in threshold (Δ=-0.45;p=0.46), discrimination (Δ=1.45;p=0.22), identification (Δ=1.55;p=0.29), or total TDI (Δ=2.64;p=0.40) after two treatments on Sniffin Sticks (n=10).

Discussion:
As the MCID for BSIT was met at the three-month mark, topical PRP may provide modest benefit for OD of multiple etiologies, particularly in those with lower BSIT scores. While the MCID of Sniffin' Sticks was not met, potentially due to the small sample size, further data collection is currently underway.

10:33 am – 10:38 am
Taste and flavor remix: The effect of Dupilumab on AERD patients' chemosensory experience
Emily Moldoff, FNP-C
Stella Lee, MD
Lora Bankova
Tanya Laidlaw
Dante Minchetti
Simon Chiang
Mengyuan Ruan
Brigham and Women's Hospital

Introduction:
Patients with AERD exhibit severe and refractory symptoms marked by significant chemosensory dysfunction. Dupilumab treatment has shown to improve olfactory function in patients with CRSwNP, but few studies have described its effects on taste.

Material & Methods:
692 patients with AERD responded to a smell and taste survey through the Brigham and Women's Hospital AERD Center data registry. 389 patients were on dupilumab at the time of the survey and 303 patients were not. Patients responded to a subjective questionnaire on their inability to smell

specific odorants and taste specific flavors as well as dysosmia and dysgeusia quality and severity. Two sample z-tests were used to compare whether the proportions of respondents who reported chemosensory dysfunction were the same between the two AERD cohorts.

Results:
Patients on dupilumab exhibited significantly less dysfunction in perceptions of smell and taste across all five taste groups and specific flavors compared to patients who were not on dupilumab. Proportions were significant (P <0.001) across all five taste groups with patients who were on dupilumab indicating less taste dysfunction: 81.5% of patients on dupilumab indicated ability to detect salty taste vs. 59.6% not on dupilumab, sweet 83.8% vs. 60.7%, sour 83.8% vs. 60%, bitter 81.8% vs. 57.3%, and umami 82.2% vs. 58.4% respectively.

Conclusions:
Patients on dupilumab had less dysfunction in major taste groups and specific flavors compared to patients not on dupilumab. The coupling of taste and smell outcomes suggests a possible common chemosensory architecture that is disrupted through the IL-4/IL-13 proinflammatory processes.

10:39 am – 10:45 am
Q&A

Moderators: Angela Donaldson, MD, FARS; Erin O'Brien, MD, FARS

10:45 am – 10:50 am
Quantifying CRS health utility: Direct & indirect
Wirach Chitsuthipakorn, MD
Narissara Pracharktam
Juthaporn Phetpong
Patlada Kowatanamongkon
Kittichai Mongkolkul
Kornkiat Snidvongs, MD, PhD

Abstract:
Introduction: EuroQol-5-Dimensions-5-Levels (EQ-5D-5L), visual analog scale (VAS), time trade-off (TTO), and standard gamble (SG) are used for the assessment of Health Utility Scores (HUS) of chronic rhinosinusitis (CRS). This study aimed to determine the overall HUS of CRS, the factors which influence the HUS, and the most appropriate method.

Methods:
A cross-sectional study was conducted. Patients with primary CRS were recruited. Clinical and socioeconomic data together with HUS were assessed. Four HUS scores determined from the four different methods were compared.

Results:
A total of 335 patients were enrolled. The overall HUS, as measured by EQ-5D-5L, VAS, TTO, and SG, were 0.88 ± 0.14, 0.79 ± 0.17, 0.89 ± 0.15, and 0.86 ± 0.16, respectively. The multivariable linear regression revealed that each increasing 22-item sinonasal outcome test (SNOT-22) score predicted a reduction of about 0.001 to 0.003 in HUS (all methods, $p \leq 0.01$). Patients who scheduled for endoscopic sinus surgery had 0.06 to 0.11 HUS lower than other groups in EQ-5D-5L and VAS (all $p < 0.05$). Higher endoscopy score, age, presence of comorbid airway diseases, and lower education correlated with lower HUS ($p < 0.05$). Given the HUS result and regression models, the EQ-5D-5L was the most practical choice.

Conclusion:
The overall HUS of CRS were approximately 0.79 to 0.89. High SNOT-22 score and those who failed medications, presence of comorbid AR/asthma, increased age, high endoscopy score, and low education negatively impacted HUS. Our data suggest that EQ-5D-5L is the most suitable method.

10:51 am – 10:56 am
Impact of patient factors on MCID for SNOT-22 in chronic sinusitis
Felix E. Fernandez-Penny, BS
Mohamed Aboueisha, MD
Jacob Hodges
Waleed Abuzeid, MD, FARS
Ian Humphreys, DO, FARS
Aria Jafari, MD, FARS
University of Washington

Background:
This study explores how patient demographics and comorbidities affect the calculation of the minimally clinically important difference (MCID) for SNOT-22 scores in medically treated chronic rhinosinusitis (CRS). The role of MCID in evaluating clinically meaningful changes is well acknowledged, yet the influence of specific patient factors on this calculation has not been thoroughly examined.

PROGRAM ABSTRACTS

Methods:
Patients presenting to a tertiary care rhinology practice were analyzed using the SNOT-22 questionnaire, along with anchor questions before and after treatment. Adjusted logistic regression was utilized to determine the factors influencing MCID achievement.

Results:
Among the 221 patients, 43.9% (97 patients) experienced improvement following treatment. Gender, education level, depression, and migraine were identified as significant factors influencing perceived improvement. Our predictive model, incorporating these variables, achieved an AUC of 0.818 (95% CI: 0.762, 0.875), with a sensitivity of 74.4% and specificity of 77.9%. Changes in SNOT-22 scores were not strongly associated with clinical improvement in patients with depression. Conversely, patients with migraines exhibited more pronounced clinical improvements or deteriorations at the extremes of score changes.

Conclusion:
Our findings underscore the substantial impact of patient demographics and comorbidities on the MCID for the SNOT-22. The demonstrated variability in perceived clinical change across different patient groups advances our understanding of MCID's variability, indicating the complex manner in which patient characteristics can affect clinical outcomes.

10:57 am – 11:02 am
Role of social determinants of health on quality of life in adult chronic rhinosinusitis
Ryan Ziltzer, MD MPH
Connor Hunt
Ruifeng Cui
Rafka Chaiban
Chadi Makary, MD, FARS
West Virginia University

Introduction:
Socioeconomic disadvantage, environmental factors, and other social determinants of health (SDOH) have been increasingly investigated for their associations with outcomes in variety of health conditions, including those in otolaryngology.

Goal:
The aim of this study is to explore the role of SDOH on symptom-related quality-of-life (QoL) in adults with chronic rhinosinusitis (CRS).

Methods:
Cross-sectional study of all adult patients (age 18 years and older) presenting for CRS between August 2020 and June 2023 at an academic institution. Patients were asked to complete the SNOT-22 questionnaire at initial and follow up visits. Demographics and comorbidities were collected. SDOH were measured based on the national area deprivation indices (ADI). The association between ADI and SNOT-22 score were assessed using multivariate linear regressions while controlling for clinical factors.

Results:
A total of 466 patients met age and CRS criteria. Mean national ADI was 63.74 (SD=21.13). After controlling for asthma, obstructive sleep apnea, allergic rhinitis, and nasal polyposis, national ADI was significantly associated with worse SNOT psychological domain (p=0.029) and SNOT sleep domain (p=0.033) scores. For every decile increase of national ADI, mean SNOT psych score increases by 0.39 [SE=0.18] and mean SNOT sleep score increases by 0.33 [SE=0.15].

Conclusion:
Worse SDOH as measured by national ADI is connected to worse patient-reported CRS QoL in psychological and sleep domains and may serve to predict health disparities in these patients.

11:03 am – 11:08 am
Socioeconomic status and gender impact sinus disease severity in people with Cystic Fibrosis
Ethan Han, BS
Christine Liu, BS
Jakob Fischer, MD
Jess Mace, MPH, CCRP
Jeremiah Alt, MD, PhD, FARS
Naweed Chowdhury, MD, MPH,
Peter Hwang, MD, FARS
Adam Kimple, MD, PhD, FARS
Milene Saavedra, MD
Zachary Soler, MD, MSc, FARS
Daniel Beswick, MD, FARS
University of California, Los Angeles

Background:
Socioeconomic status (SES) factors including race/ethnicity, education, income, and insurance status impact pulmonary disease in people with cystic fibrosis (PwCF), but the relationship between SES and chronic rhinosinusitis (CRS) severity remains unclear.

PROGRAM ABSTRACTS

Methods:
In a multi-institutional study, adult PwCF completed the 22-Question SinoNasal Outcome Test (SNOT-22), 40-Question Smell Identification Test (SIT), Questionnaire of Olfactory Disorders (QOD-NS), and Cystic Fibrosis Questionnaire-Revised (CFQ-R). Lund-Kennedy (LK) nasal endoscopy scores, sinus computed tomography, and clinical data were collected. Data were analyzed across genders and SES factors using multivariate regression.

Results:
73 PwCF participated with a mean age of 34.7±10.9 years and 49 (67.1%) were female. Medicaid/Medicare health insurance was associated with worse LK endoscopy scores (p=0.016), CFQ-R respiratory subdomain scores (p=0.005), and ppFEV1 (p=0.003). Linear regression modeling identified that current elexacaftor/tezacaftor/ivacaftor (ETI) use (β= -4.09, 95% CI [-6.08, -2.11], p<0.001), female gender (β= -2.14, 95% CI [-4.11, -0.17], p=0.034) and increasing age (β= -0.14, 95% CI [-0.22,-0.05], p=0.003) were associated with lower/better LK scores. Having private health insurance (β=17.76, 95% CI [5.20, 30.32], p=0.006) and >16 years of education (β=13.50, 95% CI [2.21, 24.80], p=0.020) were associated with higher ppFEV1. No SES factors were significantly associated with SNOT-22, QOD-NS, or SIT scores.

Conclusions:
Differences in CRS and pulmonary disease severity exist among PwCF related to SES factors, gender, and ETI use. Understanding how these factors impact response to treatment may help identify care disparities among PwCF.

11:09 am – 11:15
Q&A

11:15 am – 12:00 pm
Panel: Pursuing Inclusive Excellence in a Changing Landscape
Moderator: Jose Mattos, MD
Panelists: Tracy Downs, MD; Erin O'Brien, MD, FARS; Joan E. St. Onge, MD, MPH, FACP

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

8:00 am – 12:00 pm
Outpatient Rhinology and Allergy Practice - Breakout 4
Splash 14-16

Session Chair: Karen Bednarski, MD, FAR

8:00 am – 8:30 am
Panel: Rhinitis: How to Evaluate and Manage This Underappreciated Condition
Moderator: Anthony Del Signore, MD, FARS
Panelists: Mary Ashmead, MD; Karen Bednarski, MD, FARS; Seth Brown, MD, FARS; Christopher Davis, MD; Kathleen Tibbetts, MD

Moderators: Mary Ashmead, MD; Karen Bednarski, MD, FARS

8:30 am – 8:35 am
Rhinorrhea recurrence after intranasal cryoablation: a multicenter cohort study
Curtis Mack, Medical Student
Aleks Vidovich, Resident
Theodore Nguyen, MD
Edward Kuan, MD, FARS
John Craig, MD, FARS

Background:
Posterior nasal nerve cryoablation improves chronic rhinitis (CR) symptoms in 70-80% of cases, especially clear thin rhinorrhea (CTR). The primary purpose of this study was to determine the recurrence rate and time to recurrence of CTR following cryoablation.

Methods:
A retrospective cohort study was conducted on consecutive patients who underwent bilateral intranasal cryoablation to treat CR-related CTR at two centers. All patients were offered an ipratropium bromide nasal spray (IBNS) trial. Cryoablation was applied along the posterolateral wall of middle meatus. Demographic and clinical data were collected at clinic visits or by phone surveys. Patients were followed for either a minimum of 12 months, or until CTR recurrence. Primary outcome measures were CTR improvement and recurrence based on subjective runny nose scores (0-5), and time to CTR

recurrence. Additionally, preoperative and postoperative frequency of IBNS use were recorded, as well as patient preferences for subsequent treatment options if CTR recurred.

Results:
Of 75 included CR patients, median age was 63.0 years, and 52% were female. Regarding CR subtypes, 76.1% were nonallergic, 4.2% allergic, and 19.7% mixed. Additionally, 82.1% were IBNS responders. Of the 75 patients, 63 improved (84.0%) and 12 had no response (16%). Of 60 patients with adequate follow-up for CTR recurrence, 57 recurred (95%) at a median 4 months (IQR: 2,6).

Conclusion:
Intranasal cryoablation led to CTR improvement in 84% of CR patients, with 95% recurrence by about 4 months postoperatively.

8:36 am – 8:41 am
Cryoablation of the posterior nasal nerve in children
Nisreen Al-Musaileem, MD, FACS
Peter Catalano, MD
Yusuf Gulleth
University of Toronto

Introduction:
Allergic rhinitis AR & Nonallergic rhinitis NAR impacts > 58 millions people in the US. A combination of AR and NAR is known as mixed rhinitis MR. The most common type of NAR is vasomotor rhinitis VMR and is characterized by autonomic dysfunction. Cryotherapy has been used for ablation of the posterior nasal nerve PNN in adults with VMR and AR.
We report a study of cryoablation of the PNN in children with AR, VMR, & MR to assess feasibility, tolerability/ safety, & effectiveness.

Methods:
A Retrospective chart review of children who had cryoablation from 2018 to 2022 was performed. Patients were 4-12 yrs of age with a diagnosis of AR, VMR or MR and had cryoablation during nasal surgery under GA. Data collection included demographics; medical
treatment; allergy results; feasibility; safety; tolerability; and effectiveness. The Total Nasal Symptom Score TNSS was obtained at baseline and 3 months post-op to assess outcomes.

Results:
97 charts met inclusion criteria. There were 65 M and 33 F; mean age = 7.5 years. 64% had VMR, 23.7% had AR, and 12.4% had MR. Pre-op, 28.9% used nasal steroid, 39.6% oral antihistamine. Cryotherapy was aborted in 3/97 cases due to poor access in children aged 4 and unrelated to anatomical obstruction such as DNS, ITH, CB or PMT. There were no intra-op complications. Post-op complications were 2%. 26.6 % of children, all with confirmed AR, continued to use topical steroid spray at 3 months. There was a statistically significant improvement in TNSS at 3 months vs baseline ($p<0.005$), however, this was not true for kids with AR.

Conclusion:
Cryoablation of PNN under GA is safe, well tolerated, and effective for children with chronic rhinitis, however it was less effective in patients with AR vs VMR and MR.

8:42 am – 8:47 am
Impact of septal deviation in temperature-controlled radiofrequency treatment of the nasal valve
William Yao, MD, FARS
Philip Chen, MD, FARS
Dennis Tang, MD, FARS
Arthur Wu, MD, FARS

Background:
Septal deviation is often observed in patients with nasal valve dysfunction (NVD) and considered to be a major contributor to nasal airway obstruction (NAO). Herein, patients were analyzed to determine the efficacy of Temperature-controlled radiofrequency (TCRF) treatment of the nasal valve in treating NVD despite the presence of a deviated septum (DS).

Methods:
A post-hoc independent analysis was performed on 122 patients from 2 prospective studies evaluating the effect of TCRF on patients with NAO with a baseline Nasal Obstruction Symptom Evaluation (NOSE) score ≥55 at 2 yrs. Previously obtained images and videos were reviewed by 3 independent blinded rhinologists assessing severity of DS via modified Brodsky scale (Grade 0-4) and involvement of the nasal valve region. Responder defined as ≥20% reduction NOSE score or ≥1 reduction in severity class were compared relative to degree of DS. Results were analyzed with individual t-test. Reviewer

agreement of DS was evaluated using Cohen's kappa test as well as continuous data analyzed with a t-test.

Results:
Interrater reliability of the assessment of DS had substantial agreement (kappa > 0.7). The change in NOSE score pre-to-post treatment at 2 yrs was −43.2 (95%CI, −50.9 to −35.5) with p<0.05 for patients with no DS/≤25% DS. Patients with DS ≥25% involving the nasal valve had a reduction in NOSE score of −50.5 (95% CI, −58.3 to −42.7) at 2yrs. Responder rates were similar for both groups as well.

Conclusion:
Minimally invasive TCRF treatment of NVD resulted in significant and sustained improvements in the symptoms of NAO at 2 years regardless of DS severity and involvement of nasal valve.

8:48 am – 8:53 am
Intranasal trigeminal function in aging adults
Noah Feit, MD
Rodney Schlosser, MD, FARS
Zachary Soler, MD, MSc, FARS
Tina Lapointe, Research Associate
Charn Pitiranggon
Carter Smith
Mathew Gregoski
Isabel Finnegan
Medical University of South Carolina

Background:
Intranasal trigeminal function is important in detecting environmental stimuli. The impact of age-associated chemosensory dysfunction upon taste and olfaction are well described, but an understanding of trigeminal loss (chemesthesis) is lacking. We performed a nested cohort study examining demographics, comorbidities, patient-reported outcome measures, and olfactory, taste, and trigeminal psychophysical testing to better characterize trigeminal function in older adults.

Methods:
Twenty-eight participants over 50 years of age were recruited from the community. They completed chemosensory questionnaires, PROMs, and psychophysical testing for taste (taste strips), olfaction (Sniffin' Sticks), and trigeminal (eucalyptol lateralization). Data were analyzed for associations between trigeminal function, taste and olfactory psychophysical performance, subjective metrics, and demographic risk factors.

Results:
Subjective trigeminal impairment is less severe than other chemosensory loss, with mean VAS scales (rated 0-100) for smell (32.9 +/- 34.2), taste (20.6 +/- 28.4), and trigeminal sensation (9.5 +/- 12.8). In contrast, psychophysical trigeminal dysfunction assessed by eucalyptol lateralization was present in 35.7% of subjects. Hypercholesterolemia was associated with psychophysical trigeminal dysfunction (mean in hypercholesterolemia 57.7% +/- 17.1 vs. 74.1% +/- 10.4, p=0.008). Psychophysical olfactory and taste dysfunction were present in 57.1% and 28.6% of the population respectively.

Conclusion:
Intranasal trigeminal impairment is present in nearly one-third of aging subjects when assessed by psychophysical methods but is under-recognized by patients. Hyperlipidemia may be associated with trigeminal impairment.

8:54 am – 9:00 am
Q&A

Moderators: James W. Mims, MD; Jennifer Villwock, MD

9:00 am – 9:05 am
Intralesional sclerotherapy more effective for epistaxis in HHT
Nitish Kumar, MS
Devyani Lal, MD, FARS
Pedro Lanca Gomes, MD
Michael Marino, MD, FARS
Amar Miglani, MD
Stephen Bansberg, Consultant-Rhinology
Mayo Clinic

Background:
We compared efficacy of intralesional sclerotherapy using 3% sodium tetradecyl sulfate with non-sclerotherapy treatments for managing epistaxis associated with hereditary hemorrhagic telangiectasia (HHT-Ep).

Methodology:
Patients who underwent surgical intervention for HHT-Ep from 01/2010-02/2024 were selected. Based on treatment received at our institution, patients were studied as sclerotherapy and non-sclerotherapy groups to compare breakthrough

epistaxis in the 3-months postoperative period, intraoperative blood loss and intervals between successive procedures.

Results:
23 patients who underwent 74 intranasal procedures were identified. 17 patients underwent 47 procedures in the sclerotherapy group. In the non-sclerotherapy group, 10 patients underwent 27 procedures. 76.5% of patient in sclerotherapy and 100% in non-sclerotherapy group had undergone prior procedures such as intranasal bevacizumab injection, septodermoplasty, laser photocoagulation, coblation, cauterization ± debridement, and nasal closure. In 3 months post-treatment, breakthrough epistaxis was significantly less after sclerotherapy procedures (13/47) vs. non-sclerotherapy procedures (14/27); (p=0.037). Intraoperative blood loss was significantly lower during sclerotherapy (median:10mL) vs. non-sclerotherapy procedures (median:50mL); p<0.001. Time interval between successive procedures was not significantly different in sclerotherapy (median 6.5 months) vs. non-sclerotherapy group (median 3.5 months); p=0.13. No episodes of blindness were noted.

Conclusions:
Compared to non-sclerotherapy treatments, intralesional sclerotherapy for epistaxis in HHT is more effective in decreasing breakthrough epistaxis and has lower intraoperative blood loss.

9:06 am – 9:11 am
Selective neurovascular cautery during turbinoplasty reduces rhinitis symptoms
Alexander Zhang, MBBS
Alkis Psaltis, Associate Professor
Peter-John Wormald, Professor
Queen Elizabeth Hospital

Aims:
Whilst the mucosa-sparing inferior turbinoplasty is effective in addressing nasal obstruction, patients may still experience other symptoms of rhinitis. This study aims to explore outcomes from a novel turbinoplasty technique, which involves cautery of the neurovascular bundles giving parasympathetic supply to the inferior turbinate.

Methodology:
The double flap turbinoplasty technique, involving preservation of both medial and lateral turbinate mucosa, was used in 34 patients. The neurovascular bundles were identified and cauterised with bipolar forceps in all patients. Symptom burden was assessed with pre- and post-operative Sino-Nasal Outcome Test (SNOT-22) and Adelaide Disease Severity Score (ADSS) questionnaires.

Results:
Patients showed a significant difference in pre- and post-operative total SNOT-22 (43.3 vs 20.03; p<0.001). There was a significant reduction in all SNOT-22 rhinitis subdomains including nasal blockage (3.5 vs 1.3; p<0.001), sneezing (1.4 vs 0.7; p=0.002), runny nose (1.7 vs 1.0; p=0.009), post-nasal discharge (1.7 vs 0.9; p<0.001), nose blowing (2.0 vs 1.1; p<0.001) and thick nasal discharge (1.1 vs 0.5; p=0.008). There was a significant reduction in the total ADSS scores (13.0 vs 8.5; p<0.001) and rhinitis subdomains including nasal obstruction (3.6 vs 1.8; p<0.001), rhinorrhoea (2.5 vs 1.8; p =0.003) and postnasal drip (2.5 vs 1.8; p=0.002).

Conclusions:
Selective cautery of the neurovascular bundles using the double-flap inferior turbinoplasty technique provides a significant reduction in nasal discharge and sneezing, whilst also providing significant relief from nasal obstruction.

9:12 am – 9:17 am
Nasal outcomes of rhinitis medicamentosa: Validation of the NORM form
Brekel Kemp, MD, MPH
Edward McCoul, MD, FARS
T.C. Flowers
Anna Bareiss, Resident
Andrew Thomas, MD
Alexander Riley, Attending Physician
Tulane University

Background:
Rhinitis medicamentosa (RM) is characterized by physiologic dependence on sympathomimetic nasal sprays. Established standards for the assessment and management of RM are lacking. There is a need for a validated clinical instrument to assess the burden of disease and nasal spray usage on quality of life.

Methods:
The Nasal Outcomes of Rhinitis Medicamentosa (NORM form) was developed using standard survey development techniques with an addiction medicine specialist. The final instrument consisted of 22 questions plus a global

assessment of health constructed on a 5-point Likert scale. The NORM form was distributed to consecutive outpatients presenting to rhinology clinic with nasal obstruction and habitual use of a nasal spray. Subjects concurrently completed the Nasal Obstruction Symptom Evaluation (NOSE). Pairwise comparisons were made between decongestant spray (DS) and steroid spray (SS) groups. Content validity, construct validity, discriminative validity, and test-retest reliability were assessed for the NORM form.

Results:
Forty DS and 30 SS users were enrolled. The NORM form had excellent discriminative ability between groups, with an overall mean (SD) score of 3.3 (1.2) for DS and 1.8 (0.9) for SS ($p<0.0001$). Total score was highly correlated with a global assessment of health and test-retest reliability was high. DS users described significantly more dependence and frustration with nasal spray use, and more often used it to facilitate work, mitigate stressors, and before bedtime.

Conclusion:
The NORM form provides a valid assessment of patient-reported disease burden in patients with RM. Elements of physiological and psychological dependence are present in DS users more prominently than in SS users.

9:18 am – 9:23 am
Intranasal mucosal sensitivity to mechanical airjet stimulation among ENS and septoturb patients
Ahmad Odeh, BS
Kanghyan Kim, BS
Veronica Formanek
Joseph Lee, MD
Bradley Otto, MD
Kathleen Kelly, MD
Kai Zhao, Associate Professor
The Ohio State University

Objectives:
Abnormal nasal mucosal function has been frequently implicated in the symptomatology of empty nose syndrome (ENS), yet with limited evidence. This prospective study aims to compare nasal mucosal sensitivity to mechanical stimuli between ENS patients and patients who underwent septoplasty/turbinate reduction surgery (septoturb) but without ENS symptoms.

Methods:
Four ENS and three septoturb subjects were recruited. Precise, 15 millisecond air jets with flow rates ranging from 0.5 to 5 L/min were delivered via 25-gauge Dermasculpt blunt-tipped microcannula, with a 0.01 x 0.03-inch side opening, placed 2 mm from the mucosal surface at predetermined sites, and fixed with a custom eyeglass holder. The sites included the medial/lateral side of nasal valve, the inferior turbinate head and its opposing septum, and along the middle inferior turbinate and its opposing septum. Detection thresholds were determined using a single-staircase method in 0.5 L/min steps.

Results:
The ENS group showed significantly higher thresholds (less sensitive) across all stimulation sites (ENS: 1.82 ± 0.51 Septoturb: 1.01 ± 0.47 L/min, $p<0.001$). In particular, the medial side of the nasal valve, the inferior turbinate head and its opposing septum, and the middle inferior turbinate, showed significantly higher thresholds for ENS than that of septoturb subjects ($p<0.05$). Within the ENS cohort, the nasal valve showed the lowest detection thresholds compared to other sites, although the difference was not significant.

Conclusion:
There appears to be significant regional mucosal sensitivity impairment among ENS patients, which may contribute to their paradoxical symptomatology. A future larger sample size would make a more definitive conclusion.

9:24 am – 9:29 am
Q&A

9:30 am – 9:45 am
Debate: "Allergy Testing: Skin Testing v. In Vitro Testing
Moderator: Sandra Lin, MD, FARS
Panelists: James W. Mims, MD; Jennifer Villwock, MD

9:45 am – 10:15 am
Break with Exhibitors in Sparkle Ballroom East

PROGRAM ABSTRACTS

Moderators: Greg Davis, MD, FARS; David Yen, MD

10:15 am – 10:20 am

Factors associated with high-risk ergonomic posture during office-based rhinology procedures

Orli Weiss, Medical Student
Shaun Edalati, BS
Katherine Liu
Jennifer Ren
Mohamed Taha, MD
Alfred Marc Iloreta, MD
Anthony Del Signore, MD, FARS
Satish Govindaraj, MD, FARS
Icahn School of Medicine at Mount Sinai

To measure posture and identify risk factors associated with high-risk positions during in-office rhinology procedures.

Fellowship-trained rhinologists wore ergonomic sensors on their upper bodies while performing in-office procedures. For each joint, the average joint angle and the percentage of time spent in high-risk angles were calculated. Duration, time of day, and type of procedure were also recorded for comparison.
25 nasal endoscopies, 3 debridements, and 5 turbinate reductions, 10 rhinitis (Clarifix, RhinAer, Neuromark) procedures were conducted by two rhinologists. Display screens were on the left while scopes were in the left hand. On average, rhinologists spent 96.8% of total procedure time in a high-risk position involving any joint. Longer procedures were associated with significantly greater percentage of time in high-risk positions for neck rotation (88% vs 76%, p=0.03) and left shoulder flexion/extension (83% vs 69%, p=0.03). In contrast, shorter procedures were associated with significantly greater percentage of time in high-risk right shoulder abduction/adduction (46% vs 23%, p=0.01). Time of day was associated with significantly greater percentage of time spent in high-risk right shoulder flexion/extension in the morning compared to afternoon (80% vs 68%, p=0.01).

With the increase in office procedures performed by rhinologists, the risk of ergonomic injury may rise. Unlike the controlled environment of the operating room with support staff, office settings require closer examination regarding procedures and ergonomics. While duration, time of day, and type of procedure were identified as contributing factors, further research is warranted to promote optimal ergonomic positioning for rhinology procedures.

10:21 am – 10:26 am

Environmental impact of nasal endoscopy

Darpan Kayastha, MD

Environmental impact of nasal endoscopy

Darpan Kayastha, MD
Beatrice Katnelson, Medical Student
Ryan Rimmer, MD, FARS
Yale School of Medicine

Introduction:
Surgical procedures generate the majority of total hospital waste and up to one-third of US healthcare-associated waste. Although nasal endoscopy surgery (NES) is a common procedure used to diagnose and treat a variety of sinonasal conditions, there is a paucity of literature regarding its environmental impact.

Objectives:
To analyze and compare the environmental impacts of single and multi-use items involved in standard NES.

Methods:
A single institution cradle-to-grave life cycle assessment (LCA) of NES. The global warming potential (GWP) and energy, electricity, and water demands associated with the production, transport, use/re-use, and disposal of single-use and multi-use components were considered.

Results:
The environmental impacts of a single NES for landfilling vs incineration scenarios are estimated at 1054 vs 809 MJ of energy consumption, 52.53 vs 65.61 kg CO2 eq of GWP, and 152 vs 132 m3 of water consumption, respectively. Extrapolation yields estimated annual impacts at our institution of 206 vs 145 GJ of energy consumption, 9.22 vs 12.42 tons CO2 eq of GWP, and 3.83 x104 m3 vs 3.84 x 104 m3 of water consumption. Single-use items demand 6 to 8.7 times more energy consumption and have 8 to 11 times more GWP than multi-use items. Decontamination of multi-use items, while energy-consumptive, still has significantly lower energy demand than use of single-use items.

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Conclusion:
The environmental impact of NES is substantial with the most energy demand and GWP linked to single-use items. This supports greater incorporation of multi-use items despite greater decontamination needs.

10:27 am – 10:32 am
Perioperative pollen exposure affects chronic rhinosinusitis outcomes after endoscopic sinus surgery
Benton Tullis, BS
Jess Mace, MPH, CCRP
Vijay Ramakrishnan, MD, FARS
Daniel Beswick, MD, FARS
Zachary Soler, MD, FARS
Timothy Smith, MD, MPH, FARS
Jeremiah Alt, MD, PhD, FARS
Amarbir Gill, MD
University of Utah

Although environmental factors can negatively impact chronic rhinosinusitis (CRS), little is known about the effects of pollen on outcomes. Here, we analyzed the association between perioperative pollen exposure and quality-of-life outcomes after endoscopic sinus surgery (ESS).

Patients with CRS were prospectively enrolled in a multi-institutional study after ESS. The 22-item SinoNasal Outcome Test (SNOT-22) and Medical Outcomes Study Questionnaire Short-Form 6-D (SF-6D) scores were recorded at study enrollment, and during short-term (<6 months) and long-term (>6 months) follow-up. County-based pollen data through the American Academy of Allergy, Asthma & Immunology was used to calculate mean 1- and 2-week preoperative, and 1- and 3- month postoperative grass/weed, tree, ragweed, and total pollen exposure. Spearman's correlation coefficients (ρ) and p-values were calculated.

79 patients were included (mean follow-up 8 months; range 4-17). Higher perioperative total pollen exposure was associated with significantly less short-term improvement in SF-6D scores (1- and 2-week exposure: ρ=0.550, p=0.012 and ρ=0.580, p=0.008; 1-month exposure: ρ=0.480, p=0.030). Long-term SNOT-22 score improvement was reduced by total pollen exposure 1-week before (ρ=-0.310, p=0.018), and 1- and 3-months after surgery (ρ=-0.350, p=0.007 and ρ=-0.334, p=0.010). SF-6D scores were primarily impacted by grass/weed exposure across all examined time points (ρ>0.500, p<0.030). SNOT-22 scores were principally affected by tree pollen at both pre-operative time points and 1-month post-operatively (ρ<-0.273, p<0.040).

Perioperative pollen exposure attenuated short-term improvement in SF-6D scores and long-term improvement in SNOT-22 scores after ESS.

10:33 am – 10:38 am
Ambient particulate matter and frequency of outpatient visits for chronic rhinosinusitis in the US
Hong-Ho Yang, BS
David Grimm, Medical Student
Esther Velasquez, PhD
Peter Hwang, MD, FARS
David Geffen School of Medicine at UCLA

Introduction:
Emerging evidence has underscored the harmful effects of air pollution on the upper airway and its subsequent impact on health care utilization. We investigated the relationship between ambient particulate matter (PM) level and the frequency of outpatient visits for chronic rhinosinusitis (CRS).

Methods:
We conducted a cohort study of US adults enrolled in The Merative® MarketScan® Databases from 2007-2019. For each geographical subunit (Core-Based Statistical Area, CBSA), we calculated the annual rate of CRS-related outpatient visits (CRS-OV) per 1000 well checkup (WC) visits. Using data from the EPA's Air Quality System, we mapped the rolling statistical average of daily PM2.5 and PM10 over the preceding year onto each CBSA. We employed multivariable negative binomial regression modeling to estimate the association between PM levels and CRS-OV.

Results:
Across 294 CBSAs, encompassing ~3.9 billion visits, the median annual CRS-OV rate was 164 per 1000 WC visits (IQR 110-267, range 26-4114). The mean PM2.5 level was 8.9 μg/m³ (SD 2.6, range 2.2-21.7) and the mean PM10 level was 20.2 μg/m³ (SD 7.2, range 5.3-67.6). After adjusting for patient demographics and

respiratory comorbidities, a compounded rise in CRS-OV was observed with increasing PM levels. Starting from a PM2.5 and PM10 base of 0, each standard deviation (SD) rise in PM2.5 independently predicted a 6% increase in CRS-OV (aIRR 1.06, cluster-adjusted 95% CI 1.02-1.11) and each SD rise in PM10 predicted a 5% increase in CRS-OV (aIRR 1.05, 1.01-1.09) over the previous SD.

Conclusion:
Elevated ambient PM2.5 and PM10 levels are associated with a subsequent compounded increase in the frequency of CRS-related outpatient visits.

10:39 am – 10:45 am
Q&A

Moderators: Jean Kim, MD, FARS; Elina Toskala, MD, FARS

10:45 am – 10:50 am
Generic competition and prices for azelastine-fluticasone nasal spray
Vinay Rathi, MD
Akash Bhat, BS
Rodney Schlosser, MD, FARS
Alan Workman, MD
Zachary Soler, MD, FARS

Background:
In May 2012, the FDA approved azelastine-fluticasone (Dymista) nasal spray for seasonal allergic rhinitis. Though Dymista has superior efficacy compared to azelastine (AZ) or fluticasone (FL) monotherapy, costs may be prohibitive for patients and payers. In April 2020, the manufacturer introduced an authorized generic version; we investigated related trends in pricing and market competition.

Methods:
We performed retrospective cross-sectional analyses of inflation-adjusted January wholesale and point-of-sale (POS) prices for Dymista, AZ, and FL using publicly available NADAC and Medicare data from 2019-2023. We additionally reviewed the FDA Orange Book (versions 2013-2024) to identify all manufacturers and patents for Dymista. We then queried Google Patents to identify all litigation associated with each patent as of March 2024.

Results:
Between 2019-2023, the POS price for Dymista decreased $20.67 (relative change [RC]: -8.5%). However, the absolute (range: $181.31-$201.17) and relative (range: 417.6%-520.8%) markup relative to separately purchasing AZ/FL remained substantial. Dymista wholesale prices were 87.5%-90.8% POS prices, indicating that high prices were driven by the manufacturer rather than pharmacies. The manufacturer has received 4 patents (2 for formulation, 2 for delivery method) and successfully prevented 5 other manufacturers from US generic market commercialization through patent litigation.

Conclusions:
Dymista's price marginally declined after introduction of an authorized generic; the combined spray remains >5-fold more expensive than purchasing AZ/FL separately. Dymista will likely remain unaffordable for many patients until the patent-protected market monopoly expires in August 2026.

10:51 am – 10:56 am
Persistent reduction of total serum IgE in CRSwNP after ESS with short course Dupilumab
Leandra Mfuna Endam, Coordinator, Clinical Affairs
Audrey Pelletier, Scientist
Emmanuel Gonzales, Metagenomics Team Lead
Martin Desrosiers, MD
Centre Hospitalier de l'Université de Montréal

Introduction:
In the Dupilumab for Prevention of Recurrence of CRSwNP After Endoscopic Sinus Surgery (ESS) trial (NCT04596189) a fourteen-week course of dupilumab or placebo is administered to patients with recurrent CRSwNP undergoing revision ESS for CRSwNP to reduce long-term recurrence of nasal polyposis. A pre-specified analysis was performed at the 16-week post-ESS timepoint to verify safety parameters.

Method:
Blood drawn during the study for assessment of safety and monitoring of inflammatory parameters was assessed and compared between treatment groups. 30 participants (Dupilumab:16; Placebo:14) were included in this interim analysis.

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Results:
Of all measured serum parameters, only total serum IgE showed a consistent modification. In patients receiving Dupilumab, serum IgE showed a reduction which persisted until end of study. (Dupilumab vs Placebo: 20 weeks after last injection: 57.9 vs. 142.9 IU/ml (range: 9-168 vs. 20.0-400.7, p=0.03); 40 weeks: 46.5 vs. 163.2 IU/ml (range: 9-197 vs. 23.0-634.0, p=0.04).

Conclusion:
Administration of dupilumab for 14 weeks at the time of ESS in patients undergoing revision surgery for CRSwNP is associated with a persistent post-treatment reduction in serum IgE. This suggests that a short course of Dupilumab administered during performance and recovery from ESS effects a durable modification to the biology of surgery-refractory CRSwNP patients. This may have implications for development of ongoing efforts to induce remission in CRSwNP.

10:57 am – 11:02 am
Dupilumab-associated adverse events in children vs adults: An analysis of the FAERS database
Elias Saba, MD
Nicholas Del Mundo
Henry Zheng
Jonathan Liang, MD, FARS
Kaiser Permanente Oakland Medical Center

Background:
Dupilumab is a biologic used in the treatment of several indications including adult chronic rhinosinusitis with nasal polyposis (CRSwNP). It is unknown if dupilumab is safe in children with CRSwNP.

Methods:
The FDA Adverse Event Reporting System (FAERS) was queried from 1/1/20-6/30/23 for all dupilumab-associated adverse events (DA-AE) in patients treated for asthma, CRSwNP, or atopic dermatitis (AD). Multiple logistic regression and zero-truncated poisson analysis were used to assess risk factors for DA-AE in patients treated for CRSwNP.

Results:
There were 85258 entries identified, of which 11994(14.1%) involved a pediatric patient. The 81 events involving pediatric CRSwNP included administration-based events such as unapproved indication use (66.7%), generalized dermatologic events (7.41%), ophthalmologic events (6.17%), local injection-related events (4.94%), and generalized symptoms (4.94%).

Adjusted for gender, children were less likely to experience a serious DA-AE [OR 0.36; 95% CI, 0.33, 0.39] or resultant serious outcome [OR 0.32; 95% CI 0.29, 0.36] in comparison to adults. In comparison to younger children, children aged 12-17 were less likely to experience a serious reaction [OR 0.74; 95% CI 0.63, 0.88]. Concurrent treatment for asthma, but not AD, was a risk factor for serious reactions [OR 2.15; 95% CI 1.83, 2.53] and outcomes [OR 2.35, 95% CI 1.87, 2.93].

Conclusion:
To the authors' knowledge this is the only database study comparing DA-AE in adults and children. This analysis suggests children are less likely to experience a serious DA-AE in comparison to adults. Concurrent treatment for asthma, but not AD, was a specific risk factor for serious adverse reactions and outcomes.

11:03 am – 11:08 am
The impact of sinonasal corticosteroid irrigations on glycemic control: A retrospective analysis
Anthony Botros, MD, MBA
Khaled Altartour, Visiting Fellow
Andee Fontenot, Resident Surgeon
Roberto Soriano, Resident Surgeon
Georges Daoud, Resident Surgeon
Thomas Edwards, Assistant Professor
Emory University School of Medicine

Background:
Topical sinonasal corticosteroid irrigations are widely used to treat chronic rhinosinusitis. Irrigations are thought to have little systemic absorption and thus likely minimal impact on glycemic control. However, this has not been rigorously studied. This study investigated hemoglobin A1c (HbA1c) values before and after initiation of topical sinonasal corticosteroid irrigations.

Method:
A retrospective chart review of patients prescribed corticosteroid irrigations from 2021-2024 was performed. Patients with both an A1c

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level within 1 year of initiation of irrigations and another at least three months after initiation of rinses were included. Patients with diabetes or taking medications expected to alter glycemic control were excluded. Pre-rinse and on-rinse HbA1c data were analyzed using the Wilcoxon signed-rank test with significance set to $p<0.05$.

Results:
38 patients were identified for inclusion. The median age was 61. 42.1% of patients received mometasone rinses while 57.9% received budesonide rinses. 36.8% had documented sinus surgery before starting rinses. 28.9% received oral corticosteroids while on rinses. The median pre-rinse HbA1c was 5.4%, and the median on-rinse HbA1c was 5.2%. The difference, -0.2%, was less than the established MCID for HbA1c of 0.5%. Rinse type, sinus surgery, and oral steroid use were not associated with significant changes in HbA1c levels.

Conclusion:
This study found no clinically significant change in HbA1c in patients using topical sinonasal corticosteroid irrigations. The results of this study support the assumption that these medications have minimal impact on glycemic control.

11:09 am – 11:15 am
Q&A

11:15 am – 12:00 pm
RiPP Panel: "What's Your Side Gig? Capturing Additional Income"
Moderator: David Yen, MD
Panelists: Greg Davis, MD, FARS; Douglas Reh, MD, FARS; Stacey Silvers, MD, FARS; Geoffrey Trenkle, DO

12:00 pm – 1:00 pm
Lunch with Exhibitors in Sparkle Ballroom East

12:15 pm – 1:00 pm
Splash 9 & 10
ARS Fall Film FESStival

Saturday, September 28, 2024

1:00 pm – 5:00 pm
General Session
Sparkle Ballroom West

1:00 pm – 1:15 pm
ARS Business Meeting and Presidential Citations
Pete Batra, MD, FARS; Michael Stewart, MD, FARS; Kevin Welch, MD, FARS

1:15 pm – 2:00 pm
3rd Annual Hwang Family Lectureship
Guest Speaker: Alexander Chiu, MD, FARS
"A Disruptive Career Path: Lessons From Great Teachers, Personal Failures and Risky Career Choices"

Moderators: Anthony Del Signore, MD, FARS; Kristine Smith, MD

2:00 pm – 2:05 pm
Prevalence of Cystic Fibrosis carrier status in chronic rhinosinusitis without nasal polyps
Do-Yeon Cho, MD
Jessica Grayson, MD
Justin Turner, MD, FARS
Bradford Woodworth, MD, FARS
University of Alabama at Birmingham

Introduction:
Emerging evidence indicates that carriers of cystic fibrosis (CF) may exhibit not only subclinical laboratory abnormalities but also CF-like clinical phenotypes. This study aims to determine the prevalence of cystic fibrosis transmembrane conductance regulator (CFTR) mutations in patients with recalcitrant chronic rhinosinusitis (CRS) without nasal polyps (NP).

Methods:
A CF screening test (Quest Diagnostics™) was conducted on patients with recalcitrant CRS without NP who visited a tertiary rhinology clinic from August 2023 to January 2024. This screening test identifies 32 CF mutations, including the 23 core mutations. Patients were categorized based on culture results during screening into culture-positive and culture-negative groups.

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Results:
Out of 115 patients with recalcitrant CRS without NP (52 males and 63 females; mean age = 53.6 +/- 1.6 years), 10 (8.7%; 7 males and 3 females; mean age = 55.5 +/- 6.8 years; all Caucasian) were heterozygous for at least one of the screened CF mutations, including delta F508, R117H, G542X, R334W, and 1898+1G>A. A significantly higher prevalence of CF carrier status was observed in culture-positive patients (14.1%) compared to culture-negative patients (3.8%) ($p = 0.02$).

Conclusions:
The study revealed a notably higher prevalence of CFTR mutations in patients with culture-positive recalcitrant CRS without NP, suggesting a potential link between CF carrier status and the development of persistent sinusitis in non-type 2 CRS subsets. This finding underscores the importance of considering CFTR mutations in the diagnostic evaluation of CRS, particularly in cases resistant to standard treatments.

2:06 pm – 2:11 pm
Olfactory cleft opacification and outcomes improve with expanded intranasal steroid treatment
Alan Workman, MD, MTR
David Lerner, MD
Vinay Rathi, MD
Jennifer Douglas, MD
Michael Kohanski, MD, PhD
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
University of Pennsylvania

Background: Olfactory dysfunction is associated with impaired quality of life in CRS. The purpose of this study is to assess olfactory cleft opacification before and after expanded intranasal corticosteroid treatment and assess changes in olfaction and taste.

Methods: Patients with severe impairment in olfactory/gustatory dysfunction (score of 5 in “lack of taste/smell”) were identified from the ReOpen1/2 EDS-FLU trials. Standardized olfactory cleft opacification scores (0-4 anterior/posterior) were calculated on pre-and post-intervention CT scans; SNOT-22’s and UPSIT scores were analyzed.

Results: Of 205 subjects with severe olfactory/gustatory dysfunction, 69 randomized to placebo, 73 to single-spray steroid, and 63 to double-spray for 24 weeks. Both low- and high-dose treatment improved anterior (-0.67; -0.64, $p<0.0001$) and posterior (-0.58; -0.56, $p<0.01$) olfactory cleft opacification relative to placebo (-0.04; -0.11). Correspondingly, patients reported significant improvement in smell/taste with low-dose (-1.59, $p<0.01$) and high-dose treatment (-1.52, $p=0.01$) compared to placebo (-0.86). UPSIT scores improved by 4.5 points ($p<0.01$) and 4.0 points ($p<0.05$) in the low-and high-dose treatment arms, respectively; UPSIT scores did not improve on placebo (-0.3 points). There was a linear relationship between decreases in anterior olfactory cleft opacification grade and subjective taste/smell improvement ($p<0.001$), as well as UPSIT score ($p<0.001$).

Conclusion: Olfactory cleft opacification improves with expanded intranasal steroid treatment relative to placebo, and this is directly associated with objective and patient-reported taste/smell improvement in CRS patients with severe olfactory and gustatory dysfunction.

2:12 pm – 2:17 pm
Inflammatory endotypes in CRSwNP: Implications for postop outcomes
Christina Dorismond, MD, MPH
Yash Trivedi
Mason Krysinski, MD
Rory Lubner, MD
Li-Ching Huang
Quanhu Sheng
Rakesh Chandra, MD, FARS
Naweed Chowdhury, MD, MPH
Justin Turner, MD, PhD, FARS

Intro:
While CRSwNP has been linked to type 2 inflammation, recent studies suggest a more heterogeneous inflammatory profile. We aimed to characterize CRSwNP based on inflammatory biomarkers and compare postoperative outcomes across endotypes.

Methods:
Nasal mucus levels of 17 inflammatory mediators were measured in CRSwNP patients who underwent sinus surgery from 2015-2023. Endotypes were characterized using hierarchical cluster analysis, and clinical factors

and postoperative outcomes were compared among clusters using Kruskal-Wallis, Chi-squared, and log-rank tests.

Results:
We identified 6 inflammatory clusters within our 269 CRSwNP patients. While each exhibited a component of type 2 inflammation, Cluster 1 (46.5%) was characterized by relatively low inflammation. Clusters 4 (13.3%) and 6 (7.1%) also had low inflammation but with elevated levels of IL-12/IL-21 and of CC chemokine ligand-5, respectively. Cluster 2 (4.5%) exhibited mixed type 1 and 3 inflammation (high IFN-γ and IL-17) and Cluster 3 (10.0%) showed an innate, proinflammatory profile (high IL-1β and IL-6). Cluster 5 (18.9%) demonstrated classic type 2 inflammation (high IL-5 and IL-13). Asthma and AERD prevalence and baseline CT and SNOT-22 scores were similar across clusters. Patients in Clusters 2 and 4 had worse polyp recurrence free survival ($p<0.01$) and patients in Cluster 4 had worse non-steroid use survival compared to Cluster 1 (HR 1.57, 95% CI 1.01-2.45). Time-to-biologic prescribing was similar across clusters ($p=0.43$).

Conclusion:
Despite phenotypic similarities, CRSwNP patients exhibit distinct inflammatory endotypes which may result in diverse post-ESS outcomes. Endotyping may help reveal novel treatment targets to improve CRSwNP outcomes.

2:18 pm - 2:23 pm
Autonomic dysfunction and olfactory loss in long COVID
Eve Champaloux, MD, PhD
Aria Jafari
Ian Humphreys
Mohamed Aboueisha, Research Fellow
University of Washington

Background:
Post-Acute COVID Syndrome (PASC) presents persistent symptoms, with an increasing link to autonomic dysregulation. Furthermore, autonomic dysfunction is believed to play a role in post-COVID-19 chemosensory dysfunction (CD). Our objective is to explore the association between autonomic and chemosensory dysfunction in PASC patients.

Methods:
A longitudinal cohort study of 1,591 patients diagnosed with PASC.

Results:
We identified a notable correlation between CD and autonomic symptoms (AS). Of the PACS patients exhibiting CD, 37% experienced persistent smell or taste loss nearly two years post-initial diagnosis. Patients presenting with CD initially showed elevated AS rates in all measures (headache, cardiac symptoms, dizziness, sweating, brain fog, exercise intolerance) [two-way ANOVA, significant main effect of both symptom ($p=0.0004$) and sensory loss ($p=0.0013$)]. Those with ongoing CD had significantly higher AS rates compared to those with resolved CD, and they reported greater concern regarding their AS, for example 5.8% with ongoing concern about brain fog in CD patients and 3.6% in those without. Notably, brain fog was the most frequent enduring symptom, particularly prevalent among CD patients (78% versus 68% in those without CD).

Conclusions:
This investigation reveals a correlation between autonomic symptoms and sensory dysfunction in long COVID, emphasizing the extensive size and longitudinal depth of our cohort. It underscores the necessity for further research to validate this relationship and to assess the effectiveness of stellate ganglion blockade in alleviating these persistent post-COVID-19 symptoms.

2:24 pm – 2:30 pm
Q&A

Moderators: Benjamin Bleier, MD, FARS; Stephanie Smith, MD

2:30 pm – 2:35 pm
Immunophenotyping invasive fungal sinusitis survival
Lauren Roland, MD
Iris Lee
Peggy Kendall
Washington University in St. Louis

Introduction:
Invasive fungal sinusitis (IFS) is a devastating diagnosis with high mortality. Survival is thought to be driven by swift intervention and ability to reverse immune system deficits. To date,

granulocyte stimulating factors and other similar infusions have not been shown to improve overall survival rates. Therefore, we sought to investigate the cell types critical for survival in IFS patients.

Methods:
Peripheral blood mononuclear cells (PBMCs) were isolated from patients with confirmed IFS at the time of diagnosis. Using Cytometry by Time of Flight (CyTOF), over 40 cell types were compared between IFS survivors (defined by 6-month survival) and non-survivors.

Results:
There were a total of 3 survivors and 5 non-survivors with PBMCs viable for analysis. Non-survivors had significantly less WBCs overall, at the time of diagnosis, as compared to survivors. Interestingly, CD4+ T-cells were selectively and statistically significantly decreased in proportion ($p=0.02$) and overall count ($p=0.005$) in the non-survivors as compared to IFS survivors. Monocytes, NK cells, CD8+ T-cell and B cell proportions and total counts did not differ between groups.

Conclusion:
This is the first analysis of the systemic immune system of IFS survivors using CyTOF, a novel method to assess cellular composition and activation status. This work supports the critical value of CD4+ T-cells in IFS survival and may promote future targeted therapies for activated T-cell transfer following IFS diagnosis.

2:36 pm – 2:41 pm
Deep learning approach for automated frontal sinus opacification assessment on CT scans
Caio Athayde Neves, MD, PhD
Adriana CC Patrocinio, MD
Trishia El Chemaly, MS
Fanrui Fu, PhD
Nikolas Blevins, MD
Peter Hwang, MD, FARS
Stanford University

Introduction:
The automation of radiological objective assessment and precise delineation of the frontal sinus, including its geometry and aeration, can improve preoperative evaluation and intraoperative navigation for endoscopic sinus surgery. This study presents a Deep Learning (DL) based system for the automation of delineation and characterization of radiological opacification of the frontal sinus, and its comparison with the modified Lund-Mackay score (MLM).

Methods:
237 high-resolution clinical sinus CT scans were divided into a training set (n = 125) and a test set (n = 112). The frontal sinus of the training set was manually annotated by an expert and the data were used to train a DL anatomical delineation model. In the test set, the percentage of frontal sinus opacification, as determined by the DL model in conjunction with automated threshold delineation, was compared with the MLM classification (0-4) blindly performed by an expert.

Results:
The DL model achieved high accuracy, with a Dice coefficient of 0.92 (0.00 - 1.00), indicating strong correlation with manual delineation. The system accurately identified frontal sinuses in all test set CT scans, regardless of opacification degree. The average frontal sinus volume was 9.79 mm^3 (1.27 - 40.66) and the average opacification percentage was 37% (0 - 100%). The system demonstrated a strong correlation with a specialist's MLM classification (R: 0.88, $p<0.001$) in the test set.

Conclusion:
We present an automated frontal sinus delineation and assessment of opacification that shows strong correlation with the current standard. Our DL approach demonstrated robust performance in frontal sinus assessment, showing potential as a promising tool for improving patient care.

2:42 pm – 2:47 pm
PAR2 activated IL13Rα1 in eCRS
Ching-Chih Lee, MD, PhD

Objective:
This study aimed to explore the role of the protease-activated receptor 2 (PAR2)/SPI1/IL13Rα1 pathway in eosinophilic chronic rhinosinusitis (eCRS).

Methods:
Patients diagnosed with CRS between 2018 and 2020 were included. Clinical characteristics, such as age, sex, social habits, Japanese

PROGRAM ABSTRACTS

Epidemiological Survey of Refractory Eosinophilic Chronic Rhinosinusitis (JESREC) score, and global osteitis scoring system (GOSS) score, were determined. The optical intensity and percentage of PAR2, SPI1, and IL13Rα1 in nasal mucosal tissues (n=64) were analyzed by immunohistochemistry (IHC) and immunofluorescent (IF) multiplex staining using specific antibodies. The correlations between PAR2, SPI1, and IL13Rα1 IHC or IF staining were analyzed using Pearson's correlation; two-sided P-values <0.05 were considered statistically significat.

Results:
Sixty-four patients with CRS were included; mean age was 48.5 (SD, 12.3); 51 patients (80%) were male; 18 patients (28%) had eCRS. The average tissue eosinophil count was 155 in patients with eCRS and 62 in patients with non-eCRS. Patients with eCRS had higher JESREC scores (12.6 vs. 4.5, p<0.001) and GOSS scores (29.6 vs. 18.6, p<0.001). IHC revealed PAR2, SPI1, and IL13Rα1 were upregulated and positively associated with the JESREC score and GOSS score in eCRS. IHC and IF revealed positive correlations between PAR2, SPI1, and IL13Rα1 expression in eCRS, but not in non-eCRS.

Conclusions:
PAR2 may activate IL13Rα1 via SPI1 in eCRS. The PAR2/SPI1/IL13Rα1 pathway could represent a novel treatment target for eCRS.

2:48 pm – 2:53 pm
Olfactory fossa opacification on CT scan is correlated to nasal IL-5 in chronic rhinosinusitis
Radhika Duggal, MA
Kunio Nakamura
Mohamad Chaaban, MD, FARS
Cleveland Clinic Lerner College of Medicine, Case Western Reserve University School of Medicine

Introduction:
In the western world, chronic rhinosinusitis (CRS) with nasal polyps is characterized type 2 inflammation with elevated levels of IL-5. Thus far, type 2 inflammation cannot be identified without cytokine testing. In this study, we investigated correlates of type 2 inflammation using CT scan.

Methods:
We utilized a prospective cohort of 48 patients with CRS undergoing functional endoscopic sinus surgery (FESS). Nasal swabs were collected preoperatively and analyzed for cytokine levels by Eve Technologies. Preoperative CT scans were segmented into regions signifying the olfactory fossa and bilateral maxillary, ethmoid, sphenoid, and frontal sinuses using a custom deep learning algorithm with U-Net architecture. Each region was further divided into center and border regions by morphologically eroding by 2 voxels. Opacification of each region on CT was quantified by the Hounsfield units (HU) at various percentiles and was associated with nasal IL-5 by Spearman correlation.

Results:
In our cohort, 29 (60%) patients were male, 41 (85%) were white, and the mean ± SD age of FESS was 51 ± 17. 31 (65%) patients had nasal polyps and 17 (35%) did not. We found the 20th percentile HU of the olfactory fossa border to have the strongest association with nasal IL-5 values (Correlation coefficient = 0.60, p <0.01). Further analysis of this association demonstrates that while at greater HUs, nasal IL-5 is variable, at lower HUs, the nasal IL-5 is always low.

Conclusions:
We have established an objective correlation between opacification of the olfactory fossa on CT and nasal IL-5 levels – low HU of the opacity fossa may be a clinically useful tool to identify non-T2 inflammation in patients with CRSwNP.

2:54 pm – 3:00 pm
Q&A

3:00 pm – 3:30 pm
Break with Exhibitors in Sparkle Ballroom East

3:30 pm – 4:15 pm
International Panel: "Real World Management of Non-Type 2 CRS Inflammation: A Case-Based Discussion"
Moderator: Do-Yeon Cho, MD
Panelists: Hector de la Garza, MD; Islam Herzallah, MD, PhD; Jin-Young Min, MD, PhD; Rodolfo Nazar, MD

PROGRAM ABSTRACTS

4:15 pm – 5:00 pm
Panel: ARS/AAOA – Empty Nose Syndrome: Just a Bunch of Hot Air?
Moderator: Haidy Marzouk, MD
Panelists: Pete Batra, MD, FARS; Seth Brown, MD, FARS; Sandra Lin, MD, FARS; R. Peter Manes, MD, FARS; Jayakar Nayak, MD; Masayoshi Takashima, MD, FARS

5:00 pm
Meeting Concludes

POSTERS

Poster #A001

A case of orbital necrotizing fasciitis originating from sinonasal pathology

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David Allen, Resident Physician
Daniel Gorelik, Resident Physician
Travis Smith, Medical Student
Nadia Mohyuddin, Associate Professor
Omar Ahmed, MD, FARS
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Introduction:
Necrotizing fasciitis (NF) is a severe and potentially fatal soft tissue infection that commonly requires multiple operative interventions and prolonged antimicrobial treatments. While NF has been well-described within the deep neck spaces and aerodigestive tracts; there are few reports of sinonasal NF with extension to the orbit. Herein, we describe a case of orbital NF caused by direct spread from sinonasal pathology.

Methods:
A case report and literature review was performed.

Results:
A 44-year-old male with a history of poorly-controlled diabetes mellitus presented with one week of progressive right sided proptosis, pain, periorbital edema and acute-onset vision loss. Further evaluation revealed no light perception, complete ophthalmoplegia, and relative afferent pupillary defect in the right eye. Imaging showed significant emphysema within the orbit and due to increased intraocular pressures, an urgent canthotomy was performed at bedside. The patient was then immediately taken to the operating room for right sided endoscopic sinus surgery with orbital decompression and evacuation of the orbit. Given minimal clinical improvement on broad spectrum antimicrobials, the patient was taken for multiple exploratory orbitotomy procedures and debridements with pathology revealing NF. Ultimately, the patient underwent orbital exenteration on hospital day six given progression of disease. He subsequently improved with prolonged anti-microbials and underwent reconstruction with an anterolateral thigh flap.

Conclusion:
Prompt recognition of NF is key to achieving disease control. We implore additional reporting of orbital NF as a result of complicated sinusitis to understand prognostic outcomes and treatment paradigms.

Poster #A002

A descriptive analysis of characteristics of CRSwNP patients within US clinical practice

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Shahar Rosenberg
Amit Sabban
Rachel Black
Richard Stanford
Aakash Gandhi
Nita Thingalaya
Ofir Sagi
Mark Corbett, Dr.
Hernan Avella
Arun Subramaniam
Eastern Virginia Medical School

Objective:
The objective of this real-world study was to characterize demographic and clinical characteristics of CRSwNP patients in the US, based on their surgery status post-diagnosis.

Methods:
This retrospective study used Lynx.MD's electronic medical record data. Patients with CRSwNP were identified between 07/2018-12/2022. First visit for nasal polyps with an otolaryngologist was the index date. Patients were ≥12 yrs at index with ≥3 physician visits and ≥12-months follow-up post-index. Patients were stratified by surgery receipt during f/u. Differences in demographic and clinical characteristics across surgical (S) and non-surgical (NS) groups were evaluated using chi-square and t-tests.

Results:
6,219 patients met all criteria. 1,726 (27.8%) underwent surgery. Mean f/u was similar (897.1 [392.4] days for S vs 907.8 [381.7] for NS). The S group was 63.2% white, 8.3% African American, and 7.9% Asian. The NS group was 67.5% white, 7.2% African American, and 5.9% Asian. Relative to NS, S were younger (47.4 [16.1] vs 51.5 years [17.0]; p<0.001), primarily

male (55.8% vs 48.8%; p<0.001), with higher proportion of atopy (82.6% vs 76.1%; p<0.001), allergic rhinitis (72.8% vs 68.6%; p=0.001), and asthma (53.1% vs 41.6%; p<0.001). Proportion with a biologic prescription for S and NS groups post-index were 15.5% and 11.7% (p<0.001), respectively. Mean time to biologic initiation post-index was 426.7 (410.3) days and 498.5 (424.4) for S and NS groups, respectively. Use of oral corticosteroids post-index was significantly higher in S compared to NS groups (82.9% vs 57.5%; (p<0.001).

Conclusion:
This analysis highlights demographic differences and higher comorbidities/treatment use among S compared to NS patients with NP in the US.

Poster #A003
A double dilemma: A novel case series of concomitant anterior and lateral cerebrospinal fluid leaks
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Introduction:
Spontaneous cerebrospinal fluid (CSF) leaks occur at a significantly higher rate in patients with idiopathic intracranial hypertension (IIH) in comparison to patients with normal intracranial pressure. Often presenting with rhinorrhea, vertigo, subjective hearing loss, aural fullness, and dysgeusia, timely and accurate diagnosis is crucial, as operative intervention is necessary to prevent disease progression and severe complications like meningitis and brain abscess. This novel series presents three cases exhibiting spontaneous anterior and lateral CSF leaks, a presentation yet to be reported. Our unique findings underscore the necessity for heightened awareness and comprehensive evaluation in IIH patients presenting with CSF leaks.

Case Series:
Case 1 includes a left sphenoid sinus and right tegmen encephalocele, case 2 a left sphenoid sinus and right mastoidal encephalocele, and case 3 a right ethmoid sinus and right tegmen encephalocele. The diagnoses were confirmed with Beta-2-transferrin testing and skull base dehiscence on imaging. Each patient was managed with a ventriculoperitoneal shunt to prevent further sequela of IIH.

Discussion:
Our case series demonstrates the complexity of CSF leaks in patients with IIH and emphasizes the critical need for comprehensive skull base examination to identify all potential leak sites. The interplay between spontaneous CSF leaks and IIH highlights the importance of considering elevated intracranial pressure (ICP) in the differential diagnosis, even when initial ICP measurements may be misleading due to communication with atmospheric pressure. Effective management of IIH is crucial for symptom resolution and to prevent progression and recurrence.

Poster #A004
A novel presentation of sinonasal seromucinous hamartoma
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Introduction:
Seromucinous Hamartoma (SH) is an epithelial mass that can arise in the sinonasal tract. Clinically, SH may be asymptomatic or present as nasal obstruction or recurrent sinus infections. Fewer than 30 cases of SH have been reported, and all have defined SH as polyp-like masses. We present a unique manifestation of SH that challenges the treatment considerations of this rare sinonasal pathology.

Case:
A 69-year-old female presented with right-sided nasal obstruction, headache, and cheek pressure. CT/MRI showed right paranasal sinus opacification with bony erosion of the lateral sphenoid wall. Endoscopic evaluation revealed significant edema of right middle meatus and significant thick purulent debris in all right-sided paranasal sinuses. There was no discrete mass or lesion appreciated intra-operatively, but all sinus specimens contained seromucinous hamartoma to include the uncinate process and

nasal wall. Six months post-operatively the patient symptomatically improved with minimal facial pressure and congestion. Despite this, she continued to have recurrent maxillary sinus infection and drainage. Repeat CT/MRI showed an area of mucosal thickening with enhancement to the anterior maxillary wall, concerning for possible residual disease, for which the patient plans to eventually undergo surgery.

Conclusions:
We present a unique manifestation of SH. The presence of bony erosion and lack of a discrete mass have not been described. Despite surgical intervention, persistent infection may represent an SH-related process unresolved due to residual disease. Without discrete resectable margins, this case highlights diagnostic challenges and treatment considerations for SH that present with atypical features.

Poster #A005
A review of IIH management options after spontaneous CSF leak
Ahmad Odeh, BS
Joseph Lee, MD
Jack Harness
Kyle Wu
Daniel Prevedello
Ricardo Carrau
Kyle VanKoevering
Kai Zhao
Bradley Otto, MD
Kathleen Kelly, MD

Introduction:
Controversy surrounds optimal long-term management of IIH after CSF leak repair: acetazolamide (ACTZ) versus shunt. This study aimed to compare efficacy between the two and identify patient-specific factors that may guide decision-making.

Methods:
We retrospectively reviewed 75 patients with IIH after CSF leak repair. Records of lumbar puncture (LP) opening pressure (OP), length of stay (LOS), infections, shunt failures, revision shunts and tolerance of ACTZ were noted.

Results:
23 patients had ACTZ only, 30 had shunts only, 13 had ACTZ followed by shunt, and 11 opted for no treatment. ACTZ significantly decreased LP OP from 27.7 cmH2O±3.9 to 20.5 cmH2O±4.3, $p<0.001$ (n=21). Median dose and duration of ACTZ was 500mg and 1.2 years, with 79% tolerance. Most common side effects were fatigue and dizziness. 31% (n=12) of patients failed ACTZ and required a shunt; 58% (n=7/12) were due to recurrence. 14 shunts were ventriculoperitoneal (VPS) and 30 lumboperitoneal (LPS). 2 VPS (14%) and 1 LPS (3%) were removed due to infection. 4 VPS (29%) and 7 LPS (23%) required revisions. Mean LOS without shunt (n=32, 3.25±3.25 days) was significantly shorter than patients who received a shunt (n=43, 4.84±4.29 days, $p<0.05$).

Discussion:
Although ACTZ significantly reduced LP OP, it had a failure rate of 31% due to side effects, persistent symptoms, and recurrence. LPS trended to a lower infection rate with comparable revision rates compared to VPS. ACTZ was offered to patients with post-op LP OP<30 cmH2O, first time CSF leak, or only 1 defect. Shunt was recommended to patients with higher overall OP, multiple defects, OP>30 cmH2O on ACTZ, or any recurrence.

Poster #A006
WITHDRAWN

Poster #A007
Analyzing disparities in head and neck cancer among Hispanic populations and the role of HPV
Cristina Benites, MBS
Samuel Angel
Saket Pandit
Joseph Novoa
David Goldrich

In our analysis, we explored the incidence of head and neck cancers (HNC) in the United States specifically looking at how cancer rates vary among racial and ethnic groups. By examining data from the Surveillance, Epidemiology and End Results (SEER) program spanning from 2000 to 2020 our aim was to analyze patterns and disparities in cancer occurrence. We focused on the increasing cases of HPV-related cancers and their connection with ethnicity, socioeconomic status (SES) and vaccination rates.

Our analysis uncovered trends in cancer occurrence within Hispanic and Non-Hispanic White communities particularly observing a rise in HPV-related oropharyngeal, tongue and tonsil cancers. While HPV vaccinations have improved, disparities remain, challenging the belief in SES as the primary factor and highlighting the need for further research into what factors drive the HNC disparities in this population. As vaccination efforts continue to unfold, we anticipate a clearer understanding of the relative contributions of SES and genetic factors to HNC. This knowledge will be valuable for crafting targeted and impactful public health approaches and interventions.

Our study emphasizes the importance of addressing the requirements of diverse ethnic groups when it comes to cancer research, prevention strategies and treatment approaches.

Public health programs that take into account differences, better healthcare availability and policies targeting the reduction of disparities are needed to lessen the effects of head and neck cancers in the United States. This holistic approach can have a significant impact for those dealing with HNC and advancing towards a fairer healthcare system.

Poster #A008

Anemia in nasal fracture

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Objective:
Nasal fracture presents emergently with blood loss that may worsen outcomes. Our study utilizes a national inpatient database to investigate the impact of anemia on outcomes of nasal fractures.

Study Design:
Retrospective database study.

Methods:
The 2010 to 2014 National Inpatient Sample was queried for adults (age ≥18 years) with a primary diagnosis of facial fracture. Multivariable binary logistic regressions were implemented to identify associations between anemia status and outcomes.

Results:
Of the 6,526 patients satisfying inclusion criteria, 739 (11.3%) had anemia. Compared with non-anemic patients, anemic patients were older (mean 62 vs. 44 years) and had a higher incidence of hypertension (54.0% vs. 24.9%) (P<0.001). The incidence of closed fractures was similar between anemic and non-anemic cohorts (72.0% vs. 73.3%, P=0.442). The rate of acute cardiac event, acute respiratory failure, acute renal failure, hemorrhage/hematoma, reintubation, and tracheostomy was 7.2%, 2.2%, 1.7%, 0.3%, 6.2%, and 0.9%, respectively. Adjusting for patient demographics, admission status, fracture type, and comorbidities, patients with anemia had greater total charges ($85,844 vs. $46,308), length of stay (6.6 vs. 3.0 days), number of procedures undergone (4.4 vs. 3.1 procedures), and odds of acute respiratory failure (aOR 2.03, 95% CI 1.35-3.05), hemorrhage/hematoma (aOR 5.87, 95% CI 1.84-18.68), and reintubation (aOR 1.63, 95% CI 1.22-2.17) (P<0.001). Anemia was not associated with odds of acute cardiac event, acute renal failure, and tracheostomy (P>0.05).

Conclusions:
In a national cohort of inpatients with nasal fracture, anemia was associated with poor outcomes.

Poster #009

Anterior ethmoid artery ligation for epistaxis: A systematic review

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Background and Objective:
Anterior ethmoid artery ligation (AEAL) is a surgical intervention utilized for refractory epistaxis from the superior nasal cavity. Limited literature exists regarding the effectiveness of this procedure. This systematic review aims to identify the outcomes and complications of the various AEAL approaches.

POSTERS

Methods and Analysis:
MEDLINE and PubMed were searched for English-language articles published in peer-reviewed journals using “Epistaxis” AND “anterior ethmoid artery” along with associated terms. Inclusion criteria captured full-text studies that examined AEAL in human subjects as the (1) main treatment, (2) part of a combination treatment, or (3) adjuvant therapy. Of the 160 articles reviewed, 21 (13%) met selection criteria. Data was extracted and descriptive statistics were calculated following PRISMA guidelines.

Results:
A total of 122 patients underwent various AEAL approaches: external approach via a Lynch incision (76.2%), transnasal endoscopic approach (9.8%), and transcaruncular approach (13.9%). 7/108 (6.5%) patients had postoperative bleeding despite AEAL.

28/99 (28.3%) of patients were reported to have postoperative complications of varying severity. 68% of those patients completely recovered. The following complications occurred after an external approach via Lynch incision: eyelid/orbital edema, ptosis, intracerebral abscess, diplopia, dilated pupil, ophthalmoplegia, trigeminal nerve irritation, and keratoconjunctivitis.

Conclusion:
AEAL effectively reduces epistaxis in suitable patients, with most complications from the Lynch incision being temporary. Further research is required to optimize AEAL’s approach and utility for intractable epistaxis.

Poster #A010
Anterior skull base MRI framework for otolaryngologists
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Background:
The assessment of anterior skull base pathologies via magnetic resonance imaging (MRI) plays a crucial role in guiding endoscopic anterior skull base surgeries. In the current literature, there is no formal consensus regarding the proper sequences and essential components for standardized MRI review of anterior skull base pathologies. Having a consensus on this topic would be useful for preoperative and intraoperative guidance as the availability of imaging sequences continues to expand. To maximize the utility of skull base MRI, any standardization or framework of the imaging modality should consider factors such as indications, essential sequences, and pathognomonic findings.

Methods:
We conducted a narrative review of literature on MRI in endoscopic skull base surgery, focusing on essential components such as specific sequences (T1, T2, DWI, Fiesta, Spin-Echo, Flair, STIR), anatomical landmarks, and tumor spread.

Results:
Twenty-four articles were analyzed, revealing diverse approaches, protocols, imaging disparities, and common pathologies in skull base procedures. Discrepancies in identifying key MRI findings for rhinologic procedures underscore the need for clearer definitions and guidelines.

Conclusions:
Standardized guidelines for optimizing MRI utility in anterior skull base surgery would benefit training programs and surgical decision-making. The results of this review phase of our study will be strengthened by the integration of Delphi panel guidance on essential landmarks, findings, and MRI sequence utility. A greater understanding of the topic can foster increased relevance for MRI in endoscopic anterior skull base procedures, which will hopefully increase precision and safety.

Poster #A011
Antigen specific IgE in nasal secretion
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Introduction:
In order to diagnose allergic rhinitis, serum antigen specific IgE level is very valuable data. However, invasive examination is stressful, especially in pediatric cases. If the nasal secretion can be a substitution for peripheral blood as the available sample, it is very helpful

at out-patient clinics. According to ARIA (Allergic rhinitis and its impact on asthma) 2008, the nasal secretion is not recommended as a sample for evaluating the antigen specific IgE level based on the very old evidence. In order to study the correlation of antigen specific IgE level between nasal secretion and serum in rhinitis cases especially in children.

Materials & Methods:
We harvested the serum and nasal secretion in our university hospital and evaluated the antigen specific IgE levels of house dust mite and Japanese cedar pollen from 24 children aging from 3 to 9 years old after getting guardian consent in accordance with the ethical policy and processing in the committee of our university hospital. The unit for every antibody level was IU/ml by alaSTAT3g system.

Results:
The correlation of antigen specific IgE (Japanese cedar pollen, Der. pteronyssinus, Der. farinae) levels between serum and nasal secretion were confirmed; r value was 0.896, 0.679 and 868, respectively.

Discussion:
Nasal secretion is a useful sample for the diagnosis of allergic rhinitis and local allergic rhinitis. The house dust mites (Dermatophagoides) are global antigens and, accordingly, the easily inspecting kit by nasal secretion for them could be a very popular product in the world, which would conduct efficiently sublingual immunotherapy for the house dust mite allergy among children and prevent the pediatric atopy march.

Poster #A012
Apophysomyces elegans rhino-orbitocerebral infection in immunocompetent individuals
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While invasive fungal sinusitis in immunocompromised patients is widely discussed in the literature, there is limited documentation of cases occurring in immunocompetent individuals. Apophysomyces elegans is an atypical and very rare causative agent of rhino-orbitocerebral mucormycosis (ROCM) infections.

In this report, we describe two cases of Apophysomyces elegans ROCM in immunocompetent individuals without concurrent diabetes, which were managed at our tertiary healthcare center. The first case involves a 42-year-old male who presented with left cheek cellulitis, while the second features a 61-year-old female with presenting complaint of decreased vision in her right eye. Diagnostic delays may be attributable to low suspicion of ROCM in non-immunocompromised patients. Early detection and initiation of aggressive treatment with antifungal regimens and surgical debridement as necessary are crucial to mitigate the spread of infection, prevent intracranial complications, reduce the need for repeated mutilating surgical procedures, and ultimately minimize mortality.

Poster #A013
AR and VR in rhinology review
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Objectives:
Virtual reality (VR) and augmented reality (AR) are innovative technologies that have a wide range of potential applications in the healthcare industry. The aim of this study was to investigate the body of research on AR and VR applications in rhinology by performing a scoping review.
Data Sources:
PubMed, Scopus, and Embase

Review Methods:
Following the PRISMA guidelines, a scoping review of literature on the application of AR and/

or VR in the context of Rhinology was conducted using PubMed, Scopus, and Embase

Results:
49 articles from 1997 to 2023 met the criteria for review. Five broad types of AR and/or VR applications were found: preoperative, intraoperative, training/education, feasibility, and technical. The subsequent clinical domains were recognized: craniovertebral surgery, nasal endoscopy, transsphenoidal surgery, skull base surgery, endoscopic sinus surgery, and sinonasal malignancies.

Conclusion:
AR and VR have comprehensive applications in Rhinology. AR for surgical navigation may have the most emerging potential in skull base surgery and endoscopic sinus surgery. VR can be utilized as an engaging training and educational tool for surgeons and residents and useful as distraction analgesia for patients undergoing office-based procedures. Additional research is essential to further understand the tangible effects of these technologies on measurable clinical results.

Poster #A014
Artificial intelligence driven automated performance metrics in endoscopic skull base surgery
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Introduction:
Artificial intelligence (AI) offers the potential for automatic, consistent, and scalable analysis of performance through surgical video analysis. We sought to develop AI-driven automated performance metrics in this exploratory study of endoscopic skull base surgery.

Methods:
Five cases of endonasal transsphenoidal pituitary adenoma resection were analyzed. Demographics, tumor characteristics and operative details were summarized. Operative videos were uploaded to the Surgical Data Science Collaborative online platform and analyzed using an YoloV8-based neural network for instrument recognition and spatiotemporal tracking. Videos were annotated for surgical phases (nasosphenoid, sellar, closure). Instrument motion plots were generated and compared by phase using Dice Similarity Coefficient scores (DICE).

Results:
5 patients (median age 59.5) had histologically confirmed pituitary adenomas. 1.7 million frames were analyzed, and instrument motion plots were generated for 9 instruments: suction, straight forceps, grasper, bipolar, scissors, rongeur, dissector, curette, doppler. The most common instruments by phase with associated frequency by frame (%) were nasosphenoid: suction(44.4), bipolar(32.5), straight forceps (7.2); sellar: suction(44.9), bipolar(19.0), grasper(10.8); closure: suction(39.9), bipolar(16.3), straight forceps(10.2). Moderate-High mean DICE scores were noted for bipolar forceps 0.75, suction 0.71 for nasosphenoid, and bipolar forceps 0.70 for sellar. Moderate mean DICE scores for Suction 0.63 and straight forceps 0.42 for closure.

Conclusion:
In this pilot study, we have developed instrument motion patterns conserved during endonasal skull base surgery using AI-driven automated video analysis.

Poster #A015
Aspiration pneumonitis: An overlooked consequence of CSF rhinorrhea - A systematic review
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Introduction:
Cerebrospinal fluid (CSF) rhinorrhea commonly manifests as unilateral nasal drainage characterized by distinctive appearance and clinical history. In certain occult or complex scenarios, CSF rhinorrhea may be revealed by

intracranial complications; however, aspiration pneumonitis may serve as an additional indicator suggesting intracranial origin of nasal drainage. This study aims to systematically describe aspiration pneumonitis associated with CSF leaks.

Methods:
A systematic review of the literature was performed. Five databases were queried: PubMed, Embase, Cochrane, Web of Science, and Scopus, using the terms “aspiration pneumonia” and “cerebrospinal fluid leak” and their synonyms. Peer-reviewed, full-text, case series or case reports describing pneumonitis or pulmonary findings in the context of CSF leaks were included.

Results:
Among 216 studies identified, nine were included. Fifteen patients (58% female) were included, with a mean age of 50.15 years (SD=2.6). Most leaks were spontaneous (73%). The most common presenting symptoms were rhinorrhea (93%), cough, wheezing or dyspnea (73%), headache (27%), fever (27%), post-nasal drip (13%), and hoarseness (13%), while one patient was asymptomatic with non-resolving radiologic lung infiltrates. Chest imaging demonstrated ground glass opacities and pulmonary infiltrates. Common laboratory findings included leukocytosis and elevated CRP.

Conclusion:
This review underscores the importance of considering CSF rhinorrhea in the context of persistent pulmonary symptomatology and nasal drainage. Particularly in patients with spontaneous CSF leaks, there appears to be a heightened risk for aspiration pneumonitis, which may pose a perioperative risk factor.

Poster #A016
Assessing adult sinusitis guidelines: A comparative analysis of AAO-HNS and AI chatbots
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Objective:
To compare the guidelines offered by the American Academy of Otolaryngology—Head and Neck Surgery Foundation (AAO-HNS) on adult sinusitis to GPT 3.5, GPT 4.0, Bard, and Llama 2 responses.

Methods:
ChatGPT-3.5, ChatGPT-4.0, Bard, and Llama 2 represent extensively employed and openly accessible large language model-based chatbots. Each recommendation or guideline was preceded by a set of questions. In December 2023, the answers were obtained from the Chatbots. To avoid bias from previous responses, each question received its own window.

Results:
A total of 12 guidelines consisting of 30 questions from the AAO-HNS were compared to 4 different chatbots. Adherence to AAO-HNS guidelines varied, with Llama 2 providing 80% accurate responses, BARD 83.3%, ChatGPT-4.0 80%, and ChatGPT-3.5 73.3%. Over-conclusive responses were minimal, with only one instance each from Llama 2 and ChatGPT-4.0. However, rates of incomplete responses varied, with Llama 2 exhibiting the highest at 40%, followed by ChatGPT-4.0 at 33.3%, BARD at 23.3%, and ChatGPT-3.5 at 36.7%. Fisher’s Exact Test analysis revealed significant deviations from the guideline standard, with less accuracy ($p = 0.012$ for Llama 2, $p = 0.026$ for BARD, $p = 0.012$ for ChatGPT-4.0, $p = 0.002$ for ChatGPT-3.5), inclusion of supplemental data ($p < 0.001$ for all), and less completeness ($p < 0.01$ for all) across all chatbots, indicating potential areas for enhancement in their performance.

Conclusion:
Although AI chatbots like Llama 2, Bard, and ChatGPT exhibit potential in sharing health-related information, their present performance in responding to clinical concerns concerning adult rhinosinusitis is not up to par with recognized clinical criteria.

POSTERS

Poster #A017

Assessment of TikTok as a patient education resource in chronic rhinosinusitis

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Background:
TikTok is one of the fastest-growing social media platforms and has been on the rise since its debut in August 2021. In March 2023, TikTok had 150 million active users in the USA. In medicine, use of social media as a free patient education tool has since gained in popularity. This study evaluates the quality of patient education content related to chronic rhinosinusitis, its symptoms and treatments.

Methods:
A systematic randomized review of TikTok content was conducted by searching relevant terms: (1) #Chronic Rhinosinusitis, (2) #Endoscopic Sinus Surgery, (3) #Nasal Polyps, and (4)#Nasal Irrigation, and randomly selecting the top 50 videos, to mimic a user's search result. Following inclusion & exclusion criteria, 97 videos were included for analysis and were independently reviewed by two teams of rhinology experts to reach consensus using standardized tools (Modified DISCERN (mDISCERN), PEMAT/AV). Reviewers labeled the videos by content creator and type. They also reported their opinion on potential for harm, alignment with guidelines, and expert recommendations.

Results:
Metadata analysis revealed a total of 142 million views in total. The PEMAT/AV and mDISCERN score averages from the videos were 43.1(±20.1) and 1.3(±0.93) respectively, which are both considered low quality. Significantly higher mDISCERN scores were reported for videos by ENTs and other physicians, compared to patients and other healthcare professionals ($p<0.0001$). Our expert panel reported 35% of videos containing potentially harmful contents. Reviewers would only recommend 20% of the included videos to patients.

Conclusions:
This study highlights the risks and limitations of using TikTok as a patient education platform in rhinology.

Poster #A018

Association of nutritional vitamin intake and sinonasal infections

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Youn Soo Jung
Simon Chiang
Margaret B. Mitchell, MD
William Thorley
Jonathan Zou
Mengyuan Ruan
Tanujit Dey
Regan Bergmark, MD, FARS
Rachel Roditi, MD, FARS
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Introduction:
Dietary omega-3 supplementation has shown to have a protective effect on olfaction and reduced dietary fat intake has been linked to olfactory dysfunction. The effect of other nutritional vitamins on frequency of sinus infections is poorly understood.

Methods:
National Health and Nutrition Examination Survey (NHANES) 2013-14 data with complete smell/taste questionnaires and examinations was analyzed. Weighted univariate logistic regression was used to screen covariates including sex, age, race, smoking status (cotinine level), energy intake, BMI, and history of head injury or facial trauma. Univariate and multivariable logistic regression analysis was performed to determine the association of multivitamins (vitamin A, C, D, E, B1, B2, B6, B12, K, niacin, folic acid, choline, selenium, and zinc) and history of >2 sinus infections. Bayesian kernel machine regression (BKMR) was used to assess the joint effect of the fourteen vitamins on reports of sinus infections, the impact of an individual vitamin as part of a mixture, and the potential interactions among different vitamins.

Results:
A total of 2,818 participants were included in this study. We found that increased folic acid (mcg) (OR = 1.001, p = 0.0193) intake was associated with increased reports of ever

experiencing >2 sinus infections. The overall effect analysis demonstrated a positive relationship between overall vitamin intake and report of sinus infections. No interactions were found between any two vitamins.

Conclusions:
The relationship between vitamin intake and sinus infections needs further clarification. Patients who may be more susceptible to sinus infections may comprise a cohort that takes more supplemental vitamins.

Poster #A019
Association of obesity with chronic adenoiditis and chronic rhinosinusitis in children
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Rafka Chaiban
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Background:
Obesity has been associated with chronic rhinosinusitis (CRS) in adults. Studies exploring this association in children are limited to one study based on a recent systematic review. Objective: To evaluate the association between obesity and chronic adenoiditis (CA) and CRS in children.

Methods:
A retrospective case-control study was performed of all children 0-18 years presenting to our clinic between July 2020 and February 2024. Patients' demographics and comorbidities were reviewed. Obesity was classified based on percentile body mass index (BMI) of 95% and greater. Diagnoses of CRS and CA were determined based on clinical presentation and objective findings on CT scan and/or nasal endoscopy.

Results:
401 children were reviewed, including 125 children (31.2%) with obesity (mean BMI = 29.4 kg/m2, mean percentile = 97.6%). Children with obesity were older (11.6 vs 10.2 years, p=0.008). Obesity was associated with asthma (OR=2.25, p=0.002) and obstructive sleep apnea (OSA) (OR=2.49, p<0.001). However, there was no association between obesity and CRS (OR=1.04, p=0.856), CA (OR=0.84, p=0.529), or allergic rhinitis (OR=1.41, p=0.144). Multivariate logistic regression showed that age (OR=1.07, p=0.007), asthma (OR=1.74, p=0.050), and OSA (OR=3.05, p<0.001) were significantly associated with obesity.

Conclusion:
This study suggests no association between obesity and CA or CRS in children. Further studies should explore how obesity plays a role in the treatment response of CRS.

Poster #A120
WITHDRAWN

Poster #A021
Association of race and insurance status with endoscopic anterior skull base surgery outcomes
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Introduction:
While multiple fields have extensively studied associations between social determinants of health (SDOHs) and patient outcomes, studies in anterior skull base surgery are limited. Our meta-analysis examines the effect of SDOHs on endoscopic anterior skull base surgery outcomes.

Methods:
Literature from 1946-2023 analyzing SDOHs in endoscopic anterior skull base surgery outcomes was identified using predefined syntax via Embase, Web of Science, MEDLINE, and CENTRAL. Outcomes included length of stay, 30-day readmission, cost of care, and postoperative complication rates. Data extracted included insurance status, race, socioeconomic status (SES), patient's residence, and smoking history.

Results:
The meta-analysis included 6 studies that evaluated the effect of insurance status, race, and SES on 30-day readmission and

postoperative diabetes insipidus. Asian patients had 30% higher odds of 30-day readmission compared to White patients (OR=1.30, 95% CI 1.04-1.62, p=0.02). Black patients had 1.3 times the risk of postoperative diabetes insipidus compared to White patients (RR=1.32, 95% CI 1.09-1.59, p<0.01). Medicare and private insurance patients had no significant difference in 30-day readmission or risk of postoperative diabetes insipidus. Medicaid patients had 30% higher odds for 30-day readmission (OR=1.30, 95% CI 1.08-1.56, p<0.01) and 1.25 times the risk of postoperative diabetes insipidus (RR=1.25, 95% CI 1.02-1.52, p=0.03) compared to private insurance patients.

Conclusion:
This meta-analysis shows that race and insurance status significantly influence rates of readmission and postoperative complications in endoscopic anterior skull base surgery. Additional research is needed to identify measures to mitigate risk.

Poster #A022
Attitudes toward COVID-19 among patients with chronic rhinosinusitis
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Background:
Chronic rhinosinusitis (CRS) is one of the most common sinonasal diseases and predisposes patients to upper respiratory infections including coronavirus disease 19 (COVID-19). Patients with CRS are also more likely to experience depression and anxiety. Given these heightened risks, we sought to better understand the thoughts and attitudes of patients with CRS regarding the COVID-19 pandemic.

Methods:
This study was conducted using survey data from the All of Us Research Program. For our analysis, we selected 18 questions which addressed attitudes toward COVID-19, isolation, social distancing, and vaccination. Univariate analysis was performed to identify differences in response rates between patients with and without CRS. Associations between CRS status and survey responses were then assessed using logistic regression, and odds ratios (OR) were calculated.

Results:
Patients with CRS more frequently experienced a recent illness compared to those without CRS (OR: 1.34; 95% CI: 1.20–1.48). When asked about attitudes toward COVID-19, patients with CRS were more likely to suppress feelings about COVID-19 (OR: 1.09; 95% CI: 1.04–1.15), feel watchful or on-guard (OR: 1.10; 95% CI: 1.05–1.15), and have trouble concentrating (OR: 1.11; 95% CI: 1.06–1.17). Patients with CRS were also more likely to be stressed by social distancing (OR: 1.17; 95% CI: 1.13–1.22), follow recommended pandemic hygiene (OR: 1.12; 95% CI: 1.07–1.18), and receive the flu vaccine (OR: 1.20; 95% CI: 1.09–1.33).

Conclusion:
Patients with CRS generally reported increased anxiety about COVID-19 and had increased adherence to safety measures. Further research is needed to identify the clinical implications of this association for patients with CRS.

Poster #A023
Baseline characteristics of patients with CRSwNP in the United States in the AROMA global registry
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Background:
The AROMA global registry study (NCT04959448) is recruiting adult patients initiating dupilumab for chronic rhinosinusitis with nasal polyps (CRSwNP) in real-world clinical practice. Here we report baseline characteristics of patients enrolled in the US from a planned interim analysis.

Methods:
AROMA is a phase 4, prospective,

observational, global registry study that will follow patients for up to 36 months. Baseline assessments include demographics, disease characteristics, and medical and surgical histories.

Results:
As of February 2023, there were 173 patients in the US enrolled in AROMA. Mean (standard deviation; SD) age was 49.4 (14.7) years, 41.6% of patients were male, 86.1% had a history of allergic rhinitis, 66.5% had asthma, 21.4% had non-steroidal anti-inflammatory drug exacerbated respiratory disease, and 10.4% had atopic dermatitis. Mean (SD) nasal congestion and loss of smell scores (range 0–3 for both) were 1.7 (0.87) and 1.9 (1.19), respectively, mean (SD) 22-item Sino-Nasal Outcome Test score (range 0–110) and total symptom score (range 0–9) were 41.2 (21.87) and 5.0 (2.40), respectively, and mean (SD) Lund-Mackay computed tomography score (range 0–24) was 10.5 (6.71). A total of 79 (45.7%) patients had a mean (SD) of 2.1 (2.31) prior sinonasal surgeries.

Conclusion:
Patients in the US initiating dupilumab for CRSwNP in AROMA frequently had coexisting type 2 inflammatory disease. Patients had moderate-to-severe CRSwNP disease burden at baseline, and 46% had prior NP surgery.

Poster #A024
Biologic claims by otolaryngologists
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Introduction:
The use of biologics in otolaryngology is expanding, especially after FDA approval of dupilumab in 2019. However long term usage data on these treatments has not been explored. Our objective is to evaluate the usage of 3 biologics (dupilumab, omalizumab, and mepolizumab) by otolaryngologists.

Methods:
Medicare Part D Prescribers by Provider and Drug from the Centers for Medicare & Medicaid Services website were accessed to obtain prescription claim information for all 3 biologics. The total number of claims allowed services pertaining to each year were recorded, as well as the geographic characteristics of prescriber. Average annual percent increase (AAPI) was calculated using a compound annual growth rate formula (CAGR). IBM SPSS was used for data analysis.

Results:
During the study period (2019-2021), the total number of Medicare Part D claims submitted by otolaryngologists for dupilumab, omalizumab, and mepolizumab was 6039, 858, and 98, respectively. Dupilumab claims exhibited the highest AAPI (247.49%), followed by mepolizumab (64.54%), and omalizumab (7.26%). The total prescription costs were highest for dupilumab ($20,385,536, 255.19% AAPI), followed by omalizumab ($2,527,612, 11.81% AAPI), and mepolizumab ($431,367, 93.97% AAPI) for mepolizumab.

Conclusions:
The use of biologics is increasingly prevalent in otolaryngology. Dupilumab had the highest average annual increase in claims, demonstrating that it has rapidly become the biologic of choice among providers.

Poster #A025
Carolyn's window Asian noses
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Minh Hoang
Kittichai Mongkolkul
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Kornkiat Snidvongs, MD, PhD

Introduction:
Carolyn's Window Approach (CWA), a novel technique developed in Australia, involves axillectomy and drilling through the radix of the nasal bone directly into the sinus, employing a 0-degree endoscope for the entire procedure. The primary objective was to assess the success rate of using a 0° endoscope and sinus patency, considering the typically lower radix height in Asian noses compared to Western noses.

Methods:
This retrospective study included adult patients who underwent CWA at Rajavithi Hospital, Bangkok, Thailand. The procedure, performed by trained rhinologists, involved creating an inferior-based flap on the lateral nasal wall,

followed by high-speed drilling to access the frontal sinus. Postoperative care included nasal irrigation, antibiotics, and steroids.

Results:
Data from 29 patients (36 operations) revealed a 100% sinus patency rate at 3 months post-surgery. Early postoperative morbidity included bleeding (8.3%), pain (13.9%), and periorbital edema/hematoma (8.3%). Notably, bleeding cases were associated with the graft harvest site, and all complications resolved within a week. No late surgical complications were observed.

Discussion:
The study concludes that CWA is effective in achieving sinus patency in Asian patients, despite the lower nasal radix. While the approach is associated with some morbidities, mainly bleeding at the graft harvest site, these are generally not severe and manageable. This indicates that CWA is a viable option for frontal sinus surgery in Asian populations, with careful attention to technique and postoperative care.

Poster #A026
Case report and literature review of prostate cancer metastases to the sphenoid sinus
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Introduction:
Primary sphenoid tumors make up <5% of all sinus neoplasms, and metastases to the sphenoid sinus are exceedingly rare. The main objective of this study is to report a case of acute vision loss as the presenting symptom of prostate cancer and to review the literature.

Methods:
A literature search on prostate metastases to the sphenoid sinus was conducted. The epidemiology, presentation, diagnosis, treatment, and outcomes were reviewed. The patient's medical record, imaging, and histopathology were reviewed.

Results:
A 54-year-old male presented with complete left vision loss that began 3 days prior. He also reported 3 weeks of intermittent left-sided headaches. An MRI orbit demonstrated a 3.0x2.3x2.0 cm contrast-enhancing mass in the sphenoid sinus extending to the left orbital apex. A non-contrasted CT scan showed cortical margin loss in the left optic canal. The patient was taken to the operating room for endoscopic biopsy and debulking of the sphenoid mass. Histopathologic examination revealed poorly differentiated carcinoma, with tumor cells staining positive for NKX3.1, AMACR, and OSCAR and negative for PSA. PET scan showed an enlarged prostate and increased uptake in the prostate, spine, ribs, shoulders, pelvis, and sphenoid. A prostate biopsy revealed acinar adenocarcinoma. He is undergoing systemic therapy with docetaxel. The literature review revealed <10 prior reports of prostate cancer metastases to the sphenoid.

Conclusion:
Metastases to the sinuses are rare and typically arise from the kidney and lung; however, for sphenoid metastases, the prostate and lung are the most common primary sites. We present a case of complete vision loss as the presenting symptom for widely metastatic prostate cancer.

Poster #A027
Characteristic CT findings in silent sinus syndrome
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Anthony Tang, Medical Student
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Objective:
To evaluate and characterize the features of CT imaging findings in silent sinus syndrome (SSS) patients.

Methods:
A radiology database of CT scan reports from CT maxillofacial scans obtained from 2015 to 2022 within a single institutional database was queried to identify patients diagnosed with SSS. Patients with bilateral SSS diagnoses were excluded. Anatomic structures of interest were

measured on each side and differences in measurement between the SSS and non-SSS side were compared using paired student's t-test.

Results:
47 patients were identified to have unilateral SSS on CT imaging reports. Slight predominance of left-sided involvement was observed (57.4%). On the affected SSS side, orbital height was noted to be taller by 3.8 mm (95% CI: 2.8 – 4.8; $p < 0.001$) and the uncinate process was more lateralized by 3.9 mm (95% CI: 2.9 – 4.9; $p < 0.001$) when compared to the non-affected side. Moreover, degree of enophthalmos of the globe was greater on the SSS side by 0.7mm ($p < 0.001$). Surrogate measurements of the maxillary sinus area demonstrated an average decrease in the volume of the affect side by 55.6 mm2 (95% CI: 10.1 – 44.5; $p < 0.001$). Lastly, rates of accessory ostia were higher on the non-SSS side when compared to the SSS side (9.5% vs 0%).

Conclusions:
SSS is a rare clinical entity which is characterized by a unique constellation of changes in anatomy relationships. These findings are readily identifiable and measurable on CT imaging. These differences include enlargement of the orbital height, lateralization of the uncinate process, worsening enophthalmos and a decrease in the volumetric caliber of the maxillary sinus.

Poster #A028
Characteristics of patients initiating Dupilumab for CRSwNP by number of previous surgeries
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Joseph Han, MD, FARS
James W. Mims, MD
Thomas Plucinak, Dr.
Lucia De Prado Gomez, Dr.
Mark Corbett, Dr.
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Juby A. Jacob-Nara, Dr.
Harry Sacks, MD
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Background:
Sinonasal surgery is considered for patients with chronic rhinosinusitis with nasal polyps (CRSwNP) uncontrolled by medical therapy. Characteristics of patients with CRSwNP starting dupilumab having undergone multiple sinonasal surgeries are unknown in the real-world setting.

Methods:
AROMA (NCT04959448) is a prospective global registry study recruiting adults with CRSwNP initiating dupilumab and following them for up to 36 months. Baseline assessments include demographics, disease burden, and sinonasal surgery history.

Results:
As of February 2023, AROMA had recruited 303 patients (n=116 no prior surgery; n=118 one prior surgery; n=69 two or more prior surgeries). Oral corticosteroid (OCS) use in the 2 years prior to enrolment was reported by 62.9%, 70.3%, and 75.4% of patients in the 0, 1, and ≥2 prior surgeries subgroups, respectively, and antibiotic use by 43.1%, 45.8%, and 47.8%. The proportions of patients regularly seeing an otolaryngologist were 52.6%, 46.6%, and 63.8% in the 0, 1, and ≥2 prior surgeries subgroups, respectively. Physicians' global assessment of CRSwNP severity was severe in 39.7%, 47.5%, and 47.8% of patients in the 0, 1, and ≥2 prior surgeries subgroups, respectively, and very severe in 16.4%, 16.1%, and 17.4%.

Conclusion:
In AROMA patients, more prior surgeries was associated with higher rates of OCS and antibiotic use. Patients reporting two or more surgeries were most likely to regularly see an otolaryngologist.

Poster #A029
Characteristics of patients with/without prior sinonasal surgery initiating Dupilumab for CRSwNP
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POSTERS

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Background:
Chronic rhinosinusitis with nasal polyps (CRSwNP) is associated with lowered health-related quality of life. Sinonasal surgery is considered for patients with CRSwNP uncontrolled by medical therapy.

Methods:
AROMA (NCT04959448) is a prospective global registry study recruiting adults with CRSwNP initiating dupilumab and following them for up to 36 months. Baseline assessments include demographics, disease burden, and sinonasal surgery history.

Results:
As of February 2023, AROMA had recruited 303 patients: 187 with prior surgery, 116 without. Patients with prior surgery were more likely to be male (55.1% vs 40.5%), more likely to report prior oral corticosteroid (OCS) use (72.2% vs 62.9%), and less likely to regularly visit an allergist (36.9% vs 66.4%) than surgery-naïve patients. Patients with prior surgery visited otolaryngologists at similar rates to surgery-naïve patients (52.9% vs 52.6%) and reported similar coexisting asthma burden (69.8% vs 71.1%). Patients' global assessment of CRSwNP symptoms was higher/worse for prior-surgery than surgery-naïve patients (35.3% vs 25.9% moderate; 31.0% vs 27.6% severe). Physicians' global assessment of CRSwNP symptoms was severe in 47.6% of prior-surgery patients and 39.7% of surgery-naïve patients, and very severe in 16.6% and 16.4%, respectively.

Conclusion:
More than half of patients in AROMA have a history of sinonasal surgery, with some measures of disease such as OCS use and patient assessment of symptoms being worse than surgery-naïve patients.

Poster #A030

Cholesterol granuloma of the posterior ethmoid presenting as proptosis: Case presentation

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Introduction:
Cholesterol granulomas are a common benign pathology classically found in the mastoid antrum and air cells of the temporal bone and less commonly found in the skull and paranasal sinuses. They are precipitated cholesterol clefts that ensue a foreign body reaction. Exact pathogenesis is unknown but it has been hypothesized to be due to impaired drainage, poor ventilation, or hemorrhage in the sinus. Sinonasal presentation is rare and posterior ethmoid localization has been reported, based on our review in only 6 cases.

Case presentation:
A 64-year-old female complaining of progressive right-sided proptosis for the past 8 months, exacerbated within the last 2 months, reports slight blurred vision, denies diplopia, and has a normal ophthalmological evaluation. She also denies any history of sinonasal surgery or facial trauma.

Nasal endoscopy was unremarkable.

Computerized tomography shows a homogeneous soft tissue density well defined round mass apparently arising from right posterior ethmoidal sinus, with bony erosion of the lamina papyracea and to the skull base. Unilateral right proptosis was evident in the axial scans.

T1-weighted images of MRI demonstrated a heterogeneous high intensity mass in the posterior ethmoid sinus, and T2-weighted images demonstrated a comparatively low intensity mass containing a low intensity region.

Surgical treatment consisted in a maxillary antrostomy, anterior and posterior ethmoidectomy and a sphenoidotomy. Lesion capsule was dissected carefully with complete marsupialization and exposure of periorbita and skull base defect.

POSTERS

Histological analysis of the tissue showed presence of cholesterol clefts, multinucleate giant cells and hemosiderin-laden macrophages.

Poster #A031
Chronic granulomatous invasive fungal sinusitis in the United States
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Background:
Chronic granulomatous invasive fungal sinusitis (CGIFS) is a rare condition, mainly reported in regions of North Africa, the Middle East, and Asia. We are presenting a patient with CGIFS who has no history of travel outside the United States.

Methods:
Clinical presentation, imaging, pathology, treatment, and outcomes of this case were reviewed.

Results:
A 34 year-old immunocompetent male presented with worsening bilateral nasal obstruction over the past year and more recently severe headaches and diplopia. Exam was notable for telecanthus and bilateral superomedial orbit masses; endoscopy showed nasal polyps filling the anterior nasal cavity bilaterally. CT showed pan-sinonasal opacification with erosion of the cribriform plate and lamina bilaterally. MR most notably showed 1) heterogeneous, T2 hypointense solid enhancing lesions in the right superomedial orbit and bilateral upper nasal cavities and ethmoid extending into the right frontal sinus and anterior cranial fossa with surrounding vasogenic edema in the frontal lobe, and 2) rim-enhancing T2 hyperintense lobular lesions within the bilateral nasal cavities extending to the nasopharynx consistent with polyps. The right orbital mass was biopsied, pathology was granulomatous inflammation with invasive fungal elements. Surgical debridement of the pan-sinonasal, bilateral orbit, and intracranial disease was performed. Pathology/culture was consistent with the initial biopsy with Aspergillus as the causative organism. The patient received a 12 week course of voriconazole with complete resolution of disease.

Discussion:
This case emphasizes considering CGIFS in the differential in immunocompetent patients without any history of travel outside the United States.

Poster #A032
Chronic rhinosinusitis diagnostic rates during the COVID-19 pandemic
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Background:
The COVID-19 pandemic was associated with decreases in diagnoses across all specialties. While rhinology was disproportionately affected, the impact on chronic rhinosinusitis (CRS) is not well understood. We aimed to characterize CRS diagnostic rates during the COVID-19 pandemic.

Methods:
Using the TriNetX US collaborative database, CRS incidence rates from January 1, 2020 - April 30, 2023 were calculated. Patients under the age of 18, and those with cystic fibrosis, sinonasal malignancy, or prior CRS were excluded. Time periods were aggregated into pre-COVID (January 1, 2018 - December 31, 2019) and COVID (March 1, 2020 - April 30, 2023). A Poisson regression model was used to estimate and compare incidence rate ratios (IRR) between the COVID and pre-COVID time periods. Cohorts were then stratified and adjusted by age, sex, race, and ethnicity.

Results:
The 57,104,054 patients were a majority female (53.8%), white (57.9%), not hispanic or latino (59.7%), and with a mean (SD) age of 52.0 (19.0) years. 2.0% of the cohort received a CRS diagnosis. CRS diagnostic rates during COVID were decreased [IRR 0.56; 95%CI(0.47,0.68)] when compared to pre-COVID. CRS diagnostic rates during the pandemic remained decreased when adjusting for age, sex, ethnicity, and race. When stratifying by race, asian [IRR 0.54; 95%CI(0.31,0.97)] and black [IRR 0.51; 95%CI(0.29,0.91)] patients had a significant

decrease in CRS diagnoses during COVID. CRS diagnosis remained decreased until a significant increase in April 2023 [IRR 3.87; 95%CI(3.75,3.99)].

Conclusion:
Diagnostic rate of CRS was lower during the COVID-19 pandemic, but has recently been rising. Asian and black patients had disproportionately lower CRS diagnosis rates.

Poster #033
Chronic rhinosinusitis in endoscopic sinus surgery
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Introduction:
Our study investigates the role of chronic rhinosinusitis (CRS) in the management and outcomes of endoscopic sinus surgery (ESS).

Study Design:
Retrospective database study.

Methods:
The 2017 National Inpatient Sample was queried to identify adults with a primary diagnosis of ESS (ICD-10: 09JY4ZZ). CRS was identified (ICD-10: J32). Univariate and multivariable analyses were performed to identify statistical associations by CRS status.

Results:
Of the 390 inpatients identified, the majority were male (78.3%), White (65.3%), and did not have CRS (52.6%). CRS patients had higher incidence of diabetes mellitus (43.2% vs. 29.3%), chronic pulmonary disease (27.0% vs. 17.1%), respiratory failure (24.3% vs. 14.6%), deficiency anemias (21.6% vs. 9.8%), acute kidney failure (18.9% vs. 7.3%), weight loss (16.2% vs. 2.4%), and liver disease (10.8% vs. 4.9%) than non-CRS patients ($p<0.05$). On multivariable analyses, adjusting for patient and hospital characteristics, CRS patients had greater total charges ($91,751 vs. $39,021), length of stay (LOS) (6.5 vs. 4.0 days), and odds for acute kidney failure (OR 3.40, 95% CI 1.54–7.50) than non-CRS patients ($p<0.005$). CRS patients had lower odds for skin and subcutaneous tissue infections (OR 0.41, 95% CI 0.20–0.86, $p=0.018$) but similar odds for respiratory failure (OR 1.17, 95% CI 0.53–2.58), pneumonia (OR 0.60, 95% CI 0.24–1.47), laryngoscopy (0.57, 95% CI 0.22–1.48), and imaging (0.47, 95% CI 0.16–1.41) as non-CRS patients.

Conclusion:
In a national ESS cohort, healthcare utilization and odds for several complications varied by CRS status.

Poster #034
Clear cell carcinoma presenting in the nasal cavity
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Objective:
To describe a case of clear cell carcinoma presenting in the nasal cavity.

Methods:
Retrospective chart and histopathological review.

Results:a
A 45 year-old man with past medical history notable for active smoking presented to otolaryngology clinic initially with dysphagia, and on a neck CT with contrast was found to incidentally have a highly vascularized right nasal mass extending from the middle turbinate to the olfactory cleft. The patient subsequently developed nasal congestion, epistaxis, and right-sided epiphora, and on endoscopy, a polyp mass was noted filling the right nasal cavity. A small biopsy was done in clinic, complicated by epistaxis, that initially showed only inflammatory cells with bland vascular proliferation, possibly representing a pyogenic granuloma.
The patient was then taken to the operating room for definitive diagnosis and resection of this mass. A right maxillary antrostomy, anterior ethmoidectomy, and frontal sinusotomy was performed for post-obstructive sinusitis. The mass was found to be based on the superior mid-septum, and had significant vascular

supply. Pathology showed low-grade clear cell carcinoma that was present at the margins. No distant metastases were noted on staging imaging. The patient was discussed at multi-disciplinary tumor board to discuss the role of adjuvant treatment with recommendations for proton beam radiation therapy.

Conclusions:
In the literature, clear cell carcinoma is described as a rare tumor presenting in the head and neck, often misdiagnosed as metastatic renal cell carcinoma. This case demonstrates a unique case of a clear cell carcinoma presenting in the nasal cavity that demonstrates the broad differential for vascular tumors in this region.

Poster #A035
Clearing the air: The link between particulate matter exposure and the severity of AERD
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Introduction:
Air pollutants may play a role in disease severity in patients with aspirin exacerbated respiratory disease (AERD). The aim was to investigate the role of environmental pollutants—specifically exposure to particulate matter (PM)—in AERD severity.

Methods:
A cross-sectional analysis was conducted on adult patients diagnosed with AERD enrolled between 2013-2023 in the Brigham and Women's AERD registry. Outcomes studied included the Sinonasal Outcomes Test-22 (SNOT-22) (n=1022 patients) and Asthma Control Test (ACT) (n=1124), which were then linked to date of enrollment and residence zip code to determine PM2.5 exposure from the closest EPA monitoring station. Associations between average SNOT-22 and ACT scores and PM2.5 levels during the day, week, and month prior to SNOT-22 and ACT assessment were evaluated using Pearson correlation in pre-and post-COVID periods.

Results:
Analysis of mean SNOT-22 and ACT scores in the pre-and post-COVID periods demonstrated worsened nasal symptoms in the post-COVID cohort (p=0.0035), but no significant differences for asthma control. In the post-COVID period, there was a correlation (r=0.1, p=0.0118) between increasing PM2.5 levels in the one-month lag measurement and worsening SNOT-22 scores. Additionally, among patients on montelukast, a significant association (r=0.101, p=0.014) was observed between higher PM2.5 exposure in the one-month lag time period and increased SNOT-22 score, and a notable correlation with worse ACT scores (r=-0.0942, p=0.0166).

Conclusion:
Increased PM2.5 exposure may be linked with worse AERD disease outcomes. The association with the treatment with montelukast needs further investigation.

Poster #A036
Clinical and radiographic characterization of central compartment atopic disease
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Central compartment atopic disease (CCAD) is a form of chronic rhinosinusitis with nasal polyps (CRSwNP) characterized by isolated polypoid changes to the central sinonasal compartment. We sought to add to existing literature by describing distinguishing clinical and radiologic features of CCAD in a large patient cohort.

We conducted a retrospective cross-sectional analysis of patients at UChicago with a diagnosis of CRSwNP between January 1, 2018 and December 31, 2022. Patients with CRSwNP were stratified as CCAD or non-CCAD based on endoscopy and CT findings. Demographic and clinical features of these groups were compared using chi-square tests and t tests (alpha=0.05). Analyses were performed using STATA version 18.

254 patients with CRSwNP were included in the study, 24% of which had CCAD. Hispanic ethnicity was significantly more prevalent in the CCAD group (16.4% vs 5.2%, p<0.01), with no other differences in demographic features (age, gender, race) between groups. Patients with CCAD had a significantly lower Lund-Mackay score on CT than non-CCAD patients (8.9 vs 12.3, p<0.001). CCAD patients were significantly more likely to have a positive allergy test (60.7% vs 35.2%, p<0.001), but both groups had similar rates of asthma. Significantly more non-CCAD patients were treated with endoscopic sinus surgery (67.7% vs 52.5%, p=0.031). Both groups had similar rates of persistent disease at last follow-up.

Our data suggests that CCAD patients have higher prevalence of allergies, a lower burden of radiographic disease, and less-frequently require surgery compared to other CRSwNP subtypes, supporting the current hypothesis that this likely represents an allergic phenomenon.

Poster #037
WITHDRAWN

Poster #A038
Clinical predictors of endoscopic modified medial maxillectomy
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Introduction:
Endoscopic Modified Medial Maxillectomy (EMMM) is an effective procedure for recalcitrant maxillary sinusitis due to its potential for improved access and drainage. The objective of this study is to determine the clinical risk factors that predispose patients to requiring EMMM and describe the postoperative outcomes of patients undergoing EMMM compared to standard maxillary antrostomy (MA).

Methods:
Retrospective chart review at a single tertiary center analyzing patients with chronic maxillary sinusitis undergoing MA or EMMM between 2016 and 2023. Various clinical parameters were evaluated.

Results:
A total of 144 patients were included in the study, with 107 patients undergoing a MA and 37 patients an EMMM. The presence of positive sinus cultures for MRSA/MSSA (OR = 6.1, CI=2.1-18.3, P = 0.001) or gram-negative bacteria (OR = 6.8, CI=1.6-28.6, P = 0.01) significantly correlated with a higher likelihood of undergoing EMMM compared to other cultures. In both groups, SNOT scores significantly improved postoperatively. The absolute change of SNOT22 scores at 3-4 months and 6-12 months post-surgery were significantly higher in the combined culture group compared to patients with MRSA/MSSA (P=0.03 and P=0.008, respectively).

Conclusion:
Pathogenic strains such as MRSA/MSSA and Gram-negative bacteria appeared to be associated with the need for EMMM. EMMM should be considered even during primary surgery for these patients, to avoid revision maxillary surgery. These findings provide essential insights for otolaryngologists in tailoring revision maxillary sinus surgery for recalcitrant maxillary sinusitis.

Poster #A039
Comparative effectiveness of medical and surgical treatments for chronic rhinosinusitis
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Objective:
To compare the effectiveness of functional endoscopic sinus surgery (FESS) to successful optimal medical treatment in improving quality of life (QoL) of patients with chronic rhinosinusitis (CRS).

Methods:
Retrospective cohort study of patients

presenting to the otolaryngology clinic with CRS was performed. Patients were divided into two cohorts: those who were successfully treated medically and those who required FESS after failing medical treatment. Primary outcome was the 22-items sinonasal outcome test (SNOT-22) at 3-6 months follow up. Secondary outcome was endoscopy scores. Medical treatment consisted of intranasal corticosteroid spray, high volume corticosteroid rinses, saline rinses, intranasal antihistamine spray, or combinations of all. Patients on biologic therapy were excluded. Surgical intervention consisted of FESS with or without septoplasty.

Results:
345 patients were included, 143 in the medical cohort and 202 in the surgical cohort. Surgical patients were more likely to have nasal polyps and more likely to be active smokers. Although both cohorts showed significant improvement in SNOT-22 scores and its domains, patients who underwent FESS achieved significantly better QoL than the medical cohort [SNOT-22 (24.2 vs 33.1, p<0.001); rhinologic (7.1 vs 9.8, p<0.001); extrarhinologic (3.4 vs 4.9, p<0.001); ear/facial (4.4 vs 6.3, p<0.001); sleep (7.5 vs 9.6, p=0.008); psychological (7.4 vs 9.8, p=0.005)]. Multivariate analysis adjusting for covariates showed that OSA and female gender were predictors for worse surgical outcome.

Conclusion:
Even when optimal medical treatment for CRS is successful, FESS continues to be superior in improving patients' QoL.

Poster #040
Comparison of steroid implants to repeat ESS for recurrent NP on HCRU in CRSwNP patients
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Background:
Three main treatments exist for recurrent NP after surgery in CRSwNP patients: steroid-eluting implants, repeat ESS, or biologics. This study used linked medical claims and EHR data to compare the health care resource utilization (HCRU) of patients who received implants for recurrent NP to patients who underwent repeat ESS.

Methods:
This retrospective, observational cohort study included adult patients with CRSwNP who received steroid-eluting implants (1350 µg mometasone furoate) for recurrent NP between 2018-2021. Implant patients were propensity score (PS) matched to patients who underwent repeat ESS. HCRU over an 18-month follow-up was compared between the matched cohorts.

Results:
The study population (n = 534) consisted of 267 patients who received a sinus implant for recurrent NP (mean age 49.6 ± 15.2 years, 55.1% male) and 267 PS-matched patients who underwent repeat ESS. The two cohorts had equivalent utilization across the following all-cause encounters: outpatient (98.1% vs 98.9%, p=0.476), otolaryngology (82.0% vs 75.3%, p=0.057), ER (18.4% vs 21.0%, p=0.446), and hospitalization (6.4% vs 7.5%, p=0.609) encounters. Sinus debridement procedures were lower (51.7% vs 72.3%, p<0.001), while nasal endoscopy procedures were higher (78.7% vs 68.2%, p<0.006) in the implant cohort. Both cohorts saw equivalent subsequent treatment with repeat surgery or biologics (27.0% vs 26.2%, p=0.845).

Conclusion:
Observed HCRU for patients receiving steroid-eluting implants for recurrent NP was largely equivalent to patients who underwent repeat ESS. Given their markedly lower cost and equivalent impact on HCRU, steroid implants may warrant consideration over repeat ESS as a first-line intervention for recurrent NP.

Poster #A041
Contemporary practice patterns for chronic rhinosinusitis with nasal polyposis
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Background:
The paradigm of chronic rhinosinusitis with nasal polyposis (CRSwNP) has changed considerably with clinical consensus documents

and Food and Drug Administration (FDA) approval of new therapies. This study assesses current utilization patterns for CRSwNP.

Methods:
A 11-item online survey was sent to American Rhinologic Society (ARS) members to analyze practice patterns for CRSwNP management. Questions evaluated the frequency of therapies providing adequate symptom relief.

Results:
72 ARS members completed the survey, 17% of whom practice outside the US and 60% in academic institutions. Nasal steroid irrigations (NSI) were the most common topical therapy, with a preoperative use 3.7x greater than intranasal sprays and 6.5x greater than XHANCE (EDS-FLU). NSI adequately controlled 23% of patients without the need for functional endoscopic sinus surgery (FESS), as compared to 16% for intranasal sprays and 17% for EDS-FLU. Post-FESS, NSI controlled symptoms in 65% of patients and was used 3.6x more than intranasal sprays and 14.3x more than EDS-FLU. In patients who did not undergo FESS, Dupilumab was the most common biologic therapy used, at a rate 18.6x and 24.6x more than mepolizumab and omalizumab, respectively. Post-FESS, Dupilumab adequately controlled symptoms in 58% of patients as compared to 37% in surgery-naive patients ($p<0.05$).

Conclusions:
ARS members utilize multiple therapies to manage CRSwNP. Nasal Steroid Irrigations and Dupilumab were the most commonly utilized topical and systemic therapies in both the pre- and post-operative setting.

Poster #A042
Corticosteroid and antibiotic use before and after initiating Dupilumab: CRSwNP real-world practice
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Background:
Dupilumab improved in outcomes in patients with severe chronic rhinosinusitis with nasal polyps (CRSwNP) in randomized clinical trials and real-world practice. This study compares the corticosteroid and antibiotic burden in CRSwNP patients pre- and post- dupilumab initiation in US real-world practice, where evidence is limited.

Methods:
A retrospective observational cohort study in adults with CRSwNP who initiated dupilumab 300 mg every 2 weeks between June 2019 and June 2022, using the OM1 Real-World Data Cloud and Reg-ENT Registry. CRSwNP-related corticosteroid use (systemic [SCS] and oral [OCS]) was defined as within 5 days of a CRS and/or NP diagnosis or within 30 days of sinus surgery. CRSwNP-related SCS/OCS use and prescription of intranasal corticosteroids (INCS) and antibiotics in the 12 months before and after dupilumab initiation are summarized descriptively.

Results:
The cohort comprised 1016 patients. The proportion of patients with CRSwNP-related SCS and OCS use decreased from 63.0% and 59.1% pre-dupilumab to 19.5% and 17.7% post-dupilumab, respectively; 75.3% and 76.5% of patients discontinued SCS and OCS use, respectively, after initiating dupilumab. The proportion of patients with a prescription of INCS reduced from 50.5% to 31.1%, and antibiotics from 64.6% to 31.8%. Among patients with comorbid asthma (n=579 [57.0%]), CRSwNP-related SCS and OCS use decreased from 62.5% and 58.7% pre dupilumab to 20.7% and 18.7% post dupilumab, respectively.

Conclusions:
Patients with CRSwNP who initiated dupilumab had reduced corticosteroid and antibiotic use during the subsequent 12 months compared to the 12 months pre-dupilumab, demonstrating the real-world effectiveness of dupilumab in this US cohort.

POSTERS

Poster #A043

Cost and carbon emissions analysis of a multidisciplinary complex airway clinic

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Introduction:
Multidisciplinary clinics mitigate the need for multiple specialist visits which can streamline patient care. This project aimed to define the monetary cost and carbon emissions of a multidisciplinary complex airway clinic (MCAC) from the Canadian government payer perspective.

Methods:
A time-driven activity-based costing model was used. Clinical pathways were created and used in real-time by a tertiary rhinologist, respirologist, and allergist. The time needed to complete each task was recorded or estimated through interviews. Tasks were assigned a cost based on the province's medical services commission payment schedule, schedule of laboratory fees, and health authority salaries. Carbon emissions were calculated using the distance travelled (km), method of transport, accommodation, and dietary consumption.

Results:
One new patient visit at the MCAC cost $1194.52 CAD while one new patient visit at a rhinology clinic cost $323.90. The MCAC also reduced the patient's carbon emissions. The major costs per patient in the MCAC were physician/surgeon fees, clinical coordinator/educator salaries and investigations.

Conclusions:
This study determined the time-driven activity-based cost of running a multidisciplinary complex airway clinic in the Canadian healthcare system to be $1194.52 per patient which is about 4 times more per patient than a solo rhinology clinic. However, this is associated with a reduction in carbon emissions.

Poster #A044

COVID's impact on sinus surgery

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Introduction:
The COVID-19 pandemic had a dramatic impact on otolaryngology practices in the United States. We aim to evaluate the impact of the pandemic on utilization of endoscopic sinus surgery (ESS). We also aimed to compare trends of ESS utilization to those of balloon dilation (BD).

Methods:
Medicare Part B National Summary Datasets from the Centers for Medicare & Medicaid Services website were accessed. Current procedural terminology codes corresponding to ESS and BD were queried for the years 2017-2022. The total number of allowed services pertaining to each year were recorded. IBM SPSS was used for data analyses. Data reported prior to and after 2019 were deemed "Pre-COVID" and "Post-COVID", respectively.

Results:
Over 2017-2022, a total of 347,602 ESS procedures and 145,130 BD procedures were identified in the database. A mean of 57,934 ESS and 24,188 BD procedures were performed per year. Utilization of ESS dropped 39% (from 80,547 to 49,276) and that of BD dropped 60% (from 44,978 to 17,726) from 2017 to 2022. ESS of the sphenoid and BD of the sphenoid ostium experienced the greatest decrease among all sites (76.18% and 91.26%, respectively). ESS and BD reached a nadir in 2021 and increased 5.8% and 6.4% by 2022. As of 2022, utilization of ESS and BD remains below pre-pandemic levels.

Conclusions:
The utilization of ESS and BD declined throughout the COVID-19 pandemic. Although ESS and BD rates have increased compared to their nadir during the pandemic, neither procedure has returned to pre-COVID levels. Future studies should assess the long term impact of the pandemic on utilization of these rhinologic procedures.

Poster #A045

CT angiography's role in characterizing vascular injury from sphenoid sinus fractures

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Introduction:
Sphenoid sinus fractures occur in ~24% of head injuries and can lead to serious vascular complications. This study aims to evaluate the incidence of vascular injuries seen on Computed Tomography Angiography (CTA) in patients with sphenoid fractures to better define CTA indications.

Methods:
A retrospective analysis was conducted on patients with sphenoid sinus fractures identified by CT from 2011 to 2023 at a tertiary care center. Data on patient demographics, injury mechanisms, and clinical outcomes were collected. Imaging was evaluated for fracture locations and vascular injuries, with statistical analysis performed via t-test and Fischer's exact test.

Results:
Out of 133 patients who met inclusion criteria, 90 (67.7%) underwent CTA. Of these 90 patients, 12 (13.3%) had vascular injuries related to sphenoid sinus fractures. No statistical correlations with vascular injury were found regarding age, BMI, gender, race, epistaxis, rhinorrhea, vision or neurological changes, or injury mechanism ($p>0.05$). Positive CTA findings included carotid narrowing (n=4), opacification (n=3), irregularity (n=2), dissection (n=2), extravasation (n=1), and a carotid cave aneurysm (n=1). CT indications for individuals with a positive CTA included carotid canal involvement (n=7), comminuted fractures (n=2), clival involvement (n=2), and temporal bone extension (n=2).

Conclusion:
Identifying specific CT signs of vascular injury could lead to more judicious CTA use. While CTA should be considered for any sphenoid fracture, we found that fractures involving the carotid canal or clivus, comminuted in nature, and with temporal bone extension may be more suggestive of vascular injury. We suggest that these findings prompt CTA evaluation.

Poster #A046

CT scan findings in mucormycosis with proptosis

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Introduction:
Rhino-orbital mucormycosis can lead to severe proptosis, threatening both the visual acuity and overall prognosis of the patients. Computerized tomography (CT) scan has been used as the first radiological imaging device for assessing the extent of the disease in which images were evaluated for bone erosion, sinus opacification, and proptosis of the eye. This study focuses on the CT scan findings in patients with rhinologic involvement of the mucormycosis infection and its relation to proptosis.

Material and Methods:
This study is a cross-sectional study of patients infected with mucormycosis without previous surgical intervention that was referred to a tertiary otolaryngology hospital from October 2020 to October 2021. CT scan was performed and reconstruction of axial and coronal views with bone and soft tissue windowing was done.

Results:
Of 89 included patients, 47 (52.8%) were male and 42 (47.2%) female with an average age of 56.25±12.42 years. The most common radiologic finding was opacification of the maxillary sinus (87.6%), followed by opacification of the ethmoid sinus (84.3%) and opacification of the sphenoid sinus (69.7%). Proptosis was reported in 21 patients (23.60%). There was a statistically significantly higher rate of opacification of the ethmoid sinus in patients with proptosis (100.0% versus 79.4%, p-value=0.016).

Conclusion:
In conclusion, proptosis is a remarkable ocular manifestation of mucormycosis that warrants urgent attention. This article showed a higher rate of opacification of the ethmoid sinus in patients with proptosis.

POSTERS

Poster #A047

Current menstruation/oral contraceptive use and serum allergen-specific immunoglobulin E levels

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Background:
Allergic Rhinitis (AR) is a common chronic inflammatory airway disease, and estrogen has been shown to play a pro- and anti-inflammatory role in other diseases. We sought to examine the association of current menstruation and oral contraceptive use, both of which can affect estrogen levels, with allergen-specific serum immunoglobulin E (sIgE) levels.

Methods:
This cross-sectional study utilized data from the 2005-2006 cycle of the National Health and Nutrition Examination Survey (NHANES), a nationally representative sample of adults/children. The outcome variable was the number of positive allergens based on allergen-specific sIgE (16 evaluated). Exposure variables were currently having menstrual periods (yes vs. no), and oral contraceptive use: history (yes vs. no), duration, and age started. We conducted bivariable and multivariable analyses using linear regression models.

Results:
We analyzed data from 3,221 females >=12 years. Currently having menstrual periods (Beta: 0.60; 95% CI, 0.38-0.84) was significantly associated with a higher number of positive allergen-specific sIgE after adjusting for covariates. Oral contraceptive use was not significantly associated. Of note, covariates of race/ethnicity and household smoke exposure were associated with the number of positive allergens, while family poverty-income ratio was not, in most of the multivariate models. We did not include age in the model due to high collinearity between age and the exposure variable/s.

Discussion:
Having periods was associated with a higher number of positive allergens, whereas oral contraceptive use was not. Further studies are warranted to see if these estrogen-altering factors may be contributing to sex-specific/lifetime differ

Poster #A048

Deep learning approach for automated frontal sinus opacification assessment on CT scans

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Introduction:
The automation of radiological objective assessment and precise delineation of the frontal sinus, including its geometry and aeration, can improve preoperative evaluation and intraoperative navigation for endoscopic sinus surgery. This study presents a Deep Learning (DL) based system for the automation of delineation and characterization of radiological opacification of the frontal sinus, and its comparison with the modified Lund-Mackay score (MLM).

Methods:
237 high-resolution clinical sinus CT scans were divided into a training set (n = 125) and a test set (n = 112). The frontal sinus of the training set was manually annotated by an expert and the data were used to train a DL anatomical delineation model. In the test set, the percentage of frontal sinus opacification, as determined by the DL model in conjunction with automated threshold delineation, was compared with the MLM classification (0-4) blindly performed by an expert.

Results:
The DL model achieved high accuracy, with a Dice coefficient of 0.92 (0.00 - 1.00), indicating strong correlation with manual delineation. The system accurately identified frontal sinuses in all test set CT scans, regardless of opacification degree. The average frontal sinus volume was 9.79 mm^3 (1.27 - 40.66) and the average opacification percentage was 37% (0 - 100%). The system demonstrated a strong correlation with a specialist's MLM classification (R: 0.88, $p<0.001$) in the test set.

Conclusion:
We present an automated frontal sinus delineation and assessment of opacification that shows strong correlation with the current standard. Our DL approach demonstrated robust performance in frontal sinus assessment, showing potential as a promising tool for improving patient care.

Poster #A049
DEI in clinical research
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The FDA has long recognized the highly selective nature of patients enrolled in Phase 3 clinical trials. Studying a new drug or treatment in a multi-center, double-blinded, placebo-controlled randomized study is the “”gold standard”” for clinical research. But having a homogeneous population in a study limits the widespread extrapolation of results to the population as a whole. The FDA has provided guidance and backed legislation that will require more diverse patient enrollment. This will improve the science behind the study, but will present practical challenges at many levels that sponsors and sites will face. We identify many current issues and offer solutions to these challenges. We also explore future needs and identify gaps that will need to be filled to meet the true goals of clinical research.

Recognizing and understanding the root causes of underrepresentation in research is the important first step in addressing the problem. Major factors that play crucial roles are recruitment, need for translation services and managing these diverse research subjects that not only preserves their autonomy, but also maintains protocol adherence. Future areas that demand evaluation and novel solutions include gathering more relevant demographic data and gaining trust in underrepresented patients communities. Each of these issues are explored in this very relevant study.

Poster #A050
Detecting nasal endoscopy landmarks using a CNN
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Background:
The anatomic complexity of the nasal cavity can complicate attempts to diagnose disease during nasal endoscopy (NE). Machine learning (ML) models have shown promise in identifying structures in medical imaging but have not yet been applied to the endoscopic landmarks of the nasal cavity. We sought to develop a ML model to identify and localize these structures and orient clinicians to the visual findings of the NE examination.

Methods:
Two thousand one hundred and eleven images taken during NE containing middle turbinates (MT) and inferior turbinates (IT) were manually labeled. We applied transfer learning to a publicly available, pre-trained convolutional neural network (CNN) called YOLOv8 to classify, detect, and segment these structures. We calculated the accuracy, precision, and recall of the trained model and used these metrics to derive an F1 score. The model’s inference was evaluated using attention heatmaps.

Results:
The reparametrized YOLOv8 model was 89.5% accurate in classifying, detecting, and segmenting the MT and IT. The average precision of the model in identifying turbinates was 92.5% and the recall was 94.5%. The average F1 score at the confidence threshold of 60% was 93.5%. Heatmap-overlaid images demonstrated salient identification of the features distinguishing the turbinates.

Conclusion:
A CNN-based object-detection model can be trained to accurately classify, detect, and segment the MT and IT in images obtained during NE. This model can be used as a

starting point for algorithms that comprehensively interpret the nasal cavity architecture seen on NE.

Poster #A051

Development of a novel nasal microsampling device to standardize the analysis of protein biomarkers

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Background:
Nasal fluid biomarker analysis is an emerging method for studying sinonasal pathophysiology, monitoring therapeutic efficacy and discovering novel drug targets. Variability in biomarker results is often observed as a consequence of non-standardized collection methodology. Development of a novel device that absorbs nasal fluid using filter membranes was undertaken to improve volumetric accuracy, site-specific collection and analyte recovery.

Methods:
Fixed volumes of nasal mimic (Biochemazone) were deposited onto the anterior region of the inferior turbinates of 3D-printed sinus models (Fusetec) to assess volumetric accuracy and collection-site accuracy of the nasal microsampler in comparison to a flocked swab (Copan). Additionally, the study used ELISA methods to examine the cytokine (IL8, IP10, IL5) recovery properties of the device's absorption membrane, "Leukosorb" (Cytiva), as compared to experimental and proprietary membrane materials.

Results:
The volume of nasal fluid collected using the novel device was shown to have a statistically significant lower coefficient of variation compared to the swab ($P<0.05$). In addition, the device showed greater precision in collecting samples from the same site as compared to the swab ($P<0.05$). The spike and recovery study indicated that the Leukosorb membrane had 60%-90% cytokine recovery rates ($P<0.01$) compared to 75%-100% for the proprietary materials ($P<0.01$).

Conclusions:
The novel nasal microsampler offers significantly improved volume control and site-specificity than flocked swabs. All membrane materials demonstrated satisfactory protein recovery levels however, the safety attributes of the experimental membranes need to be investigated before in-vivo use.

Poster #A052

Diabetes mellitus in endoscopic sinus surgery

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Objective:
Diabetes mellitus (DM) has been demonstrated to influence the management of patients admitted for several medical and surgical procedures. Our study investigates the impact of DM on the management and total charges of patients who undergo inpatient endoscopic sinus surgery (ESS).

Methods:
The 2017 National Inpatient Sample (NIS) was queried to identify adult inpatients with a primary procedure related to ESS. Univariate and multivariable analyses were used to identify statistical associations with DM.

Results:
Of the 390 inpatients who underwent ESS, the majority were male (52.6%), White (65.3%), and did not have DM (64.1%). The mean age of patients in our cohort was 55.2 years. Patient demographics including sex, race, primary payer status, and severity of illness significantly varied by patient DM status ($p<0.001$). On univariate analyses, patients with DM had higher incidence of nutritional deficiency anemias (28.6% vs. 8.0%, $p<0.001$), chronic pulmonary disease (35.7% vs. 14.0%, $p<0.001$), and hypertension (67.9% vs. 36.0%, $p<0.001$). On multivariable analyses adjusting for patient demographics, hospital data, and severity of illness, patients with DM had greater total charges ($94,995 vs. $46,696, $p<0.001$) and length of stay (LOS) (7.3 vs. 4.0 days, $p<0.001$), but a similar number of procedures

undergone (1.6 vs. 2.1 procedures, p=0.180) as compared to patients without DM.

Conclusions:
Patients with DM undergoing inpatient ESS had greater total charges and LOS, but a similar number of procedures undergone as patients without DM.

Poster #A053
Diagnostic value of serum IgE levels for allergic fungal rhinosinusitis
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Introduction:
Allergic fungal rhinosinusitis (AFRS) is traditionally diagnosed using Bent and Kuhn (B&K) criteria. However, these have been reported to lack sensitivity and specificity. We aim to determine the diagnostic value of serum IgE levels for AFRS.

Methods:
A retrospective case-control study was performed, recruiting 50 consecutive patients who met B&K criteria as AFRS cases and 50 consecutive non-AFRS controls who had chronic rhinosinusitis with nasal polyposis (CRSwNP). Serum IgE levels were compared between the two groups, with sensitivity and specificity analysis performed using receiver operating characteristic (ROC) curves.

Results:
The mean serum IgE level of patients with AFRS was significantly different from that of CRSwNP controls (1269 vs 211 IU/mL, p<0.001). ROC curve analysis showed an AUC of 0.816, with a cutoff point of 430 IU/mL identified using Youden's index. Secondary analysis also was performed to determine the usefulness of serum IgE levels in diagnosing AFRS pre-operatively, before pathology results are available to fulfil all B&K criteria.

Conclusion:
Serum IgE is of value in the diagnosis of AFRS, and can be used as an adjunct with existing B&K criteria to improve diagnostic confidence pre-operatively.

Poster #A054
Disparities in nasal fracture care & surgical outcomes
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Introduction:
Nasal bone fractures (NBF) are common and timely reduction (i.e. within 2-3 weeks) is a historical treatment paradigm. Research shows that certain factors, such as nasal congestion before injury, can increase the risk of needing surgery after reduction. This study aims to assess the impact of reduction timing on need for subsequent rhinoplasty, emphasizing population-wide disparities.

Methods:
We utilized a de-identified database to identify patients with NBF treated with closed nasal reduction (CNR) and categorized patients by timing of their procedure: ≤2 weeks or 2-4 weeks post-injury. Rhinoplasty/septoplasty post-reduction served as the primary outcome. Statistical significance was determined using the Chi-square test.

Results:
32,186 patients had CNR for NBF, and 29,740 (92.40%) had treatment within 2 weeks. Native Hawaiian/Other Pacific Islander patients were proportionally more likely to experience treatment delays, with 10 (11.63%) undergoing CNR >2 weeks compared to 3.97%-4.95% among other demographic groups. Hispanic patients were more likely than non-Hispanic (1.94% vs. 16.7% p=0.009), and Asian patients were more likely than white (41.7% vs. 21.1% p=0.035) patients to undergo subsequent rhinoplasty if CNR occurred >2 weeks post-injury. Overall rate of subsequent rhinoplasty for those with CNR ≤2 weeks was less than those with CNR after 2 weeks (2.6% vs. 22.8% RR=0.113 [95% CI: 0.098 to 0.129] p<0.0001).

Discussion:
There was a significant rate of subsequent rhinoplasty for those who had CNR >2 weeks post-injury and the significant disparities observed herein necessitate targeted strategies to ensure equitable access to care, aiming to

improve outcomes and reduce necessity for secondary procedures.

Poster #A055
Disparities in sinonasal malignancy treatment
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Introduction:
Determining initial treatment patterns for sinonasal malignancy can help improve patient management. We conducted a study to investigate whether disparities exist in initial treatment types among demographic groups.

Methods:
A retrospective cohort study was conducted in TriNetX, a de-identified patient database, to query patients diagnosed with sinonasal malignancy (ICD-10 C31.0-C31.9). Patients were subsequently categorized by initial treatment received within 6 weeks after diagnosis: surgery only, chemotherapy only, radiation only, or combined chemo-radiation. Statistical significance was determined using the Chi-square test.

Results:
We identified 16,697 patients diagnosed with sinonasal malignancies; 3,446 (20.64%) patients received the following initial treatments: 784 (22.75%) surgery, 555 (16.12%) chemo-radiation, 1,030 (29.89%) chemotherapy only, and 1,077 (31.25%) radiation only. Significant differences were noted in treatment choice by gender (<0.0001), with males more likely to undergo chemotherapy or chemo-radiation and females more likely to undergo surgery or radiation. Racial disparities were observed in the proportion undergoing treatments, with Asian patients receiving all treatments less frequently than white patients except for chemotherapy ($p<0.001$) and Black/African American patients receiving surgery at lower rates than Asian patients ($p= 0.011$).

Discussion:
The study reveals distinct demographic patterns in the choice of initial treatment for sinonasal malignancy. The identified preferences underscore the need for further investigation into underlying causes, such as disease presentation, access to care, and socio-economic factors, to ensure equitable treatment allocation.

Poster #A056
Does a validated patient-reported outcome measure exist for rhinosinusitis in children?
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Background:
Paediatric rhinosinusitis is a prevalent yet under-appreciated problem, affecting the physical, social and psychological wellbeing of affected children, parents and caregivers, and can co-exist with chronic conditions such as cystic fibrosis or primary ciliary dyskinesia (PCD). Patient reported outcome measures (PROMs) systematically assess, quantify and monitor chronic disease symptoms. Despite the established use of PROMs in adults for clinical and research purposes, their integration into paediatric settings has lagged.

Aim:
To evaluate if a paediatric-specific PROM for rhinologic disease exists for use in clinical and research settings.

Methods:
A systematic review was conducted in accordance with PRISMA guidelines. MEDLINE, Embase and the Cochrane Library were searched. Original validation and content validity studies of PROMs specific for use in evaluating paediatric rhinologic disease were included. Studies were evaluated using the COSMIN methodology for adequate content validity.

Results:
Seven studies were identified: four paediatric-specific PROM development studies and three content validity studies. The PROMs include the SN-5, MSYPQ, PCD-QoL Questionnaire and S5 Score. The total quality of PROM development was inadequate for three of the four PROMs. The PCD-QoL scored highly in terms of development and validation, however its

specific nature pertaining only to PCD precludes it from use in general rhinologic disease.

Discussion:
There are no validated PROMs for the assessment and monitoring of paediatric rhinologic disease, highlighting the need to develop a holistic disease-specific metric aimed at enhancing the evaluation, treatment and academic exploration of paediatric rhinologic disease.

Poster #A057
WITHDRAWN

Poster #A058
Does Dupilumab therapy for chronic rhinosinusitis with nasal polyposis reduce nasal steroid use?
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Introduction:
Intranasal corticosteroids (ICS) are indicated for chronic rhinosinusitis with nasal polyposis (CRSwNP) and are often required for dupilumab prescription renewal. However, patients with relief on long-term biologic therapy may not need continuous ICS. We aim to investigate trends in ICS use for patients with CRSwNP with or without asthma on long-term dupilumab.

Methods:
A retrospective review of patients at a single tertiary medical center diagnosed with CRSwNP with or without asthma from 2019 onward and treated with dupilumab for at least two years was performed. Usage along with prescription and refill counts of ICS rinse and spray medications were collected.

Results:
80 patients met inclusion criteria. The number of patients on any ICS medication significantly decreased from 57 (71.2%) at baseline to 40 (54.8%) and to 31 (46.3%) at 1 year (p=0.029) and 2 years (p=0.001), respectively. The number of patients on steroid rinses decreased from 32 (40.0%) at baseline to 25 (34.2%) and to 17 (25.4%) at 1 and 2 years, respectively, with a significant decrease at 2 years (p=0.02). The number of patients on steroid sprays decreased from 32 (40.0%) at baseline to 21 (28.8%) and to 16 (23.9%) at 1 and 2 years, respectively, with a significant decrease at 2 years (p=0.04). Mean SNOT-22 and nasal polyp scores (NPS) remained improved from baseline to 2 years in patients with decreased or discontinued ICS use (SNOT-22: 32.4 to 16.2, p=0.008; NPS: 3.6 to 0.1, p<0.0001).

Conclusion:
Dupilumab therapy for CRSwNP results in significantly reduced ICS use at 1- and 2-years post treatment. The process of dupilumab renewal in the setting of better-controlled CRSwNP despite decreased steroid use requires further investigation.

Poster #A059
Double trouble: Synchronous HPV associated nasal carcinomas on an immune dysfunctional background
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A 49 year old male with a history of sarcoidosis presented to the clinic with progressive right nasal airway obstruction, and was treated with antibiotics and steroids to no avail. He was scheduled for surgery for identification and subsequent excision of the mass. At the time of surgery, an irregular focus of tissue was identified in the left nasal middle turbinate, which was identified as a separate neoplasm, and was removed on a later date. Through in-situ-hybridization for high risk HPV E6 and E7 mRNA, it was discovered that both lesions had the same strain of transcriptionally active high risk HPV, (HPV45) and immunohistochemistry revealed that both lesions stained positive for p16, suggesting

these tumors were HPV associated. Upon consultation with pathologists, the identity of the original right nasal mass was determined to be HPV associated multiphenotypic sinonasal carcinoma (HMSC), and the left mass was shown to be non-keratinizing squamous cell carcinoma (nkSCC). MRI revealed no local residual disease. However, conflicting conclusions from pathologists from multiple institutions regarding risk of lympho-vascular invasion lead to a consensus to perform PET scans. The PET scans revealed concerning nodules in the chest and abdomen, supporting the notion for starting radiation treatment.

Discussion:
HMSC is an extremely rare nasal carcinoma that generally appears with high grade features, but typically behaves as an indolent disease, with a low risk of metastasis. nkSCC is also typically an indolent low-grade disease. Therefore the development of distant metastasis is perplexing, and warrants further investigation as to what factors of this patient potentially contributed to the spread of two normally indolent tumors.

Poster #A060
WITHDRAWN

Poster #A061
Dural diverticula: Radiographic and clinical implications
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Objective:
Dural Diverticula (DD) are meningeal extensions from the frontal lobe into the anterior skull base. The incidence, radiographic characteristics and clinical implications of DD are undefined but potentially critical given the possibility of iatrogenic cerebrospinal fluid (CSF) leaks in endoscopic sinus surgery (ESS).

Methods:
470 sinus CT scans were analyzed in sagittal and axial planes to assess the incidence and radiographic characteristics (extension, length and angulation) of DD. Correlation with CSF leak during frontal sinusotomy was determined.

Results:
DD were identified in 367/470 cases (78.1%). DD were detected in 3 progressive extension patterns from the frontal lobe: to the posterior table (PT) (86/367,23.5%), within the frontal intersinus septum (ISS) (268,73.0%), and up to/through the anterior table (AT) (13,3.5%). The mean length (in mm) of DD was 4.5 for PT, 5.5 for ISS and 8.5 for AT. DD angulation was categorized as vertical i.e. through cribriform alone (131,35.7%), horizontal i.e. through posterior table alone (10 ,2.7%) and diagonal i.e. between cribriform and posterior table (226,61.6%). Of patients with DD presence, Draf 3 frontal sinusotomy was performed in 59/367 (16.1%) and Draf 2a/2b was performed in 288/367 (78.47%). Importantly, no CSF leaks were detected in any frontal sinusotomies, despite traversing the DD in 50 Draf 3 cases having ISS and AT extensions.

Conclusion:
DD is an anatomic remnant of skull base embryonic development. Although its radiographic characteristics are delineated here, our findings show no increased risk of CSF leak during standard or extended frontal sinusotomies, suggesting that DD are vestigial anatomic structures of limited clinical significance.

Poster #A062
Early intra-sinus migration of a long-term frontal sinus stent
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Introduction:
Long term stenting of the frontal sinus is increasingly used to combat frontal sinus outflow tract stenosis. Complications are rare, but may result in complications such as chronic sinusitis and skull base erosion or serve as a nidus for bacterial biofilm formation. We present a rare case of early intra-sinus migration of a long term frontal sinus stent requiring revision surgery for retrieval.

Methods:
Case report & literature review.

Results:
A 43 year old male with a history of chronic rhinosinusitis with nasal polyps presented to the office with persistent symptoms. He underwent endoscopic sinus surgery in 2011 with subsequent revisions in 2016 and 2020 with placement of a left frontal sinus Rains stent in 2022. On follow up, the stent was not well visualized, though the patient required multiple rounds of antibiotics and steroids to treat persistent symptoms. A CT obtained for further evaluation demonstrated left maxillary, bilateral ethmoid, and left frontal sinus opacification with interval migration of the Rains stent completely into the left frontal sinus. The migrated device will require revision surgery including Draf 2b or Draf 3 to retrieve.

Conclusion:
Despite initial improvement, this patient ultimately had recurrence of symptoms after unanticipated intra-sinus migration of a long term frontal sinus Rains stent. After literature review and query of the Food and Drug Administration's Manufacturer and User Facility Device Experience database, this represents to the authors' knowledge the first reported instance of completely intra-sinus migration of a Rains frontal sinus stent. While generally well tolerated, these devices are not without complications and their use should be thoughtfully consi

Poster #A063
Effect of lidocaine/oxymetazoline spray on endoscopically visualized secretions
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Introduction:
Clear sinonasal and nasopharyngeal secretions are often visualized during nasal endoscopy (NE). Their presence can be influenced by factors such as reflux, sinonasal polyposis, allergic rhinitis, and non-allergic rhinitis. Before undergoing clinic NE, patients are frequently sprayed with topical lidocaine/oxymetazoline to achieve both anesthesia and decongestion, thereby enhancing visualization. However, the effect of this application on visualized secretions remains unclear.

Methods:
19 sprayed (pressurized atomizer) and 13 control patients were prospectively enrolled in the senior author's rhinology practice from March 2023 to February 2024. Two otolaryngologists, blinded to chief complaint, graded rigid office visit NE recordings. Visualized secretions were graded on a Likert scale (0 (none) - 4 (severe drainage)) at the adenoid bed, soft palate portion of the nasopharynx, posterior septum, inferior aspect of the inferior turbinate, and middle meatus.

Results:
Demographic characteristics did not differ significantly between the two groups. Likert scale grading of secretion burden was not significantly different among the two cohorts at all 5 sinonasal sites examined. There were non-significant increased secretions noted at the inferior aspect of the inferior turbinate among the sprayed group compared to the non-sprayed group (1.5 vs 0.9, p=0.08).

Conclusion:
Graded secretions did not show significant differences between sprayed and non-sprayed patients. This dispels the notion that nasal sprays administered before an examination might trigger a vasomotor response leading to heightened nasal drainage. Therefore, optimizing patient comfort can be achieved without compromising examination quality.

Poster #A064
Effect of tezepelumab on sleep in patients with severe uncontrolled asthma and nasal polyps
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Rationale:
Patients with severe asthma and chronic rhinosinusitis with nasal polyps (CRSwNP)

often have sleep disturbance. This post hoc analysis evaluated the effect of tezepelumab versus placebo on sleep disturbance in patients with a history of comorbid CRSwNP compared with the overall patient population from NAVIGATOR (NCT03347279).

Methods:
Patients (12–80 years old) with severe, uncontrolled asthma received tezepelumab 210 mg or placebo subcutaneously every 4 weeks for 52 weeks. Patient responses to sleep-related items in the Asthma Quality of Life Questionnaire (standardized) for patients 12 years and older (AQLQ[S]+12) and in the St George's Respiratory Questionnaire (SGRQ) were collected at baseline and week 52. For AQLQ(S)+12, a responder was a patient with a score of 1–5 at baseline (severe–some limitation) and 6–7 (little–no limitation) at week 52. For SGRQ, a responder was a patient with a change in response from 'true' at baseline to 'false' at week 52.

Results:
Of 1059 patients in NAVIGATOR (tezepelumab, n = 528; placebo, n = 531), 165 had CRSwNP (tezepelumab, n = 90; placebo, n = 75). At week 52, in patients with a history of CRSwNP, higher proportions of tezepelumab versus placebo recipients were responders for the AQLQ(S)+12 sleep-related items (55–58% vs 36–49%) and the SGRQ sleep-related item (56 vs 26%; odds ratio [OR], 3.76 [95% CI: 1.62–8.73]). These responses were greater than those observed with tezepelumab versus placebo in the overall NAVIGATOR population (AQLQ[S]+12 items: 48–55% vs 37–47%; SGRQ: 51 vs 38%; OR, 1.74 [95% CI: 1.28–2.37]).

Conclusions:
Tezepelumab led to improvements in sleep-specific symptoms versus placebo in patients with severe, uncontrolled asthma and a history of comorbid CRSwNP.

Poster #065

Effects of steroid usage in diabetic COVID-19 patients on invasive fungal sinusitis incidence

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N3C Consortium

Since the COVID-19 pandemic, studies from India and Pakistan have noted an increased rate of acute invasive fungal sinusitis (AIFS) in diabetic COVID patients treated with steroids. The objective of this study is to determine the incidence of AIFS in these patients in the U.S.

The National COVID Cohort Collaborative (N3C) aggregates and harmonizes data from 83 institutions. For each COVID-positive patient, 1 to 2 COVID-negative controls were selected. AIFS patients were identified by an AIFS diagnosis or a combination of the following conditions: immunocompromised, fungal infection, sinusitis, sinus surgery, and antifungal use ≥10 days after surgery or until death. An IRB exemption (IRB# 202310054) and data use request (DUR-5962E34) were granted.

There were 8,587,193 (38.9%) COVID-positive, 13,263,103 (60.1%) COVID-negative, 3,030,648 (13.7%) diabetic, and 188 (0.0009%) AIFS patients, and 1,808,077 (21.0%) on steroids after COVID. There was no statistical difference in AIFS rates in diabetic COVID-positive (DCP) and diabetic COVID-negative (DCN) patients (RR=0.7, 95% CI 0.4, 1.1). Among DCP patients, 453,997 (5.3%) received steroids and 48 (0.0006%) had AIFS. Among DCP patients on steroids, incidence of AIFS was 4.8 per 100,000 and risk of AIFS was 17.7 times higher (RR=17.7, 95% CI 4.2, 75.3) than in DCP patients not on steroids.

COVID was not associated with higher risk of AIFS in diabetics, but steroid use after COVID was associated with higher risk of AIFS in diabetics. One limitation is a lack of information on control selection from each institution. While incidence of AIFS is low in DCP patients, providers may consider the risk of AIFS when prescribing steroids to DCP patients.

POSTERS

Poster #A066

Efficacy and safety of LYR-210 for CRS from the pivotal Phase 3 ENLIGHTEN 1 trial

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Background:
LYR-210, a bioabsorbable sinonasal implant designed to deliver continuous anti-inflammatory therapy (7500µg mometasone furoate) for 24 weeks to the sinonasal mucosa, is in development for patients with chronic rhinosinusitis (CRS) who remain symptomatic despite standard medical management. In the previously reported Phase 2 LANTERN study, LYR-210 demonstrated safety and clinically meaningful efficacy in improving CRS symptoms. We now report the results from the large, multinational Phase 3 ENLIGHTEN 1 trial of LYR-210 including treatment effects and safety through 24 weeks.

Methods:
The ENLIGHTEN 1 randomized, multi-center, blinded, controlled trial was conducted at 40 sites in the US and Europe. A total of 190 CRS patients, without nasal polyps or with grade 1 polyps, who had failed prior medical management and had not previously undergone ethmoid sinus surgery were enrolled in the trial. Eligible patients were randomized to receive either LYR-210 or sham-procedure in 2:1 ratio. The primary efficacy endpoint was the change from baseline (CFBL) in the patient reported weekly average composite score of the 3 CRS cardinal symptoms (3CS; nasal blockage, nasal discharge, and facial pain) at Week 24. Other key secondary endpoints were CFBL in the SNOT-22 total score and in the ethmoid sinus percent opacification by computed tomography (CT) at Week 24. Safety data were also collected.

Results and Conclusions:
All Week 24 patient visits are completed. Results from this confirmatory study of LYR-210 will be available in May 2024. The authors plan to update the abstract upon availability of the data.

Poster #A067

Endoscopic combined antrostomies for odontogenic maxillary sinusitis

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Introduction:
Odontogenic maxillary sinusitis (OMS) is a common cause of unilateral sinus disease, but there is no consensus on the ideal treatment. Recent studies have reported that a combination of ESS (Endoscopic sinus surgery) and dental surgery is effective. In this study, the surgical outcomes of endoscopic combined antrostomies for OMS were evaluated.

Materials and Methods:
42 patients with OMS were retrospectively evaluated between May 2015 and August 2021. The diagnosis of OMS was based on the CT findings such as maxillary sinus shadow due to apical lesions of maxillary teeth. Dental implant-related sinusitis was excluded in this study. The patients consisted of 24 males and 18 females with an average age of 46.9 years. 9 patients had previously undergone tooth extraction while 31 had not. 2 patients had unknown dental surgery history. ESS including combined antrostomies of the middle and the inferior nasal meatus under general anesthesia was performed on all 42 patients. Postoperative CT and endoscopic findings were evaluated using scoring (CT: 0 - 4, Endoscope: 0 - 2 levels) 6 to 12 months after surgery.

Results:
No surgical complications such as nasolacrimal duct injury was not found. Postoperative CT score was statistically reduced from 2.9 to 1.0. Postoperative endoscopic score showed 0.2. Postoperative CT and endoscopic scores were compared between patients with and without dental surgery, but no significant differences were found.

Conclusion:
In this study, acceptable results were obtained with ESS alone in the patients. ESS including combined antrostomies created drainage and

ventilation routes not only in the middle but also in the inferior nasal meatus.

Poster #A068
Endoscopic endonasal marsupialization of recurrent petrous apex cholesteatoma
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Background:
Cholesteatomas are benign, locally erosive cysts lined by a matrix that produces keratinizing squamous epithelium. Petrous apex cholesteatoma (PAC) are challenging to manage due to their location and proximity to critical structures. Complete removal of the matrix prevents recurrence but is not feasible when the matrix is adherent to the dura and major neurovascular structures; cerebrospinal fluid leak, major neurovascular morbidity, and death may occur. We present a case of a massive right PAC successfully managed over a decade through transsphenoidal endoscopic marsupialization and planned periodic debridement.

Case report:
An adult male presented with right abducent nerve paralysis and underwent a microscopic transsphenoidal debridement in 2003. The patient re-presented in 2011 with recurrent PAC extending into the clivus, up to the level of the foramen magnum. Bone was absent over the right petrous carotid artery, basilar artery, and pons. An endoscopic transsphenoidal approach was used to debride the lesion. Doppler and image guidance were used to localize the bilateral internal carotid arteries (ICA) to widely drill in-between the clivus. Angled endoscopy and instruments were used for meticulous microdissection and removal of squamous debris. The matrix was left undisturbed on the ICA and posterior fossa dura. The opening was then temporarily stented. The patient is now followed with imaging to monitor the regrowth of debris to plan successive debridement. He has since undergone 3 debridement procedures under general anesthesia at intervals of 2, 3, and 7 years. He has not developed any new neural deficits.

Conclusions:
Marsupialization via ETA is a feasible and safe approach to managing recurrent massive PAC.

Poster #A069
Endoscopic management of medial and inferior orbital wall fractures: A systematic review
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Introduction:
Techniques in endoscopic repair of orbital fractures have significantly improved over the last 20 years. This systemic review builds upon prior work and compares surgical outcomes of both inferior and medial orbital fractures utilizing evolving endoscopic techniques.

Methods:
A systematic review utilizing PRISMA guidelines was performed. Two investigators independently screened and reviewed 512 studies describing endoscopic surgical approaches to address inferior and medial orbital fractures. Primary outcomes included improvement and/or resolution of diplopia, enophthalmos, and extraocular muscle restriction. Secondary outcomes included conversion to external approach.

Results:
Eighteen studies were included with a total of 585 patients. 72.9% of patients were male, ages raging from 6 to 78 years. 62.5% of cases were isolated inferior orbital fractures. When comparing primary outcomes between isolated medial and inferior fractures, diplopia, enophthalmos, and extraocular muscle restriction, improvement or resolution was observed in 94% versus 91.1%, 89.5% versus 92.9%, and 99.5% versus 94.7% of patients, respectively. Comparisons in symptomatic resolution between inferior and medial fractures using Fisher's exact tests for fracture location was not significant for each primary outcome. 3.7% of cases required conversion from endoscopic to an external approach.

Conclusions:
Endoscopic management of medial and inferior orbital wall fractures has been demonstrated to be both safe and highly effective in resolving symptoms of diplopia, enophthalmos, and extraocular muscle restriction. Our findings suggest similar surgical outcomes for isolated medial and inferior orbital fractures when treated endoscopically.

Poster #A070
Endoscopic repair of nasal septal perforation with cadaveric costal cartilage
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Introduction:
The anterior ethmoidal artery (AEA) flap has been demonstrated to be a reliable option for endoscopic repair of symptomatic nasal septal perforations. The use of frozen cadaveric costal allografts (CCA) has been described as a safe alternative graft for rhinoplasty procedures. The aim of this study was to discuss our initial outcomes using CCAs in combination with the AEA flap in endoscopic nasal septal perforation repair.

Methods:
Single institution retrospective case series of all consecutive patients who underwent repair of nasal septal perforation utilizing the AEA flap combined with a CCA between December 2022 to January 2024. Demographics and comorbidities were collected preoperatively. The main outcome of this study was surgical success rate defined as closure of the septal perforation.

Results:
Five patients were included. Mean perforation size was 1.28 cm (range 0.7 to 2.8 cm). Mean age was 45.4 years (range 22-60 yr), four patients (80%) were female, 40% were active smokers, mean body-mass-index was 24.5 (range 19.1-28.7), and 0% of patients had history of chronic rhinosinusitis, diabetes, or history of intranasal drug use. Etiologies of the perforation included iatrogenic (n=3), idiopathic (n=1), and trauma (n=1). Overall success rate for complete closure was 100%. Mean follow up was 9.4 months (range 2-22 months). The majority of cases were primary cases (4 patients, 80%) with one patient undergoing septal perforation repair as a revision surgery.

Conclusion:
Initial outcomes of use of the endoscopic AEA flap in combination with a CCA for closure of a nasal septal perforation are promising. Future studies with larger sample sizes and longer follow up time would be useful to verify these outcomes.

Poster #A071
Enhancing care in chronic rhinosinusitis with nasal polyposis
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Rationale:
Keeping updated on management guidelines and clinical evidence for chronic rhinosinusitis with nasal polyps (CRSwNP), as well as the insights on the relationship between type 2 inflammatory disorders, can be challenging. Underdiagnosis is common, leading to treatment delays, and frequent comorbidities necessitate multidisciplinary management.

Goals:
PeerView designed an educational initiative for otolaryngologists, allergists/immunologists, and pulmonologists to enhance awareness of biologic treatments for CRSwNP, improve identification of comorbidities to facilitate early diagnosis, and emphasize the importance of multidisciplinary care in diagnosis and treatment.

Methods:
To maximize impact and reach, PeerView used a multi-intervention, multi-technique approach, including a series of 10 live local workshops and an on-demand online activity, podcasts, and downloadable clinical resources. Outcomes measurement included pre- and post-activity questions.

Results:
Learners (N = 3,551) included 1,710 otolaryngologists, 1,199 pulmonologists, and 476 allergists/immunologists.

Improvements were seen in ability to identify patients with severe CRSwNP who were candidates for targeted biologic therapy (73% to 93%) and assess patients with CRSwNP for comorbidities (56% to 90%). Additionally, 88% of learners planned to employ multidisciplinary approaches in CRSwNP treatment. (Pre N = 322; Post N = 196)

Conclusions:
The substantial increase in competence among participants signifies a promising shift toward more informed and collaborative care. Increasing awareness and facilitating early intervention for comorbidities may lead to significant improvements in patient outcomes and overall quality of care in CRSwNP.

Poster #A072
Environmental exposure methods in rhinology
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Introduction:
A growing body of evidence has shown that exposure to air pollutants may have deleterious effects on the nose and paranasal sinuses. An optimal approach to quantify air pollution exposure with respect to sinonasal disease remains unknown. A scoping review was thus conducted per PRISMA guidelines to characterize exposure methods in studies examining common rhinologic conditions: allergic rhinitis (AR) and chronic rhinosinusitis (CRS).

Methods:
PubMed, Scopus, EMBASE, Cochrane Database, and Web of Science were queried in December 2023 for variables relating to (1) adult patients with a diagnosis of CRS or AR and (2) outdoor air pollution exposure. Articles incorporating lower airway disease, pediatric populations, indoor pollution, or nonstandard definitions of AR/CRS were excluded. Data was extracted for pollutants, method of quantifying exposure, assessment of residential stability, inclusion of authors with expertise in environmental exposure assessment, and disease-related outcomes.

Results:
34 articles were included – 16 for AR and 18 for CRS. The most common pollutant studied was PM2.5, examined in 28 studies. 21 studies used a nearby air monitor to quantify pollution exposure, 31 studies did not report whether subjects had residential stability for the period assessed, and 16 studies included authors with climate science background.

Conclusions:
Current methods to quantify air pollution exposure vary considerably and inconsistently employ expertise from environmental scientists. Future investigations examining environmental exposure in sinonasal disease would benefit from climate science collaboration, reporting of residential stability, and standardized reporting metrics that we hereby propose.

Poster #A073
Evaluation of olfactory disorders in COVID-19 patients
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Objective:
The duration of olfactory dysfunction caused by COVID-19 varies ranging from several weeks to more than 6 months, however, the prognosis remains unclear. In this study, we evaluated the clinical characteristics of COVID-19-induced olfactory impairment in the improved and non-improved groups.

Materials and Methods:
19 patients of COVID-19 induced olfactory dysfunction who visited our clinic between January 2021 and September 2022 were included. All patients were followed up for 6 months. The patients consisted of 7 males and 12 females with the median age of 26 years. □All patients were treated with olfactory training and medicine including Tokishakuyakusan (Kampo medicine) and oral vitamins (Mecobalamin, 1500 μg/day). We evaluated the severity using T□T Olfactometer (Daiichi Yakuhin Sangyo Co.) , which can measure olfaction threshold and olfactory identification. Based on the score of olfactory identification, 8 patients were in the improved group and 11 were in the non-improved. We analyzed the age, sex, the duration of the symptoms, the results of olfactory identification and retronasal test using the intravenous olfactory test of the first visit.

Results:
The score of the olfactory identification was significantly higher in the improved group (4.18 in the improved and 3.25 in the non-improved group). The duration of olfactory dysfunction was longer in the improved group (6.13 months in the improved and 3.36 in the non-improved group). No significant difference was observed regarding the retronasal test.

Conclusions:
In this study, we experienced the improvement of olfactory dysfunction caused by COVID-19 more than 12 months after onset and in the patients with severe olfactory dysfunction.

Poster #A074
Evaluation of safety and effectiveness of Novapak™ in patients undergoing sinus surgery
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Background:
Packing materials are commonly used in sinus surgery to minimize adhesions and decrease bleeding. This study evaluated the safety and effectiveness of a dissolvable chitosan-based nasal packing system in the perioperative setting.

Methods:
A prospective, observational study examined the safety and effectiveness of Novapak after endoscopic sinus surgery (ESS) in adults. Adverse events (AE), objective clinical and Sino-nasal Outcomes Test-22 (SNOT-22) endpoints were collected at 14- and 30-day postoperative visits and compared to baseline.

Results:
74/86 enrolled subjects (mean age 48.6 ± 17.4 years, 51.2% males) underwent unilateral or bilateral ESS with insertion of Novapak and completed 30-day follow-up. Lack of adhesions were seen at Days 14 (95.7%) and 30 (96.2%). Lund-Kennedy scores at Days 14 and 30 measured statistically significant reduction in right and left sides: discharge (Day14: p=0.0224 (left), 0.0005 (right) vs. Day30: <0.0001, <0.0001), edema (p= <0.0001, 0.0003 vs. <0.0001, <0.0001) and scarring (p=0.0194, 0.0043 vs. 0.0184, 0.0028). Bleeding was controlled in all cases at Boezaart Scale Grade0 (61.9%) or Grade1(38.1%) after insertion of Novapak. SNOT-22 also supported effectiveness, with mean improvement from 40.5 at baseline to 25.1 at Day 14, and 18.7 at Day 30. Device relationship was noted 'possible' in two AEs (post-operative fever, post-surgical pain) and as 'probable' in one serious AE (severe adhesion/scarring).

Conclusion:
This study supports the safety and effectiveness of Novapak placement for postoperative control of mild bleeding and adhesion prevention following sinus surgery with a low incidence of device-related adverse events.

Poster #A075
WITHDRAWN

POSTERS

Poster #A076

Extradural pneumocephalus with subcutaneous emphysema following skull base surgery: Case report

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Background:
Pneumocephalus, the presence of air in the cranial cavity, is a known complication of neurosurgical procedures. While most cases resolve spontaneously, delayed extradural pneumocephalus is a rare occurrence, especially following skull base surgery.

Case Presentation:
We present a case of post operative extradural bifrontal pneumocephalus in a 76-year-old male with a history of frontal bone fracture repair complicated by meningitis, requiring craniotomy and frontal sinus cranialization in 1996. Following a fall in August 2023, he underwent frontonasal mucocele resection and frontal re-cranialization. Two months postoperatively, the patient presented with right forehead swelling and vertigo. CT imaging revealed extensive extradural pneumocephalus with a left supraorbital ethmoid defect and a communication to a subcutaneous emphysema. Surgical repair of the left skull base defect was performed, and the patient experienced resolution of symptoms and pneumocephalus.

Conclusion:
Delayed extradural pneumocephalus with subcutaneous emphysema following skull base surgery is a rare phenomenon. While subdural pneumocephalus is more typical and associated with dura defects and CSF leaks, our case presented without such findings. This case highlights the importance of vigilance for delayed extradural pneumocephalus in patients with a history of skull base surgery. In the absence of dura defect and CSF leak, subcutaneous emphysema may be an important clinical finding suggesting pneumocephalus. Repair of the skull base defect may resolve the pneumocephalus avoiding progression to tension pneumocephalus. Further studies are warranted to better understand optimal management strategies and preventative measures.

Poster #A077

Extramedullary plasma cell neoplasm in the nasal cavity

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ISSSTE

Extramedullary plasmacytoma is a rare neoplasm, however when it occurs, the ENT area is the most frequently affected site. The few series of patients reported in the literature, and especially in our environment, mean that current management is not very widespread. Diagnosis is somewhat difficult to perform only with clinical elements, which makes the laboratory and histopathological study with specific techniques of vital importance. It is known that its transformation into multiple myeloma constitutes the main prognostic factor, hence the patient must undergo to rigorous monitoring.

The case of a 78-year-old woman is presented, who is registered as a secondary to a chest wall tumor corresponding to a plasma cell neoplasm, which is later evaluated due to presenting symptoms of nasal obstruction predominantly left with outlet of mucous discharge of months of evolution, which was diagnosed as an extramedullary plasma cell neoplasm.Clinically, they can manifest as a nasal mass, increased volume and facial pain, airway obstruction, epistaxis, rhinorrhea, proptosis, dysphagia or dysphonia. In relation to its extension, 3 stages are distinguished. The diagnosis of extramedullary plasmacytoma is based on histological evidence of a plasma cell tumor in an extramedullary location (not bone) and without clinical, histological or radiological evidence of multiple myeloma.

In the following work we address the presentation of a clinical case and follow-up of a patient with plasma cell neoplasia.

POSTERS

Poster #A078

Fluid and electrolyte disorders in closed nasal fractures

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Objective:
Fluid and electrolyte disorders (FEDs) have been demonstrated to negatively influence the management of patients admitted for various medical and surgical procedures. Our study investigates the influence of FEDs on the healthcare consumption of patients diagnosed with closed nasal bone fractures.

Methods:
The 2017 National Inpatient Sample (NIS) was queried to identify adult inpatients with a primary diagnosis related to closed nasal bone fracture (ICD-10: S02.2XXA). FEDs were identified using ICD-10: E22.2, E86, E87. Univariate and multivariable analyses were used to characterize statistical associations with FEDs.

Results:
Of the 4,865 patients diagnosed with closed nasal bone fractures, the majority were male (56.2%), White (68.4%), and did not have any FEDs (79.4%). Patient demographics including age, sex, race, household income, primary payer status, and severity of illness varied significantly by patient FED status ($p<0.001$). FED patients had a higher incidence of congestive heart failure (18.5% vs. 8.8%, $p<0.001$), nutritional deficiency anemias (21.5% vs. 7.1%, $p<0.001$), and hypertension (67.0% vs. 47.6%, $p<0.001$) than non-FED patients. On multivariable analyses, adjusting for patient demographics, hospital information, and severity of illness, FED patients had greater total charges ($55,309 vs. $42,684, $p<0.001$), length of stay (LOS) (4.3 vs. 2.6 days, $p<0.001$), and mortality (OR 4.17, 95% CI 1.92–9.05, $p<0.001$) than non-FED patients.

Conclusions:
FED patients diagnosed with closed nasal bone fractures had greater total charges, LOS, and mortality than non-FED patients.

Poster #A079

Forever chemicals: PFAS exposure and effects on sinonasal health

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Introduction:
Per- and Polyfluoroalkyl Substances (PFAS) are widely used chemicals, notably in nonstick coatings, fire-fighting foams and equipment, and water repellents. These chemicals degrade slowly and accumulate in tissues and the environment, being detected in water, air, wildlife, and soil across the world. Initial studies have shown that these chemicals are associated with harmful health effects, but research in this area remains limited, especially in sinonasal diseases.

Methods:
The National Health and Nutrition Examination Survey (NHANES) 2013-2014 was used to analyze the association between PFAS and taste and smell survey among adults (age≥40) with complete data (n=942). The survey included self-reported sinonasal symptoms. Multivariable logistic regression adjusted for covariates was used to describe the relationship between PFAS and sinonasal health. Bayesian kernel machine regression (BKMR) was performed to consider the diverse chemical properties of PFAS and how real-life exposures involve multiple types of PFAS.

Results:
The logistic regression model found that higher PFAS concentrations were associated with a higher probability of having frequent sinus infections. [Perfluorohexane sulfonic acid (PFHS) (OR=1.226, p=0.023), perfluorooctanoic acid (PFOA) (OR=1.240, p=0.038), and perfluorooctane sulfonic acid (PFOS) (OR=1.268, p=0.008)]. The BKMR model identified that an overall increase in PFAS is likely to increase the probability of having

frequent sinus infections.

Conclusion:
Our findings may provide evidence that PFAS exposure, specifically exposure to PFHS, PFOA, and PFOS, is related to negative effects on sinonasal health.

Poster #A080
Frailty and its impact in Rhinology patients
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Introduction:
Frailty, increasingly recognized as an indicator of morbidity and mortality across medical fields, remains understudied in rhinology. This study assesses frailty's influence on clinical outcomes following medical and surgical interventions for rhinologic conditions.

Methods:
A retrospective chart review included consecutive rhinology clinic attendees from 10/1/15 to 12/31/22, aged 50 or older, with pre-treatment and post-treatment Sino-Nasal-Outcome Test-22 (SNOT-22) completed within 3 months to 1 year. Frailty was evaluated using the modified Frailty Index-11 (mFi-11) with a 0.018 cutoff. Demographics, SNOT-22 scores, treatment modalities, frailty status, and comorbidities were analyzed with paired T-tests.

Results:
150 rhinology patients (mean age 65.27 years) were included with frailty identified in 46. Both frail and non-frail groups showed significant post-treatment SNOT-22 score reductions ($p<0.01$), with averages of 9.47 and 17.01 points, respectively. Surgical interventions yielded the greatest improvement, particularly in non-frail patients (24.35 points). Frail patients also improved significantly after surgery (14.2 points), while those receiving medical treatment alone did not reach a minimal clinically important difference. This latter group also failed to show significant improvement when excluding the psychological/sleep dysfunction domains of the SNOT -22.

Conclusions:
Surgical interventions demonstrated superiority across all cohorts, while frail patients showed less improvement after medical interventions compared to non-frail counterparts. Further studies are needed to validate these findings and elucidate factors contributing to reduced medical treatment response in frail rhinologic patients.

Poster #A081
Frontal sinus IP
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Background:
Inverted papilloma (IP) is typically a benign sinonasal tumor with propensity to recur. The surgical treatment of IP arising from the frontal sinus is complicated by proximity to the orbit and the skull base. The objective of this study is to describe the surgical challenge of this disease and to propose a treatment algorithm specific for frontal IP.

Methods:
A retrospective review was performed on frontal sinus IPs resected from 1993 to 2023. Demographic and clinicopathologic data, complications, surgical approach, and outcomes were analyzed.

Results:
Ninety-eight patients (60 males, 38 females) were identified. Mean age was 58.7 years, with a mean follow-up of 46.8 months. Histopathologic evaluation identified 13 lesions (13.3%) with carcinoma-in-situ (8) or invasive carcinoma (5). Bilateral involvement was found in 26 patients (26.8%). Overall, 34 patients required multiple procedures (34.7%). 17 patients (17.3%) had recurrent disease with a median time of 31.4 months, and 14 patients (14.3 %) underwent staged procedures, with median time to second procedure of 7.0 months. 22 patients (27.2%) presented with skull base dehiscence on perioperative imaging. Skull base dehiscence had a significant association with intraoperative cerebrospinal fluid leak (OR 18.0, 95% CI 4.7-68.3, $p<0.001$). The 5-year recurrence-free survival was 64.5%.

Conclusion:
Frontal sinus IP is commonly attached at the skull base and associated with skull base dehiscence, often requiring operative repair and staged procedures. Complete tumor removal can be challenging and may necessitate a combined open and endoscopic approach. Careful surgical planning and close follow-up in the postoperative period is essential for disease control.

Poster #A082
Frontal sinus simulation training for practicing ENTs
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Background:
This study aims to assess the effectiveness of high-fidelity simulation training in enhancing skills for frontal sinus surgery within the framework of continuing medical education.

Methods:
We conducted a prospective quasi-experimental study utilizing within-subjects design and subjectively reported cross-sectional data obtained from a frontal sinus surgery simulation course. Subjects, primarily consisting of practicing otolaryngologists, expressed their concerns regarding frontal sinus surgery before and after participating in the simulation course. Statistical analysis included paired t-test and Pearson correlations.

Results:
43 subjects were included in the final analysis. There was no significant difference in mean apprehension level between practicing professionals and those in training. Prior to simulation, potential to violate skull base was identified as participant's primary concern. Post-simulation responses named low case volume in practice as the most significant deterrent. Potential for skull-base violation, likelihood of inadequate dissection, technical challenge of surgery, and suboptimal training during residency were all cited as reasons for reluctance towards frontal sinus surgery. There was significantly decreased contributory weight of each regarding apprehension for frontal sinus surgery following simulation ($p<0.005$).

Conclusions:
This study contributes to the growing body of evidence supporting simulation training in rhinology and fills a notable gap in the current literature regarding simulation training in continuing medical education. The results highlight the value of simulation training in enhancing confidence and decreasing apprehension towards frontal sinus surgery.

Poster #A083
Grades of PRNN guide endoscopic skull base surgery
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Background Introduction:
Postradiation nasopharyngeal necrosis (PRNN) is a severe postradiation complication of nasopharyngeal carcinoma. PRNN not only severely impacts the quality of life but also endangers the lives of patients. Definite grades of PRNN and their corresponding standard surgical procedures are lacking. we aimed to establish the classifications of PRNN for transnasal endoscopic skull base surgery (TESS).

Methods:
We enrolled 82 postirradiation NPC patients with PRNN, 75 of whom received TESS. PRNN was categorized into four grades: I, necrosis of the nasopharyngeal mucosa and submucosal muscularis; □, necrosis extending to the pharyngobasilar fascia; □, necrotic area breaking through the pharyngobasilar fascia and involving the internal carotid artery (ICA); □, necrosis encompassing the ICA or invading the posterior cranial nerves. Overall survival (OS) analysis based on the PRNN grades was assessed. Headache was assessed using a numeric rating scale.

Results:
The classifications of PRNN were as follows: Grade I, 18.3% (n=15); Grade II, 30.5% (n=25); Grade III, 24.4% (n=20); Grade IV, 26.8% (n=22). After surgery, headache was alleviated in most PRNN patients to varying degrees. By the last follow-up visit, 24 patients had died,

including 6 of 7 in the unoperated group and 18 out of 75 in the operated group. Surgery was associated with superior OS.

Conclusion:
The classifications of PRNN grade provide an effective guideline for the TESS treatment of PRNN.

Poster #A084
Gross total resection and margin status in very advanced (T4b) sinonasal adenoid cystic carcinoma
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Introduction:
Sinonasal adenoid cystic carcinoma (SNACC) often presents at an advanced stage due to nonspecific and indolent symptoms. While surgical excision with negative margins has been associated with improved survival, gross total resection (GTR) while tolerating positive margins may be considered for tumors involving critical structures. This study investigates the role of surgical treatment and margin status on overall survival in very advanced (T4b) SNACC.

Methods:
The 2004-2020 National Cancer Database (NCDB) was queried for patients diagnosed with T4bM0 SNACC undergoing curative-intent treatment. Treatment was classified as either GTR with negative microscopic margins (GTR-NSM), GTR with positive microscopic margins (GTR-PSM), or non-surgical treatment (radiation alone or chemoradiation). Overall survival (OS) was analyzed using Kaplan-Meier analysis and propensity score matching.

Results:
230 patients (53.5% female, mean age 57.7 years) were identified, with a 5-year OS of 61.8% (95% CI = 54.8-68.0%). Most were treated non-surgically with chemoradiation (20.0%) or radiation alone (22.2%). GTR-NSM was achieved in 27.0% of patients and GTR-PSM in the remaining 30.9% of patients. GTR-NSM was associated with the highest 5-year OS (85.8% [73.4-92.7]). GTR-PSM was associated with a significant 5-year OS benefit compared to non-surgical treatment (64.5% [51.8-74.6%] vs 44.2% [33.4-54.5%], p=0.01). This association remained statistically significant after propensity score matching analysis (p=0.004).

Conclusion:
Although NSM should always be pursued whenever possible given the most favorable outcomes, GTR while accepting positive margins should be considered among treatment options for T4b SNACC.

Poster #A085
High prevalence of sinonasal symptoms in untreated OSA patients
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Introduction:
It is well established that patients with chronic rhinosinusitis (CRS) are at an increased risk of developing obstructive sleep apnea (OSA). However, there is limited understanding regarding the sinonasal disease burden in untreated OSA patients. The study aims to assess the sinonasal disease burden, utilizing SNOT-22 and TNSS, in patients primarily seeking care for untreated OSA.

Methods:
From January 2023 to March 2024, patients at a sleep apnea clinic and a rhinology clinic filled out the 22 item CRS outcome test (SNOT-22) and the total nasal symptom score (TNSS). T-tests and chi-squared tests were performed where appropriate.

Results:
A comparison was made between 80 patients seeking treatment for untreated OSA at a sleep surgery clinic and 487 patients seeking care for various sinonasal conditions, including chronic sinusitis, chronic rhinitis, and post-nasal drip syndrome, at a rhinology clinic. Age or sex did not differ significantly between groups. Overall SNOT-22 score was similar with an average of 32.6 for CRS patients and 29.1 for OSA patients (p=0.13), suggesting significant sinonasal symptoms among patients with untreated OSA. Both groups also had a similar percentage of patients with moderate to severe SNOT-22

scores (65% OSA vs 69% CRS, p=0.53).

Conclusion:
Patients presenting to a OSA clinic display comparable CRS symptom severity, as assessed by the SNOT-22 questionnaire, to those seeking care at a rhinology clinic specifically for CRS symptoms. This suggests that individuals with untreated OSA may benefit from routine screening for CRS symptoms and subsequent tailored interventions.

Poster #A086
Hispanic nose
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The prominence of the nose in facial aesthetics is undeniable, with its beauty resting on the symmetry, balance, and harmony of facial segments. Historical methodologies for facial evaluation, including the nose, have evolved over time, influenced by changing fashion and functionality. Yet, these traditional formulas are not definitive, as the beauty assessment is inherently subjective, particularly within an ethnic context where certain traits may be valued differently.

In the current global milieu, marked by extensive migration, there's a rich tapestry of ethnic diversity, leading to the emergence of new racial categories, including the “”non-Caucasian, Hispanic, mestizo, or Latin”” category.
The mestizo nose, shaped by a mix of races, predominantly in Hispanic America, exhibits unique features—ranging from skin thickness to bone and cartilage structure—distinct from traditional Caucasian characteristics. This diversity necessitates a tailored approach in rhinoseptoplasty, challenging surgeons to innovate beyond conventional techniques predominant in Western medical literature.

The surgical aim for mestizo patients is twofold: achieving a natural look while preserving the patient's ethnic or racial traits. This objective underscores the necessity for personalized surgical planning, adapting techniques to individual requirements rather than adhering to a one-size-fits-all methodology.

With the growing mestizo population, there's a burgeoning recognition of the mestizo nose in facial surgery, fostering advancements in rhinoseptoplasty that respect and enhance ethnic diversity, aligning with patient aspirations for both aesthetic appeal and cultural identity.

Poster #A087
HLA mismatch and chronic rhinosinusitis in kidney transplants
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Introduction:
Chronic rhinosinusitis (CRS) is associated with HLA class II gene variations, especially HLA-DQA1 polymorphism. Previous studies have noted an association between kidney transplantation and CRS. This study aimed to assess the relationship between HLA mismatches and the development of chronic rhinosinusitis in kidney transplant recipients (KTR).

Methods:
A retrospective study of KTR at Mayo Clinic Florida from 2000 to 2022. Patients were stratified based on the occurrence of CRS. A total of 119 KTR and donors were typed by molecular method for HLA-A, B, C, DRB1, DQA, and DQB. The percentage of recipient and donor HLA mismatching was calculated and correlated with the development of CRS and the necessity for endoscopic sinus surgery, known as recalcitrant disease.

Results:
The median age of KTR was 59.87 (IQR 50.5-70), with a M:F ratio of 1:1.3. The total HLA mismatch rate was 96.63%. Thirty-six percent of patients (43/119) had a diagnosis of CRS. Among these, recalcitrant CRS was noted in 15.1% of cases, with a 94.4% overall HLA mismatch rate. There was no significant difference between the CRS and non-CRS KTR groups in the percent HLA class I (93.02% versus 96.05%) and class II (87.17% versus 96.05%) mismatches.

Conclusion:
We found the overall rates of HLA mismatches and the specific HLA class I and II mismatches were not significantly different between CRS and non-CRS KTR groups. Mismatches in HLA type I and II may not play a critical role in the development of CRS in kidney transplant patients.

Poster #A088
Hospital region by closed nasal bone fractures
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Objective:
Hospital location/region has been suggested to influence the management of patients undergoing various surgical procedures. Our study describes the correlations between hospital regions and outcomes of patients diagnosed with closed nasal bone fractures.

Methods:
The 2017 National Inpatient Sample (NIS) was used to identify adult inpatients with a primary diagnosis related to closed nasal bone fractures. Hospital region is defined by NIS via national census division as Northeast (NE), Midwest (MW), South, and West. Univariate and multivariable analyses were used to characterize statistical correlations between hospital regions.

Results:
4,865 patients met inclusion criteria and were treated at hospitals located in the NE (23.8%), MW (21.6%), South (35.5%), and West (19.1%). The majority were male (56.2%) and White (68.4%). On multivariable analyses adjusting for patient demographics, hospital data, and severity of illness, MW patients had fewer total charges ($33,039 vs. $40,433.54, p<0.001), shorter length of stay (LOS) (2.7 vs. 3.2 days, p<0.001), and greater mortality (OR 3.40, 95% CI 1.14–10.12, p=0.028) than NE patients. Southern patients had greater total charges ($50,513 vs. $40,434, p<0.001), but similar LOS (3.1 vs. 3.2 days, p=0.975) and mortality (OR 2.76, 95% CI 0.84–9.04, p=0.093) as NE patients. Western patients had greater total charges ($55,124 vs. $40,434, p<0.001), shorter LOS (2.5 vs. 3.2 days, p<0.001), and similar mortality (OR 1.75, 95% CI 0.48–6.36, p=0.393) as NE patients.

Conclusions:
In a cohort of inpatients diagnosed with closed nasal bone fractures, total charges, LOS, and mortality varied by hospital region.

Poster #A089
How likely are patients who receive a CT scan of the sinuses to progress to sinus surgery?
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Educational Objective:
Attendees will understand what percentage of patients who obtain a CT scan for sinusitis proceed to sinus surgery.

Objectives:
CT scans are a critical tool in the assessment of sinusitis and preoperative management of sinus surgery. We aim to assess what percentage of patients receiving CT scan of the sinuses for sinusitis proceed to surgery and examine the factors that influence progression to sinus surgery following a CT scan.
Study Design: A single-center retrospective chart review of adult patients with a CT scan of the sinuses was performed.

Methods:
Adult patients who received a sinus CT for a rhinologist-confirmed diagnosis of any type of sinusitis between 2012 and 2022 were identified. Patient data was extracted from charts, including demographics, imaging, diagnoses, and future surgical intervention. Trauma cases were excluded. Chi-square analysis was performed to assess surgical rates following CT for different patient groups.

Results:
232 patients who received a sinus CT were identified. Overall, the rate of sinus surgery following CT was 38.3%. The rate for patients with prior sinus surgery was 43.1% vs. 36.7%

in patients without prior sinus surgery (p=0.39). The rate for males was 41.1% vs. 36.0% for females (p=0.59). Patients aged 18-30 progressed to surgery at higher rates (69.2%). The surgical rates of different age groups were statistically significant (p=0.048).

Conclusions:
Most patients with a confirmed diagnosis of sinusitis who received a sinus CT do not proceed to surgery at any point without additional CT evaluations. Neither prior history of sinus surgery nor gender was associated with increased surgical progression. Young patients had higher surgical rates following CT.

Poster #A090
Impact of age on outcomes of open orbital fracture repair
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Objective:
To investigate the impact of age on outcomes of open orbital fracture repair.

Study Design:
Retrospective database study.

Methods:
The 2016 to 2018 National Surgical Quality Improvement Program was queried for adults undergoing open orbital fracture repair (Current Procedural Terminology codes 21385-21387, 21390, 21395, and 21406-21408). Univariate and multivariable analyses were implemented to identify associations between age and outcomes.

Results:
Of the 842 patients satisfying inclusion criteria, the majority were age 18-40 years (54.2%), male (65.9%), American Society of Anesthesiologists physical status (ASA-PS) 1/2 (76.8%), and had orbital floor fractures (78.5%). Compared with those age 18-40 years, patients age >40 years more frequently were ASA-PS 3/4 (41.2 vs. 7.9%) and had diabetes mellitus (13.2% vs. 0.7%), obesity (36.2% vs. 24.8%), and hypertension (43.3% vs. 4.8%) (P<0.001). The medical complication, surgical complication, unplanned reoperation, and unplanned readmission rates were 1.1%, 4.3%, 2.7%, and 2.1%. Patients age >40 years had more medical complications (2.1% vs. 0.2%) but fewer reoperations (1.3% vs.3.9%) than those age 18-40 (P<0.025).

Compared with age 18-40 years, age >40 years was associated with similar surgical complications (aOR 0.41, 95% CI 0.16-1.07), medical complications (aOR 1.76, 95% CI 0.16-19.73), unplanned reoperation (aOR 0.17, 95% CI 0.04-0.72), and unplanned readmission (aOR 0.31, 95% CI 0.08-1.23) on multivariable binary logistic regression adjusting for patient demographics, ASA-PS, fracture site, comorbidities (P>0.05).

Conclusions:
Older age was not associated with outcomes of open orbital fracture repair.

Poster #A091
Impact of anosmia on subsequent mental health disorders
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Objective:
Limited research exists on mental health disorders (MHDs) in patients with anosmia. This study investigates risk factors associated with the development of MHDs in these patients.

Methods:
MarketScan commercial and Medicare outpatient and prescription drug claims data were utilized to conduct this study on adults with anosmia. Patients were identified through ICD-9-CM and ICD-10-CM diagnosis codes from 2014 to 2020 and a one-year washout period was applied where patients did not have any diagnosis of MHD before the anosmia diagnosis. Patients were included if they were continuously enrolled for at least two years. The primary outcome was new onset of any MHDs within one year of diagnosis of anosmia. Descriptive statistics and multivariable logistic

regression model explored risk factors associated with the development of any MHDs.

Results:
Out of 12,753 anosmia patients (mean age 47.8; 54% female), 9.2% experienced new onset of MHDs, with anxiety being the most prevalent (4.45%). Of the 1173 patients that developed MHD within one year of anosmia diagnosis, 59.3% were female. Female sex [Adjusted odds ratio (AOR) 1.26, 95% CI 1.11-1.42, $p < 0.0003$], was the only identified statistically significant risk factor associated with increased odds of new onset of MHDs. There was no significant increased risk based on age, location or other health comorbidities.

Conclusion:
Anosmia patients develop MHDs within the first year of diagnosis. The only significant identifiable risk factor is female sex. These findings underscore the significance of addressing mental health in anosmia, offering valuable considerations for clinical care and future research.

Poster #A092
Impact of commission on cancer accreditation on survival outcomes in sinonasal malignancy
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Background:
The Commission on Cancer (CoC) accreditation is considered a hallmark of excellence in cancer care, designed for hospitals and healthcare systems dedicated to treating cancer patients. This program emphasizes comprehensive, high-quality cancer treatment. However, the effect of CoC accreditation on patient outcomes, particularly across different cancer types, remains underexplored. Our study aims to investigate the differences in survival times between patients with sinonasal malignancy treated at CoC-accredited institutions versus those treated at non-accredited institutions.

Methods:
This study utilized the Surveillance, Epidemiology, and End Results (SEER) dataset which is a comprehensive source of information on cancer incidence and survival in the United States. Initial survival analyses were conducted using Kaplan-Meier curves to compare survival between patients treated at CoC-accredited vs. non-accredited facilities, followed by adjusted Cox regression models to quantify the effect of CoC accreditation on survival.

Results:
Preliminary Kaplan-Meier survival analyses revealed no significant differences in survival between patients treated at CoC-accredited facilities and those who were not ($p = 0.39$). Subsequent Cox regression analyses after adjusting for sex, race, cancer location and cancer stage still indicate that CoC accreditation does not significantly impact survival time [Hazard ratio was 1.073 (95% CI: 0.790 to 1.457, $p=0.651$)]. Our preliminary findings suggest that although there may be intangible benefits, treatment at CoC designated institutions does not confer extended life expectancy.

Poster #A093
Impact of surgical cost awareness on surgical expenditure for endoscopic sinus surgery
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Introduction:
Awareness of surgical costs is crucial, particularly amidst the rising expenses in healthcare. Surgical instruments that are opened and unused significantly contribute to inflated overall expenditures. Current literature highlights a lack of awareness among otolaryngologists regarding the costs of instruments and implants utilized during surgeries. This study aimed to develop an operating room (OR) cost menu to enhance awareness of surgical expenditure for endoscopic sinus surgery.

Methods:
A single-institution study was conducted, wherein a price list of many operating room instruments in Rhinology and Skull Base surgeries was compiled and displayed as a “”cost menu”” in high-traffic areas within each OR. Data on the utilization of opened, used, and wasted materials for endoscopic sinus surgery cases were extracted from electronic medical records. Following one month of passive placement of the cost menus in the OR, Rhinology and Skull Base surgeons received biweekly reminders about the OR cost menu to augment awareness. Additional interventions to enhance cost awareness are presently underway.

Conclusion:
Both active and passive exposure to cost data have the potential to augment surgeon awareness of surgical expenses and reduce OR waste. Enhancing awareness of surgical costs in Rhinology and Skull Base surgeries is imperative for optimizing surgical practices and curbing healthcare waste and overall expenditure. This study seeks to illustrate that the implementation of active and passive reminders of common OR costs can lead to decreased expenditure.

Poster #A094
Impact of topical Levaquin rinses on chronic rhinosinusitis
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Introduction:
Treatment of chronic rhinosinusitis (CRS) with topical antibiotic rinses is growing in popularity due to their ability to deliver a high local drug concentration and mitigate systemic effects. However, published literature on the efficacy of topical antibiotics for treating CRS is scarce.

Methods:
Patients starting Levaquin 100mg nasal rinses twice daily following functional endoscopic sinus surgery at a tertiary medical center between 2018-2023 were retrospectively identified. Rinse duration, Sino-Nasal Outcome Test-22 (SNOT) scores, Lund-Kennedy (LK) scores, and adverse effects were collected. SNOT and LK scores were compared at 3 time points: pre-operative, 3mo post-operative pre-rinse, post rinses.

Results:
85 patients on Levaquin rinses for mean 43.43 days (SD: 54.31) were included. Mean SNOT score improvement across all time points was 15.20 (SD: 19.94, $p=0.046$) and mean LK score improvement was 2.54 (SD: 2.32, $p=0.055$). On pairwise comparison for SNOT scores, significant improvement was observed between pre-operative and both 3mo post-operative pre-rinse ($p=0.013$) and post rinses ($p=0.010$), but not between 3mo post-operative pre-rinse and post rinses ($p=0.278$). On pairwise comparison for LK scores, significant improvement was seen for all 3 time point comparisons ($p\leq0.001$ for each comparison). There were no allergic reactions or musculoskeletal adverse events noted.

Conclusion:
Topical Levaquin rinses demonstrate a possible benefit in LK scores but less definitive benefit on SNOT scores. Further, there were no allergic reactions or musculoskeletal adverse events noted. Additional studies are necessary to delineate the appropriate role of Levaquin rinses in the treatment of recalcitrant rhinosinusitis.

Poster #A095
Impact of topical Mupirocin rinses on chronic rhinosinusitis
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Introduction:
Treatment of chronic rhinosinusitis (CRS) with topical antibiotic rinses is growing in popularity

due to their ability to deliver a high local drug concentration and mitigate systemic effects. However, published literature on the efficacy of topical antibiotics for treating CRS is scarce.

Methods:
Patients starting Mupirocin 15 or 30 mg nasal rinses twice daily following functional endoscopic sinus surgery at a tertiary medical center between 2018-2023 were retrospectively identified. Rinse duration, Sino-Nasal Outcome Test-22 (SNOT) scores, Lund-Kennedy (LK) scores, and adverse effects were collected. SNOT and LK scores were compared across 3 time points (pre-operative, 3mo post-operative pre-rinse, post rinses) using one way ANOVA and Wilcoxon rank sum for pairwise comparisons.

Results:
30 patients (9 at 15mg, 21 at 30mg) on Mupirocin rinses for mean 76.07 days (SD: 72.34) were included. Mean SNOT score improvement across all time points was 7.84 (SD: 23.76, $p<0.01$) and mean LK score improvement was 1.07 (SD: 1.38, $p<0.01$). On pairwise comparison for SNOT scores, significant improvement was observed between pre-operative and post rinses ($p=0.02$), but not between pre-operative and 3mo post-operative pre-rinse ($p=0.22$) or 3mo post-operative pre-rinse and post rinses ($p=0.62$). On pairwise comparison for LK scores, significant improvement was seen for all 3 time point comparisons ($p<0.01$ for each comparison). There were no major adverse events noted.

Conclusion:
Topical Mupirocin rinses demonstrate a possible benefit in both SNOT and LK scores with no major adverse events. Additional studies are necessary to delineate the appropriate role of Mupirocin rinses in the treatment of recalcitrant rhinosinusitis.

Poster #A096
Improving readability of patient education materials with ChatGPT
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Objectives:
This study aimed to use an artificial intelligence-powered large language model (LLM) to improve the readability of patient handouts.

Methods:
Five handout materials obtained from the American Rhinologic Society (ARS) and the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS) websites were assessed using validated readability metrics. The handouts were inputted into OpenAI's ChatGPT-4 after prompting: "Rewrite the following at a 6th-grade reading level." The understandability and actionability of both the native and LLM-revised versions were evaluated using the Patient Education Materials Assessment Tool (PEMAT). Results were compared using Wilcoxon rank-sum tests.

Results:
The mean readability scores of the standard (ARS, AAFPR) materials corresponded to ""difficult,"" with reading categories ranging between high school and university grade levels. Conversely, the LLM-revised handouts had an average 7th-grade reading level. LLM-revised handouts had better readability in nearly all metrics tested: Flesch-Kincaid Reading Ease (70.8 v 43.9; $p<0.05$), Gunning Fog Score (10.2 vs 14.42; $p<0.05$), Simple Measure of Gobbledygook (9.9 vs 13.1; $p<0.05$), Coleman-Liau (8.8 vs 12.6; $p<0.05$), and Automated Readability Index (8.2 vs 10.7; $p=0.06$). PEMAT scores were significantly higher in the LLM-revised handouts for understandability (89 vs 69%; $p<0.05$) with similar actionability (40 vs 29%; $p=0.38$) when compared to the standard materials.

Conclusions:
Patient-facing handouts can be augmented by ChatGPT with simple prompting to tailor information with improved readability. This study demonstrates the utility of using LLMs to aid in

rewriting patient handouts and may be a tool to help optimize education materials.

Poster #A097
Inflammatory arthritis-associated chronic rhinosinusitis
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Background:
Inflammatory arthritides (IA) have a strong association with chronic rhinosinusitis (CRS), but do not always respond to standard CRS treatments raising the question of unique pathophysiology in this population. Here, we describe an IA-associated CRS phenotype.

Methods:
Single institution case series

Results:
7 patients were included with mean age 69.4 + 8.5. 86% were women. 6 patients had a diagnosis of RA, 1 had a diagnosis of PA. 4 had a diagnosis of allergic rhinitis, but only 1 patient had positive allergy testing. Failed preoperative medical regimens included: nasal saline (100%), intranasal steroids (100%), antibiotics (86%), oral steroids (43%), and antihistamines (43%). 2 patients (29%) had a history of septal perforations with unknown etiologies. Post operative regimen for patients included short-term oral antibiotics (6/7), sinonasal steroid sprays (6/7), baby shampoo irrigations (5/7), steroid nasal rinses (4/7), topical antibiotic rinses (3/7), long term doxycycline (3/7), long term azithromycin (2/7), and xylitol rinses (2/7). Patients had an average of 4.9 + 1.5 post operative visits within 1 year of surgery. Endoscopic findings noted “moderate, “significant,” or “substantial” nasal crusting in all patients post-operatively.

Conclusion:
IA- associated CRS is a pattern distinct from other forms of CRS that does not respond to topical steroids and/or antibiotics, suggesting that the underlying IA may be the driving source. The presence of spontaneous septal perforations and significant crusting reminiscent of nasal vasculitides raises concern for underlying IA-induced vasculitis in this patient population.

Poster #098
Intersection of demographic and academic productivity trends among American rhinology fellows
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Introduction:
Data on demographics and academic productivity of fellowship-trained rhinologists are lacking despite extensive otolaryngology studies. We aimed to address this gap by examining demographic trends and academic productivity among rhinology fellowship graduates.

Methods:
This cross-sectional study examined publicly available data to analyze fellowship-trained rhinologists in the US, focusing on gender, career stage, practice setting, h-index, and academic rank. Statistical analyses included Fischer’s exact test, Wilcoxon rank sum test, ANOVA, and η2.

Results:
We included 31 rhinology fellowships and 477 fellowship-trained rhinologists. No gender differences in career stage and practice type were found. Despite an absolute increase in women per year (0 to 9, η2=0.65, 95%CI, 0.46–1.00), the percentage of women in rhinology fellowships has remained stable since 2002 (η2=0.001, 95%CI, 0–1.00), averaging 21.1% (SD=10.8). Most graduates assessed were mid-career, with a median of 7 practice years; 55% worked in academics, mainly as assistant professors. Overall, women rhinologists had a statistically significant lower h-index than men (7 vs. 9; p=0.01), particularly in mid-career (7 vs. 10; p=0.01), but no h-index difference by academic rank.

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Conclusion:
Our data show a relative plateau in women's representation among rhinologists since 2002. Women had a lower h-index compared to men across various practice types. Despite an absolute h-index difference, this disappeared in subgroup analysis by academic rank. Addressing gender disparities in academic productivity necessitates acknowledging these challenges and implementing further gender initiatives.

Poster #A099
Intractable epistaxis by "nontraumatic" ICA aneurysm
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An 83-year-old woman presented with a rare case of intractable epistaxis caused by a "nontraumatic" intracavernous internal carotid artery (ICA) aneurysm. She was taken to our emergency room complaining repetitive and uncontrolled epistaxis from the right nasal cavity. After hospitalization, CT scan and MR imaging demonstrated erosion of the sphenoid sinus wall and an aneurysm of the right ICA. No evidence of infection or tumor in the sphenoid sinus, and no history of head injury were observed. On day 16 of hospitalization, angiography and endovascular coil embolization were performed under local anesthesia and resulted in success. However, one week after embolization, she was stricken with epistaxis again and MR imaging showed growth of aneurysm. Coiling was performed again on day 32. After this procedure, decreased level of consciousness and ophthalmic symptoms such as diplopia and vision disturbance were monitored with each passing day. She died due to hemorrhagic shock shortly after massive epistaxis on day 79. Intracavernous ICA aneurysm could be the cause of intractable massive epistaxis even if the patient had no history of head injury.

Poster #A100
Investigating the relationship between olfactory dysfunction and vitamin intake
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Introduction:
Reduced dietary fat intake has been linked to olfactory dysfunction and dietary omega-3 supplementation has shown a protective effect. However, the effect of other nutritional vitamins on olfaction is poorly understood.

Methods:
National Health and Nutrition Examination Survey (NHANES) 2013-14 data with complete smell/taste questionnaires and examinations were extracted. Using weighted univariate logistic regression, we selected covariates including sex, age, race, smoking status (cotinine level), energy intake, BMI, and history of head injury or facial/head trauma. Outcomes included history of olfactory dysfunction, phantosmia, and objective smell identification test results. Bayesian kernel machine regression (BKMR) analyzed the joint effect of the 14 vitamins (vitamin A, C, D, E, B1, B2, B6, B12, K, niacin, folic acid, choline, selenium, and zinc), the impact of an individual vitamins as part of a mixture, and potential interactions between vitamins.

Results:
A total of 2,818 participants were included in this study. On BKMR analysis, the overall effect analysis demonstrated that decreased cumulative vitamin intake was associated with a history of phantosmia and objective anosmia. The risk of reporting subjective olfactory dysfunction also increased with decreased vitamin B1, B2, B6, B12, K, and choline intake. Interactions were identified between these vitamins, suggesting that outcomes may vary depending on the mixture of vitamins taken.

Conclusions:
Decreased overall dietary consumption of multivitamins may be linked to an increased risk of phantosmia and objective anosmia. Increased intake of specific vitamins may be associated with lower odds of olfactory dysfunction.

Poster #A101
Lateral lamella of cribriform plate and risk of anterior skullbase injury
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Background:
The lateral lamella of the cribriform plate forms the lateral boundary of the olfactory fossa (OF) and articulates with the medial lamella to form an angle in the fovea ethmoidalis. Deeper OF and acutely angled articulation pose as high risk for iatrogenic anterior skull base injury. This study aimed to measure and correlate the length of the lateral lamella with the depth of the OF, and its angulation with medial lamella of cribriform plate on computed tomography.

Methodology:
A total of 150 computed tomography coronal scans of paranasal sinuses were reviewed retrospectively. The length of lateral lamella, depth of OF, and its angulation with medial lamella of cribriform plate were measured on both sides and their relationships with each other analyzed. The OF depth was classified as per Keros classification whilst the articulation angle was classified as per Gera; Class 1 – low risk (more than 80 degree) Class 2 – medium risk (45-80 degree) and Class 3 – high risk (less than 45 degree).

Results:
Keros type 2 (73.3%) and Class 2 articulation angle (81%) were the most common. There was very high positive correlation between the lateral lamella length and OF depth on both right (r 0.922; p value < 0.001) and left side (r 0.881; p value < 0.001). The positive correlation was however low for the articulation angle on both right (r 0.296; $p < 0.001$) and left side (r 0.294; $p < 0.001$).

Conclusion:
With the increasing length of the lateral lamella, both OF depth and the articulation angle increases though the correlation is lesser with articulation angle. Hence, longer lateral lamella is a high risk for anterior skull base injury.

Poster #A102
Left-digit bias in surgical management of chronic rhinosinusitis
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Introduction:
Left-digit bias (LDB) is a psychological phenomenon in which people tend to focus on the leftmost digit of a number (i.e. the difference between $0.99 and $1.00). In rhinology, prior concerns about the effects of endoscopic sinus surgery (ESS) on facial development may lead to unconscious bias and potential withholding of surgical therapy in teens. Therefore, this study seeks to describe the impact of LDB on ESS rates in teens and young adults with chronic rhinosinusitis (CRS).

Methods:
The Merative™ MarketScan® contains deidentified commercial insurance claims for patients not eligible for Medicare. We compiled all outpatient claims with an ICD-10-CM primary diagnosis of CRS between 2017-2021. Using a regression discontinuity design, we analyzed the difference in rates of ESS for CRS by age, while adjusting for sex, comorbidities (Charlson Comorbidity Index), and primary diagnosis.

Results:
This analysis included 1,483,163 claims. The mean age was 39.7 (range: 0-65). The most common diagnosis was other chronic sinusitis (n=1,001,059). In total, 20,517 patients received surgery for CRS (1.38%). Regression discontinuity showed that 20-year-olds were 35% more likely to receive surgery than 19-year-olds, even after adjusting for listed covariates ($p = 0.02$). This increased rate of

surgery was sustained for all patients older than 20.

Conclusions:
This insurance claims analysis suggests that there is a significant left digit bias influencing rates of sinus surgery in young adults, despite little difference in surgical risk factors. This preliminary work seeks to raise awareness of potential bias in selection of surgical candidates, underscoring the need for future studies to delineate and mitigate this bias.

Poster #A103
Living with chronic rhinosinusitis: An arts-based study
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Background:
Chronic rhinosinusitis (CRS) significantly reduces quality of life (QoL), but data regarding the extent of its impact is sparse. Questionnaire-based assessments of QoL may neglect aspects of complex patient experiences. Recent studies on patients living with asthma and other chronic conditions have used self-expression through artwork to better depict patients' experiences. This study aims to analyze the experience of living with CRS by exploring common characteristics represented within artworks.

Methods:
A prospective qualitative arts-based study was conducted. Adults with CRS were included (n=16). Disease severity and depression and anxiety were graded using standardized scales. Patient experience was evaluated using drawings and semi-structured interviews. ChatGPT-4 was used to interpret interview transcripts according to the Common Sense Model for Self-Regulation to identify themes.

Results:
Analysis of art works through interviews identified six main themes: "chronicity and adaptation", "impacts", "emotional toll", "healthcare navigation and advocacy", "resilience and personal growth", "complexity and nuance". These reveal in greater detail a multifaceted and contradicting emotional landscape shaped by chronic illness. For patients who scored high on depression and anxiety scales, emotional toll and impacts were more prominently depicted in interviews. Compared with similar studies conducted in patients with asthma, these results highlight the more prevalent difficulties of navigating the healthcare system for patients with CRS.

Conclusion:
This arts-based methodology enables in-depth exploration of the impact of CRS on QoL, identifying common themes amongst individual experiences of patients living with CRS.

Poster #A104
Local anaesthetic sinus surgery: A patient experience
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Robert Taylor, Mr.
Katherine Whitcroft, Miss

Endoscopic sinus surgery (ESS) is a commonly performed procedure in the UK with approximately 60,000 cases per annum. Each year 60% of patients are over the age of 60 and may have one or more comorbidities.

Our district general hospital has a catchment area of 250,000 people and has some of the highest rates of poverty and deprivation in the UK. The population comprises of former manual workers from the significantly contracted mining and steel sectors and thus the local population has a significant proportion of patients with cardio-respiratory comorbidities.

As such, a number of patients requiring ESS for chronic rhinosinusitis or sinonasal disease are not suitable for day case surgery or may require level 2 (high dependency) or 3 (intensive care) post-operatively.

Several centres in the UK are increasingly using local anaesthesia with and without sedation to perform ESS. Our day case district general hospital performs MMAs and complete sphenoethmoidectomy on patients under locoregional anaesthesia without sedation. We present the qualitative experience of several patients using a combination of videoed endoscopic surgery and interviews to

demonstrate the efficacy and pitfalls of performing comprehensive ESS under local anaesthesia and the acceptability to the significantly comorbid patient.

Poster #A105

Localization of mucus using machine learning

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Background:
The nasal cavity is susceptible to sinonasal disease that alters the production and composition of mucosal secretions. These secretions can be challenging to identify during nasal endoscopy (NE) but are valuable diagnostic clues to the etiology of disease. Machine learning (ML) models have shown promise in feature identification in medical imaging, with limited application in NE. We sought to incorporate ML to identify these features to assist clinicians with interpretation of these findings during NE.

Methods:
Eight hundred thirty-eight NE images containing abnormal secretions were manually labeled into classes consisting of mucus, crusts, strands, and saliva. We applied transfer learning to a pre-trained convolutional neural network (CNN) called YOLOv8 to classify, detect, and segment these secretions. We calculated the accuracy, precision, and recall of the trained model on these tasks. The mean average precision score at an intersection-over-union score of 0.5 (mAP50) and F1 score were derived. Model inference was evaluated using attention heatmaps.

Results:
The YOLOv8 model was most accurate in classifying, detecting, and segmenting saliva, but least for mucus. The average precision and recall of the model in identifying secretions were 70% and 40%, respectively. The mAP50 score was 48%, and the F1 score was 0.43 at the optimal confidence threshold of 52%. Heatmap-overlaid images demonstrate recognition of the features distinguishing overlying secretions from underlying structures.

Conclusion:
A CNN-based object-detection model can be trained to classify, detect, and segment secretions in the nasal cavity. This ML model can be used as a framework for software that comprehensively interprets NE.

Poster #A106

Low resource pituitary complications

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Introduction:
Outcomes of endoscopic pituitary surgery in low-resource settings (LRS), including Sub-Saharan Africa, are understudied. This study aims to evaluate the complication rates of endoscopic transsphenoidal pituitary surgery at one institution, Korle Bu Teaching Hospital (KBTH) in Accra, Ghana, in comparison to those in high-resource settings (HRS). We hypothesize that the rates of complications at KBTH are comparable to those in HRS.

Methods:
Our study compares surgical outcomes from KBTH to those gathered in a large HRS multi-institutional retrospective database. KBTH patients who underwent endoscopic pituitary surgery from 2021-23 were included and compared to a HRS cohort of patients derived from 6 international centers in the US, Canada, and Australia from 2002-14. The incidence of complications was analyzed and compared via multivariate analysis, controlling for gender, age, and diabetes status.

Results:
93 patients from KBTH and 1112 patients from the HRS cohort were included. The KBTH group recorded 15 overall complications (16.3%) and 2 deaths (2.1%) compared to 393 (39.9%) complications and 5 deaths (0.004%) in the HRS cohort. There were no significant differences in incidence of CSF leak, systemic or intracranial complications, or re-operation

rates. The two deaths in the KBTH cohort resulted in an odds ratio of death of 8.07 (p=0.026) for patients in Ghana. Readmission rates were lower in the KBTH cohort (OR 0.181, p=0.004).

Conclusion:
This study demonstrates that endoscopic pituitary surgery complication rates at a tertiary center in Ghana are similar to multicenter outcomes in HRS. Further study is necessary to extrapolate these findings to other low-resource settings.

Poster #A107
Machine learning for sinonasal mass classification
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Objective:
In this study we developed and assessed the performance of a machine learning model (MLM) to identify and classify sinonasal masses based on endoscopic appearance.
Methods: A convolutional neural network-based model (EfficientNet) was constructed from nasal endoscopy images from patients evaluated at an otolaryngology center between 2013-2024. Four types of endoscopy exams were used: normal endoscopy, nasal polyps, benign tumor, and malignant tumor. Inclusion of patients with polyps and tumors required pathological confirmation. Images were annotated by an otolaryngologist and independently verified by two other otolaryngologists. In this model, we used images of both high and low quality to mirror real-world conditions. The MLM was trained and validated at an 8:1 ratio. We then tested the MLM performance on a novel set of 48 endoscopic images.
Results: 479 images from 400 patients were used for this study. The MLM was trained on 301 normal, 73 polyp, 39 benign tumor and 66 malignant tumor images. Within the validation set, the model performed at a 91.6% accuracy. In the novel test set of images, the MLM performed at an overall accuracy 79.1%. The MLM correctly identified the absence or presence of a sinonasal mass at a rate of 81.2%. The MLM performed at an accuracy of 57.1% for polyps and 85.7% for benign and malignant tumors.
Conclusions: Machine learning for nasal endoscopy images can perform with moderately high accuracy in identifying the presence of sinonasal masses and classifying benign and malignant tumors. This MLM had difficulty classifying polyps, however performance may improve with larger training datasets.

Poster #A108
Malignant transformation rate of sinonasal inverted papilloma in immunocompromised patients
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Introduction:
Sinonasal inverted papilloma (SNIP) may undergo malignant transformation. It is unknown whether the rate of malignant transformation is higher in immunocompromised patients. The aim of this study is to compare the incidence of malignant transformation or dysplasia among SNIP in immunocompromised versus immunocompetent individuals.

Methods:
Retrospective review of patients with sinonasal inverted papilloma (SNIP) or sinonasal squamous cell carcinoma (SNSCC) was performed from 2010-2022. Exclusion criteria was non-SNIP pathology. Patient demographic data was collected including history of immunosuppression (transplant, immunodeficiency disorder, or chronic immunosuppressant therapy). The primary outcome was incidence of malignant transformation of SNIP between cohorts. A secondary endpoint was rate of recurrence among the two cohorts.

Results:
70 patients were included in this analysis. 6 patients were considered immunocompromised

and 64 were immunocompetent. The rate of malignant transformation was 50% in the immunocompromised group (3/6) and 13% in the immunocompetent group (8/64). This difference was statistically significant (p = 0.045). Recurrence rate was similar between cohorts, with 1 of 6 (17%) immunocompromised patients experiencing recurrence and 6 of 64 immunocompetent patient experiencing recurrence (13%).

Conclusion:
A significantly increased rate of malignant transformation of SNIP in immunocompromised patients was observed. Further investigation with larger, prospective cohorts to validate this observation is warranted. Closer surveillance of this vulnerable population may be indicated.

Poster #A109
Management of exophytic papillomas with malignant transformation into squamous cell carcinoma
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Background:
Sinonasal papillomas are common benign tumors of the nasal cavity and paranasal sinuses. While the risk malignant transformation is well-described in inverted and oncocytic papillomas, exophytic papillomas are considered benign. We describe a series of exophytic papilloma with malignant degeneration into squamous cell carcinoma (SCC).

Methods:
Case series and literature review.

Results:
We present 3 cases of malignant transformation of nasal cavity exophytic papillomas. Following excision, exophytic papilloma with high grade-dysplasia and components of papillary SCC was noted. Specimens were tested for human papillomavirus (HPV), one of which was positive for “low-risk” HPV and the other for “high-risk” HPV. All patients underwent excision with adjuvant therapy. To date, all patients are disease-free (12-14 months). Complications of treatment include nasal collapse, vestibular stenosis, septal and perforation.

Conclusions:
Exophytic papilloma with malignant transformation into SCC is rare, but due to the location on the anterior septum and nasal vestibule is a cause of substantial morbidity. Our study demonstrates that even “low-risk” HPV may be associated with SCC. Appropriate management requires surgical excision and consideration for adjuvant therapy.

Poster #A110
Mental health in endoscopic sinus surgery
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Objective:
Mental, behavioral, and neurodevelopmental (MBN) disorders have been demonstrated to impact the management of patients undergoing various procedures. Our study investigates the associations between MBN disorders and the healthcare utilization of patients undergoing inpatient endoscopic sinus surgery (ESS).

Methods:
The 2017 National Inpatient Sample (NIS) was used to identify adult inpatients with a primary procedure related to ESS. MBN was identified (ICD-10: F01–F99). Univariate and multivariable analyses were used to describe statistical correlations with MBN disorders.

Results:
Of the 390 inpatients who underwent ESS, the majority were male (52.6%), White (65.3%), and did not have MBN disorders (66.7%). Patient demographics including age, sex, race, income, primary payer status, and severity of illness varied significantly by patient MBN disorder status ($p<0.01$). On univariate analyses, patients with MBN disorders had higher incidence of alcohol abuse (7.7% vs. 0.0%, $p<0.001$) and obesity (23.1% vs. 13.5%, $p=0.016$), but lower incidence of chronic pulmonary disease (11.5% vs. 26.9%, $p<0.001$) and liver disease (3.8% vs. 9.6%, $p=0.044$) than patients without MBN disorders. On multivariable analyses, adjusting for patient demographics, hospital information, and severity of illness, patients with MBN disorders had a longer length of stay (LOS) (5.2 vs. 5.0

days, p=0.010), but similar total charges ($66,066 vs. $59,970, p=0.237) and number of procedures undergone (1.7 vs. 2.4 procedures, p=0.066) as patients without MBN disorders.

Conclusions:
Patients with MBN disorders who underwent inpatient ESS had longer LOS, but similar total charges and number of procedures undergone as patients without MBN disorder.

Poster #A111
Middle turbinate release with preservation versus MT sacrifice in expanded endonasal skull base surgery
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Introduction:
Central skull base tumors with lateral extension often require transpterygoid exposure during expanded endonasal approach (EEA) surgery. This added level of dissection is classically taught to require unilateral or bilateral middle turbinate sacrifice (MTS). As surgeries evolve toward tissue- and function-sparing techniques, the middle turbinate release with preservation (MTRP) procedure has emerged for maintaining MT presence without compromising skull base exposure. We sought to compare outcomes of MTRP against traditional MTS in EEA skull base surgery.

Methods:
92 patients undergoing EEA requiring transpterygoid exposures met inclusion criteria in this retrospective study, with 38 having MTRP and 54 with MTS. Gross tumour resection (GTR) was used as a surrogate for unhindered surgical exposure. Patient demographics, postoperative complications, and patient-reported outcomes were also analyzed.

Results:
Univariate and multivariate analysis demonstrated that patients undergoing EEA with MTRP had comparable GTR to patients having EEA with MTS ($p = 0.487$ and $p = 0.350$ respectively). Post-operative sinusitis rates were equivalent between both groups ($p = 0.766$), with only increased incidence in intra-nasal synechiae formation in the MTRP group ($p = 0.014$). SNOT-22 within 12 months of EEA surgery demonstrated similar scores ($p = 0.563$), even when analyzed via rhinologic sub-domains.

Conclusion:
MTRP during EEA skull base surgery appears to yield equivalent outcomes for gross tumor resection, postoperative complications, and SNOT-22 scores to MTS. MTRP appears to represent a modality for achieving optimal skull base outcomes while avoiding potential drawbacks of MTS.

Poster #A112
MIF drives macrophage M2 polarization facilitating CRSwNP recurrence
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Chronic rhinosinusitis with nasal polyps (CRSwNP) is characterized by tissue heterogeneity and high postoperative recurrence risk. This study aims to identify biomarkers based on multiple serum cytokine analyses associated with postoperative recurrence and elucidate the underlying mechanisms. We conducted a prospective study on CRSwNP patients, and serum samples were collected and analyzed for multiple cytokines. Participants were followed for 3 years, and categorized into recurrent and non-recurrent groups. Cytokine profiles were compared, potential biomarkers were validated in a validation cohort, and underlying mechanisms were explored with functional regulation experiments. In the discovery cohort of 61 CRSwNP patients (21 recurrent and 40 non-recurrent), circulating cytokine profiles differed significantly, with 8 cytokines showing differential expression between the two groups. Among them, serum eotaxin, MIF, RANTES,

and TRAIL exhibited promise in predicting recurrence. In the validation cohort (24 recurrent and 44 non-recurrent patients), serum eotaxin, MIF, and TRAIL levels were higher in recurrent cases. Tissue MIF was elevated in recurrent cases and had a strong predictive value for recurrence. Tissue MIF was co-expressed with CD206 in recurrent cases. Mechanistically, MIF overexpression promoted macrophage M2 polarization and TGF-β1, CCL-24, and MIF secretion, and MIF recombinant protein facilitated M2 polarization, and TGF-β1 and CCL-24 production, contributing to CRSwNP recurrence. Serum-specific cytokine signatures were associated with postoperative recurrence risk in CRSwNP. Elevated MIF enhanced macrophage M2 polarization and cytokine secretion, contributing to the recurrent mechanisms of CRSwNP.

Poster #A113
MMP1 predicts IP severity
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Introduction:
The exact etiology for the behavior of inverted papilloma (IP) has not been well elucidated and there are currently no established biomarkers to assess for risk of transformation or recurrence. Matrix Metalloprotinease-11 (MMP11) is an endopeptidase that was found to be progressively upregulated in squamos cell carcinoma ex-IP (IPSCC) as compared to IP without dysplasia (IPND) and has shown promise as a prognostic biomarker in a variety of other solid tumors. We aim to evaluate MMP11 in human IP specimens.

Methods:
Patient demographics and tumor characteristics were collected retrospectively at a tertiary care center from 2008-2023. MMP11 staining was performed by the pathology department per standard protocols. Immunohistochemistry quantification was performed using DAB-Quant, an open-source program to estimate DAB staining percentage. Non-epithelial regions were excluded from quantification analysis.

Results:
Patients with histopathology of normal sinus tissue (NST, n = 7), IPND (n = 14), IP carcinoma in-situ (n = 5), and IPSCC (n = 9) were identified and stained with MMP11 antibody. IPND and IPSCC had significantly higher MMP11 expression compared to NST (21.3% and 32.1% vs 9.1%, $p = 0.03$ and $p < 0.05$). MMP11 expression was significantly upregulated in IPSCC as compared to IPND (32.1% vs 21.3%, $p = 0.03$), suggesting that MMP11 is related to higher tumorigenicity. Patients were then stratified by skullbase attachment of IP as a surrogate for more aggressive disease. Higher MMP11 levels served as a predictor for skull base disease (31.5% vs 12.4%, $p < 0.0001$).

Conclusion:
MMP11 expression correlates with IP pathologic severity and more aggressive disease, warranting further research as a prognostic marker.

Poster #A114
NAO and athletic performance
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There are many factors affecting the performance of athletes during competition. In sports where significant physical exertion occurs, athletes breathe deeply and rapidly. Athletes were tested at extreme levels of exertion under two distinct test conditions on a stationary bicycle, where resistance and pace were monitored until an athlete could no longer keep the required pace. Nasal airflow was varied under two test conditions. In the first condition, the nose was completely obstructed using an external nose clip. In the second condition, topical nasal decongestants and external nasal strips were used to enhance nasal airflow.

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Athletes participating in a strength and conditioning program volunteered for the testing which was repeated with the variable test parameter reversed to account for performance degradation due to fatigue factors. The results of this ongoing study will be presented to determine if nasal airflow impacts athletic performance.

Poster #A115
Nasal cycling and nasal function
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Background:
Nasal cycling is an established physiologic phenomenon found in mammals, where nasal airflow spontaneously cycles between being greater in one nasal airway than the other; however, the physical mechanisms that drive this phenomenon are not well-understood. This study aims to quantify the impacts of nasal cycling on nasal function in individuals with healthy, normal nasal anatomy, but who are experiencing varying degrees of cycling.

Methods:
Cone beam computed tomography (CBCT) images of 26 adult subjects with healthy, normal nasal anatomy were classified according to degree of nasal cycling as mid, mild, or extreme. Anatomically realistic nasal airway models of subjects were reconstructed from CBCT images for simulation of nasal airflow and heat transfer at resting inspiration of 15L/min. Nasal Obstruction Symptom Evaluation (NOSE) scores were obtained from each subject.

Results:
CBCT images captured 50% of subjects cycling at mild (27%) or extreme (23%). Average (± standard deviation) NOSE was highest among mid-cycle subjects (13.1±16.1) followed by extreme (12.5±13.2) and mild (4.3±2.9), respectively. Bilateral nasal resistance was lowest in extreme (0.037±0.012Pa.s/mL), comparable between mid (0.053±0.031Pa.s/mL) and mild (0.057±0.031Pa.s/mL). Bilateral heat flux was highest in mid (171.6±16.8W/m2) and lowest in extreme (152.5±9.5W/m2).

Conclusion:
This preliminary study indicates that while extreme nasal cycling displays the highest asymmetry between unilateral airways, it could prove advantageous by reducing total nasal resistance in individuals. Conversely, the perception of mucosal cooling (heat flux) is most pronounced during the mid-cycle phase of the nasal cycle.

Poster #A116
Nasal nitric oxide in PCD after mucus debridement
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Background:
Throughout airway epithelium, nitric oxide synthase (NOS) produces nitric oxide. In the nose, nasal nitric oxide (nNO) increases mucus clearance and is bactericidal [1]. In addition to these functions, low nNO is a biomarker for patients with primary ciliary dyskinesia (PCD) [2]. A cut off of 77 nl/min supports the diagnosis of PCD. It is unknown why nNO is low in PCD and given the bactericidal nature of NO it would be logical for nNO to increase in PCD. Current leading theories for low nNO in PCD include: differences in NOS expression [3], obstruction of the paranasal sinuses [4] and epithelial hypoxia [5]. We tested the hypothesis that nNO is low in PCD at least in part because PCD mucus creates a hypoxic environment on the apical mucosal surface limiting production of NO.

Methods:
As a preliminary study, we measured nNO (nl/min) in patients with PCD in clinic before and after suctioning their nasal mucus. Exclusion criteria included: Nasal surgery within 6 months of clinic visit, recent epistaxis, and patients without EM or genetically confirmed PCD. Measurements were performed in both nares using the Ecophysics CLD NO analyzer.

Results:
In 5 of 6 patients tested there was an increase

in nNO after suction of mucus in the nasal cavity. Overall in the 6 patients analyzed, the nNO level increased from 15.57 to 20.62 nl/min (P=0.0368).

Discussion:
Our data indicates that PCD nasal airways are capable of increased production of nNO but does not define the mechanism of increased nNO production. Future studies will be needed to ascertain if nNO production is stimulated via alternative NOS enzymes, presence of increased oxygen on the apical surface, or mechanical stimulation of the epithelium with suction.

Poster #A117
WITHDRAWN

Poster #A118
Nasal septal abscesso associated with ulcerative colitis
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We report a rare case of nasal septal abscess associated with ulcerative colitis (UC). A 40-year-old female with a history of UC had lasted a little rectal bleeding, rash, nasal swelling, nasal discharge, toothache, and frontal pain for a month. She was referred to our hospital because her symptoms worsened despite antibiotic treatment. Nasal endoscopy revealed significant swelling of the nasal septum, and CT scan identified a low-density area in the same region. These findings suggested a nasal septal abscess.

Incision and drainage of the abscess were performed under general anesthesia, and intravenous injection of ceftriaxone and clindamycin were initiated. No presence of bacteria was detected with culture of the abscess. Worsened rash, rectovaginal fistula, and rectal bleeding occurred in the patient two days after surgery. The rash was diagnosed as pyoderma gangrenosum. Therefore, these findings including nasal septal abscess were considered manifestations of a moderate to severe acute exacerbation of UC and its extraintestinal complications. Prednisolone and doubled dose of mesalazine were initiated, and her symptoms improved subsequently with use of tapering steroid therapy alone without biologicals.

Nasal septal abscesses are rare, and cases due to complications of UC are even rarer. Although there is a risk of pathergy (worsening pyoderma gangrenosum with surgical intervention), incision and drainage of nasal septal abscess, and administration of prednisolone and mesalazine led to improvement in the patient's condition without any complications such as saddle nose. Early intervention with drainage and immunosuppressive therapy, including steroid was considered necessary.

Poster #A119
New device for management of epistaxis
Tanveer Janjua, MD
JSTOP LLC

Epistaxis is the most common emergency in Otolaryngology. The gold standard method to control a severe epistaxis involves multiple steps.This method is time consuming and most Otolaryngologists are not trained to use it. Presently the most common method has been packing with a Foley Catheter or a Balloon Catheter. This method is time consuming and most Otolaryngologists are not trained to use it. Presently the most common method has been packing with a Foley Catheter or a Balloon Catheter. Otolaryngologist are trained to use these devices in an effective manner along with other modalities such as nasal endoscopy and cauterization. Emergency room physicians are typically not trained to use a Foley catheter. The Balloon Catheters are difficult to insert because of a large diameter and lack of anatomical curvature. They are less likely to give a complete seal of the nasopharynx as opposed to a Foley Catheter. There exists a need for an easy to use Nasal Packing Device that can allow quick and effective control of a severe nosebleed.

JStop™ is a new patented and trademarked medical device that can be used to control severe epistaxis. It is a thinner profile double

balloon catheter with only one inflation port. . It allows inflation of the distal port with saline or water to completely seal the nasopharynx before the proximal fills up to apply middle and anterior nasal cavity pressure. The nostrils is sealed with a sponge. The proximal tip of the catheter has a speed nut that can be pushed against the sponge to tighten the seal. JStop™ has been awarded an FDA Class I classification. It is currently in Phase V of development.

Poster #A120

Noninvasive devices for congestion

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Congestion is a common symptom of sinonasal disease. Nasal sprays, irrigation, steroids, and surgery effectively improve symptoms; however, there is growing demand for less invasive options. Novel modalities utilizing vibration, positive expiratory pressure (PEP), and nerve stimulation have thus garnered increasing interest.

We provide an overview of four non-invasive congestion treatment methods: SinuSonic, SONU, Chordate System S101, and ClearUp

SinuSonic ($65) and SONU ($300) use acoustic vibration to ease congestion. SinuSonic is a nose-mask device that delivers 128 Hz and PEP. In contrast, SONU is a headband device that delivers custom frequencies based on individual sinus volume, estimated through facial scanning technology. Studies show subjective improvement in congestion for both devices, though only SinuSonic has evidence demonstrating improvement in objective measures as well.

Chordate System S101, not yet public, inserts a latex balloon into each nasal cavity which is inflated and vibrates at 68-Hz with 65-mbar pressure. Preliminary studies measuring subjective congestion improvement show mixed results, and no difference in objective measurements has been observed.

ClearUp ($250) is a handheld bioelectric device that delivers microcurrents to strategic facial points, stimulating the trigeminal sensory and sympathetic nerves. Similar to the other devices, there is evidence of subjective improvement in congestion but no data exists for objective measures.

In the last several years, four new devices that claim to improve nasal congestion by various technologies have become commercially available. As rhinologists, we should be aware of medical devices being marketed directly to our patients.

Poster #A121

NP-related exacerbations and treatments in patients with CRSwNP treated with mepolizumab

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Background
Real-world evidence on mepolizumab effectiveness for improving nasal polyp (NP)-related outcomes in patients with chronic rhinosinusitis with NP (CRSwNP) is lacking. This retrospective cohort study using the Komodo Research database (>320 million US patients) evaluated NP-related exacerbations, sinus surgeries, and medical treatments pre/post-mepolizumab.

Methods:
Adult patients with CRSwNP and without severe asthma initiating mepolizumab on/after 7/29/2021 (US CRSwNP approval) were included. Index date was the first mepolizumab dispensing/administration. Eligible patients had continuous healthcare enrollment for the study period (12 months pre-/≥6 months post-index

date; sinus surgeries assessed using all available pre-index data), ≥2 mepolizumab dispensings/ administrations within 6 months of index date, and no reslizumab/benralizumab/ tezepelumab use during study.

Results:
In 240 eligible patients, mean (SD) NP-related exacerbations were 66% lower post-index (0.3 [0.6] vs 1.6 [1.0]; rate ratio [RaR] 0.34 [95% CI: 0.26, 0.45]; p<0.001). Mean (SD) number of sinus surgeries per patient year was significantly lower post-index (0.2 [0.8] vs 0.5 [0.7]; RaR 0.43 [95% CI: 0.25, 0.74]; p=0.002). Significantly fewer patients had ≥1 NP-related medication use (intranasal corticosteroids [INCS], antibiotics, LTRA, nasal saline ± topical steroids, steroid eluting nasal stents) post- vs pre-index (76% vs 88%; risk ratio [RiR] 0.87 [95% CI: 0.82, 0.93; p<0.001]), including a 44% reduction in patients receiving antibiotics (RiR 0.56 [95% CI: 0.46, 0.68; p<0.001]).

Conclusions:
Real-world mepolizumab use significantly reduced NP-related exacerbations, sinus surgeries, and medical treatments in patients with CRSwNP.

Poster #A122
Obesity in septoplasty
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Objective:
Obesity has been demonstrated to negatively impact the outcomes of patients undergoing various medical and surgical procedures. Our study evaluates the effect of obesity on the management and outcomes of patients who undergo inpatient septoplasty.

Methods:
The 2017 National Inpatient Sample (NIS) was queried to identify adult inpatients with a primary procedure related to septoplasty. Univariate and multivariable analyses were performed to identify statistical correlations with obesity.

Results:
Of the 425 inpatients who underwent septoplasty, the majority were male (61.2%), White (71.3%), and non-obese (72.9%). The mean age of patients in our cohort was 50.5 years. Obese patients had higher incidence of chronic pulmonary disease (39.1% vs. 29.0%, p=0.047), diabetes without chronic complications (30.4% vs. 11.3%, p<0.001), and hypertension (60.9% vs. 45.2%, p=0.004), but lower incidence of diabetes with chronic complications (0.0% vs. 8.1%, p=0.002), fluid and electrolyte disorders (0.0% vs. 8.1%, p=0.002), and hypothyroidism (0.0% vs. 14.5%, p<0.001), than non-obese patients. On multivariable analyses, adjusting for patient demographics, hospital information, and severity of illness, obese patients had fewer total charges ($32,644 vs. $53,543, p<0.001), length of stay (LOS) (1.8 vs. 3.6 days, p<0.001), and number of procedures undergone (4.4 vs. 5.2 procedures, p=0.034) than non-obese patients.

Conclusions:
Obese patients who underwent inpatient septoplasty had fewer total charges, LOS, and number of procedures undergone than non-obese patients.

Poster #A123
Office-based blue laser vs. coblation therapy for inferior turbinate hypertrophy
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Objective:
To review the effect of office-based blue laser therapy for inferior turbinate hypertrophy in patients with nasal obstruction, and compare its efficacy to that of coblation therapy.

Methods:
Patients with inferior turbinate hypertrophy who underwent office-based blue laser therapy or coblation between October 2022 and December 2023 were included. The two outcome measures used to gauge the improvement in nasal obstruction were the Nasal Obstruction Symptom Evaluation (NOSE) scale and the Visual Analogue Scale (VAS). Patient's level of

comfort during the procedure was also rated using a 10-point VAS scale.

Results:
Thirty patients were included in this study and were divided into two subgroups: those who underwent office-based blue laser therapy (n=15), and those who underwent office-based coblation therapy (n=15). Among patients who presented for follow up (n=27), the mean NOSE score decreased significantly from 64.17±20.65 to 15±12.25 (p=0.002) in the blue laser subgroup, compared to a drop from 84.33±5.63 to 24.67±13.82 (p<0.001) in the coblation subgroup. Similarly, the mean VAS score decreased from 7.42±0.9 to 2.17±1.58 (p=0.002) in the blue laser subgroup, compared to a drop from 8.0±1.0 to 3.13±1.55 (p<0.001) in the coblation subgroup. The difference in the improvement of both scores between the two subgroups was not statistically (p=0.076 and p=0.251, respectively).

Conclusion:
In-office blue laser therapy is an effective treatment modality for patients with nasal obstruction and ITH. The improvement in nasal breathing is comparable to that reported following coblation therapy. Moreover, the procedure was well-tolerated by all patients.

Poster #A124
Olfaction and lifestyle after COVID-19
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Background:
A significant number of individuals experience persistent olfactory dysfunction (OD) following COVID-19, as confirmed by psychophysical smell testing. Given the importance of the sense of smell to eating and quality of life, those with diminished olfaction following COVID-19 may experience decreased enjoyment of novel foods or experiences. We sought to quantify the relationship between post-COVID OD and lifestyle domains in a longitudinal cohort.

Methods:
One hundred and thirteen participants (32 male / 101 female) were recruited. Olfactory assessment was performed with the Sniffin' Sticks battery and lifestyle domains were assessed using a 5-point scale with questions relating to food, exercise, and leisure activities. Statistical relationships were assessed using linear mixed-effect models in R to account for repeated measures as a component of the longitudinal study.

Results:
The median time of psychophysical assessment and survey administration was 447 days following COVID-19 diagnosis. Reduced psychophysical olfactory performance was related to individuals' likelihood to skip meals (beta = 0.02, p = 0.02), avoid novel cooking (beta = -0.34, p = 0.02), have low interest in learning healthy eating advice (beta = -0.03, p = 0.03), and to have decreased participation in leisure activities and household chores (beta = -0.03, p = 0.01).

Conclusions:
These results show that post-COVID-19 OD can have lasting impacts on individuals' participation in several lifestyle domains, both in the realms of food and leisure enjoyment. It is important to counsel patients on these outcomes to promote a more balanced lifestyle and improved quality of life for individuals with persistent post-COVID OD.

Poster #A125
Olfactory dysfunction in patients with allergic fungal rhinosinusitis
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Introduction:
Allergic fungal rhinosinusitis (AFRS) is an endotype of chronic rhinosinusitis with nasal polyps (CRSwNP) that occurs most commonly in warm and humid climates. Olfactory dysfunction (OD) is not well characterized in this population. In this study, we compared olfactory function in patients with AFRS against

those with CRS with nasal polyps (CRSwNP) and control subjects.

Methods:
A retrospective chart review of 486 adults (age >18) undergoing endoscopic sinus surgery (ESS) for CRS included control subjects (n=132), patients with CRSwNP (n=145), and AFRS (n=22). SNOT22 and Smell Identification Test (SIT-40) scores were analyzed. Possible malingering (scores of 0-5) was excluded from the SIT-40 analysis.

Results:
Consistent with previous reports, patients with AFRS were younger than control with a mean age of 43.18 ($p=0.0048$) and had a larger representation of African Americans at 31.8% compared to 15.2% in both CRSwNP and control. Total SNOT22 scores were higher in AFRS and CRSwNP compared to control ($p<0.05$), with no significant difference between CRSwNP and AFRS. Patients with AFRS had worse self-reported smell and taste - as measured by question 21 in SNOT22, when compared to control ($p<0.005$) - but was comparable to CRSwNP. For objective measures of OD, 32% of AFRS patients were anosmic as compared to 35% of CRSwNP and 6% of controls. The mean SIT-40 score for controls was 30; this was significantly higher than the means for CRSwNP and AFRS, which was 23 and 24, respectively ($p<0.0001$ and $p=0.0329$).

Conclusions:
Few studies have examined if AFRS patients experience olfactory loss. Here, we demonstrate that patients with AFRS experience similar subjective and objective OD to that of individuals with CRSwNP.

Poster #A126
Olfactory neuroblastoma
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Background:
Olfactory neuroblastoma, also known as Esthesioneuroblastoma, is a rare malignant neoplasm of neuroectodermal origin. In this study, we reviewed patients with olfactory neuroblastoma over a 15-year period at a tertiary care center.

Methods:
This retrospective study was conducted at Otolaryngology Hospital, affiliated with TUMS School of Medicine, from January 2007 to January 2022. Patients with histopathologically documented olfactory neuroblastoma were included in the study. The tumors were graded both histologically and clinically using Hyam's and Kadish classifications, respectively.

Results:
A total of 16 cases were reviewed, including 12 male and 4 female patients with a mean age of 43 years. Six patients had grade 1, 6 had grade 2, and 4 had grade 3 esthesioneuroblastoma. Nasal congestion was the most common presenting complaint (11 out of 16 patients, 68.75%), followed by headache (7 out of 16 patients, 43.75%). All patients underwent surgical resection and chemoradiotherapy, with recurrence occurring in six patients (37.5%) after 2 years.

Conclusion:
The findings from this research enhance the understanding of this rare neuroectodermal tumor and provide valuable insights for clinicians managing patients with olfactory neuroblastoma. The detailed analysis sheds light on the prognostic factors, treatment options, and outcomes associated with this malignancy, thereby improving the knowledge base and clinical management strategies for olfactory neuroblastoma.

Poster #A127
Orbital exenteration vs preservation: A meta-analysis of overall survival rate
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Background:
Orbital exenteration (OE) can significantly affect the quality of life due to psychosocial and functional impairment. Therefore, every attempt

is made for orbital preservation (OP) in patients undergoing surgery for sinonasal malignancies invading the orbit.

Methods:
Following the PRISMA guidelines, a systematic review was conducted and the studies comparing the overall survival (OS) rates between OE and OP groups were included. A Meta-analysis was done to assess any significant difference between these groups.

Results:
Thirteen studies comprising 1265 patients were included, of which 836 (66.08%) underwent surgery (41.38% [346] had OE and 58.37% [488] had OP during the surgery). The indication and extent of OE varied among the studies. In most of the studies, the patients in both groups had additional treatments in the form of pre-or postoperative chemotherapy and/or pre-or postoperative radiotherapy either as a single modality or as a combination. On Meta-analysis (MA), there was a high variability among the studies (I2 = 73.9), and no difference was seen in the OS between the OE and OP groups (p = 0.970). Also, there was no difference between the local control rate [(LCR); MA of three studies; p = 0.833] or the recurrence rate [(RR); MA of two studies; p = 0.681]. However, there was a significant difference (p < 0.001) in locoregional relapse-free survival rate [(LRFS); MA of two studies; OP>OE] and disease-specific survival [(DSS); MA of two studies; OE>OP].

Conclusion:
The overall survival does not differ whether the orbit is exenterated or preserved in surgical patients with sinonasal malignancy invading the orbit. An analysis with more studies is needed to assess if it affects LCR, RR, LRFS, or DSS.

Poster #A128
Outcomes after pediatric functional endoscopic sinus surgery
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Background:
Functional endoscopic sinus surgery (FESS) is generally considered to be safe, though occurs more rarely in pediatric patients. However, large scale multi-institutional studies analyzing complications and prognostic factors have not yet been performed in this specific population.

Methods:
Data were obtained using the pediatric National Surgical Quality Improvement Program database for those who underwent FESS from 2021-2022. Descriptive statistics and multiple regression analyses were used to describe patient comorbidities and 30-day postoperative outcomes.

Results:
A total of 1363 patients were included in this study with an average age of 11.8 years. The most common postoperative complications were infection (1.7%), readmission (1.6%), and bleed (0.5%). On univariate analysis, history of prematurity (P=0.002) was associated with increased surgical complications. Ventilatory dependence (P<0.001), oxygen support (P<0.001), presence of a tracheostomy (P<0.001), presence of cardiac risk factors (P=0.001), impaired cognitive status (P<0.001), neuromuscular disorder (P=0.001), presence of an ostomy (P<0.001), requiring nutritional support (P<0.001), systemic sepsis within 48 hours prior to surgery (P<0.001) were associated with increased medical complications. On multivariate analysis, predictors of any complication or reoperation included younger age (P=0.027), prematurity (P=0.015), ostomy (P=0.036), nutritional support (P=0.036), and preoperative sepsis (P<0.001).

Conclusions:
Pediatric patients often have various, unique comorbidities compared to adults. Understanding the predictive factors of outcomes following FESS in this distinct population is essential to improve safety and quality of perioperative care.

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Poster #A129

Outcomes of AIFRS with and without cranial nerve involvement

Maxwell Weng, BSE

Background:
Acute invasive fungal rhinosinusitis (AIFRS) can present with cranial nerve involvement, particularly involving the trigeminal, trochlear, abducens, and facial nerves. AIFRS with cranial nerve involvement may indicate for more extensive fungal invasion and therefore be associated with worse outcomes. The clinical manifestations and outcomes of AIFRS with cranial nerve involvement remain unclear.

Methods:
Patients with biopsy confirmed AIFRS between 2017 and 2024 at a tertiary care institution were reviewed. Patient demographic data and clinical course and outcomes were retrospectively reviewed. The principal objective of this study was to determine what impacts cranial nerve involvement may have on the outcomes of patients with AIFRS.

Results:
A total of 47 patients were included. Of the 11 (23.4%) patients presenting with AIFRS with cranial nerve involvement, 9 (81.8%) are alive with neurologic deficits and 2 (18.2%) died of disease. Among the remaining 36 patients presenting with AIFRS without cranial nerve involvement, 11 (30.6%) are alive without neurologic deficits, 6 (16.7%) are alive with neurologic deficits, 17 (47.2%) are dead, and 2 (5.6%) are lost to follow-up. Patients presenting with AIFRS with cranial nerve involvement were non-statistically significantly more likely to be alive compared to patients presenting with AIFRS without cranial nerve involvement ($p = 0.0859$ Fisher's exact test).

Conclusions:
Cranial nerve involvement was not associated with increased mortality as would be expected in this patient population. More investigation into this patient population is warranted. Neurological deficits seen in patients with AIFRS with cranial nerve involvement may likely be persisting.

Poster #A130

Outcomes using topical steroid suspended in Chitogel instead of post-operative systemic steroids

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Aims:
This study aims to explore the outcomes using topical steroid suspended in Chitogel as a replacement for post-operative oral steroids in endoscopic sinus surgery for chronic rhinosinusitis with nasal polyps (CRSwNP).

Methodology:
This retrospective cohort study examined outcomes in consecutive patients undergoing endoscopic sinus surgery for CRSwNP by a single tertiary rhinologist. There was a change in surgical practice during a 12-month period, with all patients receiving triamcinolone suspended in Chitogel to the sinus cavity, instead of oral steroids. Prior to this, patients received a post-operative course of prednisolone. Outcomes were assessed using the 22-item Sino-Nasal Outcome Test (SNOT-22) and the Adelaide Disease Severity Score (ADSS) at baseline and at 3 months post-operatively.

Results:
23 patients received topical triamcinolone with Chitogel and 27 received oral prednisolone. At 3 months post-operatively, there was no significant difference between kenacort and prednisolone groups in the reduction in SNOT-22 total score (33.3 vs 35.7; $p = 0.66$) and across nasal (12.8 vs 14.0; $p = 0.64$), sleep (13.7 vs 15.2; $p = 0.60$), otologic/facial pain (4.2 vs 4.6; $p = 0.74$) and emotional subdomains (2.7 vs 2.0; $p = 0.41$). There was also no significant difference in reduction in 3-month ADSS across total scores (5.1 vs 6.6; $p = 0.33$) or any subdomain.

Conclusion:
In patients receiving endoscopic sinus surgery for CRSwNP, topical triamcinolone suspended in Chitogel provides similar short-term symptom outcomes when compared to systemic prednisolone and may avoid the systemic side effects.

POSTERS

Poster #A131

Over-the-counter nasal sprays

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Purpose:
To evaluate and determine the prevalence of ingredients in over-the-counter (OTC) nasal sprays.

Background:
While OTC sinonasal medications account for a large percentage of annual sales in the United States, there are numerous nasal sprays that are marketed, creating a perplexing landscape for consumer.

Methods:
A survey of the inventory of major brand-name and generic OTC nasal sprays at five national pharmacies were obtained in August 2023. Data regarding the most common nasal sprays were collected on commercial websites, MedlinePlus and drugs.com.

Results:
Five pharmacies were visited, and 15 different brand names of nasal sprays were identified. The 12 most common brands were searched using the company's websites and were found to represent 49 different products. Oxymetazoline, fluticasone, azelastine, triamcinolone, phenylephrine, budesonide, cromolyn sodium and mometasone were the most common active ingredients in the products included in our analysis. The majority of the brand name nasal sprays contained only one active ingredient with oxymetazoline being the most common. When analyzed by generic names, there were 115 unique products that were comprised of five generic ingredients (oxymetazoline, sodium chloride, phenylephrine, fluticasone and budesonide).

Conclusion:
These findings suggest that there are widespread redundancies in the OTC nasal spray market. Clinician should be aware of the redundancy in OTC formulations and encourage patients to read the labels in order to make informed decisions regarding their use of OTC medications.

Poster #A132

Oxygenation outcomes in patients undergoing septoplasty

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Harvard Medical School"Background: In patients with septal deviation and nasal obstruction, septoplasty is associated with improvements in patient reported outcome measures for sinonasal symptoms and sleep. However, it is unclear if oxygenation changes objectively post-procedure.

Methods: Adults undergoing nasal septoplasty ± turbinate reduction from 2017-2022 were retrospectively reviewed. Patients undergoing concomitant endoscopic sinus surgery or upper airway augmentation surgery were excluded. Oxygen saturations (O2 sat) obtained in the180 days before and 180 days after surgery were tabulated for each patient and averaged.

Pre- and post-operative O2 sats were compared within two cohorts: those with ≥ 98% O2 sat preoperatively (normal) and those with O2 sats ≤ 97% preoperatively. Paired Students t-test was performed, comparing individuals' O2 sats before and after septoplasty. Sensitivity analysis was subsequently conducted comparing a third cohort, lowering the abnormal O2 sat cut off to ≤ 96%.

Results: We identified 1104 patients (48.1% female; mean age 43.8 years) who underwent septoplasty. For the normal cohort, there was a slight decrease in the O2 saturation postoperatively although this was not clinically significant. In each of the abnormal cohorts (O2 sat ≤ 97%, ≤96%), there were statistically significant increases in O2 sat postoperatively, with improvements of +0.87% (95% confidence interval, 0.70-1.0, $p<0.001$) and +1.43% (1.12-1.73, $p<0.001$) in O2 sat, respectively.

Conclusion: Septoplasty appears to increase oxygen saturation in patients with initially lower oxygen saturations (≤ 97%) preoperatively. This warrants further study and likely further supports the utilization of septoplasty in patients with sleep apnea.

POSTERS

Poster #A133

Paranasal sinus evolution and purpose

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Background:
We studied the evolution and drainage patterns of mammalian paranasal sinuses to understand paranasal sinus purpose in humans.

Methods:
A scoping review was conducted to identify publications on mammalian paranasal sinus anatomy. Data on gross and radiological images was compiled in up to 3 species each from 31 mammalian orders. Images were independently evaluated by 3 reviewers to assess presence of sinuses and its drainage (gravitational/anti-gravitational). Affinity propagation clustering (sklearn.cluster.AffinityPropagation, scikit-learn, v1.4.1) and hierarchical clustering (scipy.cluster.hierarchy.linkage, SciPy, v1.12.0) analyses were used to categorize species based on presence of maxillary, frontal, ethmoid, sphenopalatine, lacrimal, and sphenoid sinuses.

Results:
The prevalence of paranasal sinuses in mammalian orders is: maxillary 56%, frontal 44%, sphenoid 33% and ethmoid 20%. Frontal sinuses are more common in higher mammals than lower (71% vs. 22%). Mammals without a frontal sinus are unlikely to have ethmoid or sphenoid sinuses. Aquatic mammals lack sinuses. All maxillary sinuses, except in rodents, have antigravitational drainage. When present, lower mammal sphenoid sinus drain gravitationally and higher have mixed patterns. Cluster analysis yielded five groups with high preservation of sinuses within orders (exceptions Chiroptera, Marsupialia).

Conclusions:
Paranasal sinuses developed in mammals after the common ancestor moved from aquatic homes to land. The first sinuses to develop were likely maxillary and frontal. Sinuses may be air reservoirs and lighten the skull. Frontal sinuses, more common in higher mammals, may protect the bulkier brain and support bipedal posture.

Poster #A134

Perioperative antibiotic use in functional endoscopic sinus surgery in pediatric patients

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Background:
Functional endoscopic sinus surgery (FESS) is frequently performed for various inflammatory and infectious indications. Perioperative use of antibiotics is highly variable amongst surgeons.

Methods:
The pediatric National Surgical Quality Improvement Program database was used to identify patients who underwent FESS from 2021-2022. Patient comorbidities and 30-day postoperative outcomes were assessed using descriptive statistics and multiple regression analyses.

Results:
A total of 1363 patients with an average age of 11.8 years were included in the study. A FESS being required for an infectious indication was an independent predictor of postoperative organ space infection (P=0.017) as well as readmission (P=0.007). Administering preoperative prophylactic antibiotics independently increased the rate of reoperation (P=0.04). Continuing antibiotics postoperatively independently increased the rate of reoperation (P=0.014) and surgical complications (P=0.02). Giving prophylactic antibiotics, redosing antibiotics intra-operatively, or continuing antibiotics postoperatively did not significantly affect rates of any postoperative infectious complication. Chronic lung disease was an independent predictor of postoperative superficial wound infection (P=0.021), and history of prematurity (P=0.002) and neuromuscular disorder (P=0.016) were independent predictors of organ space infection.

Conclusions:
Widespread use of perioperative antibiotics in pediatric patients undergoing FESS may not be indicated.

POSTERS

Poster #A135
WITHDRAWN

Poster #A136
Persistence and adherence with Dupilumab in CRSwNP
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Chen Chao
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Background:
This real-world study evaluated treatment patterns in patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP) who were treated with dupilumab.

Methods:
Using IQVIA PharMetrics Plus claims database, patients aged 18-64 years who initiated dupilumab between 06/26/2019-12/31/2021 were identified. Patients were required to have ≥12 months of continuous enrollment (baseline period) before the first recorded prescription of dupilumab and ≥1 diagnosis of CRSwNP (ICD-10-CM:J33.x) during the baseline period. Follow-up was censored at the health plan disenrollment or 12/31/2021. Baseline demographic and clinical characteristics, dupilumab persistence (time between index date and end of 60-day period without a filled prescription of dupilumab, or initiation of other biologics, whichever comes first), adherence (patients with a medication possession ratio [MPR] ≥0.8), discontinuation, and re-initiation were assessed over a 12-month period.

Results:
Among 3,318 included patients, mean (standard deviation) age was 47.1 (11.1) years; 54.4% were males. At baseline, 92% of patients had >1 type 2 comorbidity, most commonly allergic rhinitis (75%) and asthma (71%); 82% of patients had received oral corticosteroids, 69% received antibiotics, and 30% underwent ≥1 sinus surgery. After dupilumab initiation, 85% continued using dupilumab at 6 months, 69% at 12 months, and 94% maintained a MPR ≥0.8 while on dupilumab treatment. Of those who discontinued, 39% resumed dupilumab within 12 months, with a median re-initiation time of 1.02 months.

Conclusion:
Dupilumab persistence remained high at 12 months and 39% of those who discontinued dupilumab reinitiated treatment within 12 months in this real-world practice setting.

Poster #A137
Pilot program for nasosinusal endoscopic surgery training
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Introduction:
The traditional learning curve in surgical practice involves a progressive acquisition of skills through guided practice in the operating room. However, contemporary challenges underscore the need to explore alternative training methodologies. The objective of this research is to evaluate the usefulness of ex-vivo sheep heads as a biological model in the training of endoscopic sinonasal surgery (ESS).

Material and methods:
Experimental study. Twenty first-year residents participated. All participants received theoretical instruction. Subsequently, they were randomly assigned to two groups; one group participated in guided training sessions on the model. Following this, both groups, along with 4 ESS experts performed autonomous surgery sessions, which were recorded on video. These recordings were then analyzed using an Objective Structured Assessment of Technical Skills (OSATS) guideline by two experts who were blinded to the operators. Statistical analysis was conducted using STATA-15.

Results:
Two aspects of evaluation were considered: overall performance and specific tasks completion. Analysis of overall performance revealed a significant difference between the

trained group and controls (p=0.0018), as well as a marginal diferencia between experts and trained (p=0.06). Specific tasks completion demonstrated a significant difference when comparing trained and experts versus controls (p=0.0015 and p=0.00009). Notably, there were no significant differences observed between the expert and trained groups across all evaluations.

Conclusions:
The use of the ovine model proves to be a valid approach for training ESS, demonstrating utility in endoscopic septoplasty, maxillary antrostomy, and sphenopalatine artery dissection.

Poster #A138
Pneumosinus dilatans with incidentally discovered septal meningioma
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Background:
Pneumosinus dilatans is a rare condition of unknown etiology causing pathologic hyperaeration of the paranasal sinuses. Although benign in nature, expansion of the paranasal sinus can cause facial deformities, headaches, and visual changes. We report the case of a patient with pneumosinus dilatans and incidentally discovered septal meningioma.

Methods:
Case report and literature review.

Results:
A 21-year-old male presented with progressive left upper eyelid swelling and inferolateral orbital displacement of seven years causing diplopia and cosmetic deformity. Exam demonstrated left proptosis, and endoscopy demonstrated left septal deviation. CT evaluation demonstrated a hyperpneumatized frontal sinus with left orbital displacement and bony expansion. He underwent combined transcaruncular orbitotomy and endoscopic sinus surgery.

Intraoperatively, a high septal lesion was noted to obstruct access to the sinuses with biopsy notable for diagnosis of sinonasal meningioma. Additional imaging noted an infiltrative lesion of orbit that may be extension of meningioma. The patient noted post-operative improvements in vision with plans for further orbital decompression and biopsy to further improve visual/ cosmetic outcomes and determine extent of meningioma. Pending results of additional biopsies, he may require additional management of the septal meningioma with surgery and/or radiation.

Conclusions:
Pneumosinus dilatans is a rare condition associated with skull-base meningiomas and middle cranial fossa arachnoid cysts. In cases where findings are not present on imaging, clinical suspicion should remain high for extracranial lesions. Multidisciplinary evaluation and management is essential for optimal outcomes.

Poster #A139
Postmarket safety profile of orkambi: An analysis of FAERS database
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Robert Saadi
Vijay Patel, MD

Objective:
Orkambi (lumacaftor/ivacaftor) has significantly improved cystic fibrosis (CF) treatment for patients with the F508del mutation. However, further research is needed to fully understand its postmarket safety profile since FDA approval in 2015. This study analyzes Orkambi's safety using data from the FDA Adverse Event Reporting System (FAERS)

Methods:
All adverse events (AEs) data for Orkambi reported in the FAERS database from 2015 - 2024, without geographical restrictions, were abstracted. Data mining techniques, including both the reporting odds ratio and proportional reporting ratio, were utilized for final analysis.

Results:
A total of 6841 adverse events associated with Orkambi were reported by healthcare providers, with a predominance among females (n=3277, 47.9%). In 2019, there was a notable increase in reported adverse events, reaching 1604 (23.4%), whereas 2022 and 2023 witnessed a significant decline in such occurrences (n=102, 1.4% and n=101, 1.4% respectively). Following data cleaning, analysis revealed 4151 (60.6%)

cases of serious injuries, 669 (9.7%) hospitalizations, and 122 (1.7%) deaths. The most frequently reported adverse reactions to Orkambi, affecting at least 5% of patients, included infective pulmonary exacerbation of CF (n=1,325, 19.37%), dyspnea (n=422, 6.17%), infection (n=320, 4.68%), chest discomfort (n=310, 4.53%), pneumonia (n=297, 4.34%), and cough (n=293, 4.28%).

Conclusion:
Orkambi is a significant advancement in cystic fibrosis treatment. However, serious adverse reactions highlight the need for careful patient monitoring and consideration of individual risk factors. This analysis enhances our understanding of Orkambi's safety profile in real-world scenarios.

Poster #A140
Postoperative oral steroid use for chronic rhinosinusitis: A systematic review and meta-analysis
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Background:
Patients with chronic rhinosinusitis (CRS) refractory to medical management may undergo endoscopic sinus surgery (ESS). Oral corticosteroids (OCSs) may be prescribed postoperatively, but the evidence of their efficacy is limited. The purpose of this study is to evaluate the efficacy of OCS use in patients with CRS following ESS.

Methods:
A systematic search was performed to identify studies examining the use of OCSs in patients undergoing ESS for CRS. The primary outcomes were sinonasal outcome test (SNOT) and Lund-Kennedy (LK) endoscopic scores. Secondary outcomes were visual analog scale (VAS) scores. Meta-analysis was conducted using a fixed effects model with a heterogeneity test via the I2 statistic.

Results:
The search yielded 1899 articles, and 22 were included in the qualitative analysis, 14 of which were randomized controlled trials with 793 total patients. OCS use differed based on type, dosage, and duration. Studies included in meta-analysis did not show a significant difference in SNOT (Standardized Mean Difference [SMD] -0.03, Confidence Interval [CI] -0.47-0.40, I2 0%), LK (SMD -0.20 CI -0.57-0.17 I2 58%), or VAS (SMD 0.19 CI -0.25-0.63 I2 54%) scores between steroid and non-steroid groups. Two studies that assessed OCSs in allergic fungal rhinosinusitis (AFRS) showed significant improvement in outcomes. Two additional studies examined OCS versus itraconazole in AFRS, with both groups showing improvement but neither one with greater significance.

Conclusion:
This study showed no significant difference in SNOT, LK, or VAS scores in patients with CRS who received OCSs following ESS. Given the limited number of studies in the analysis, further investigations are warranted before making recommendations.

Poster #A141
Postoperative pain after functional endoscopic sinonasal surgery in chronic rhinosinusitis
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Background:
Postoperative pain management following functional endoscopic sinonasal surgery (FESS) varies widely, with no universally accepted standard protocols. Due to concerns regarding opiod abuse, there is hesitancy to prescribe opioids. This study aims to explore postoperative pain of Chronic Rhinosinusitis (CRS) patients undergoing FESS with an opioid-free pain relief regimen.

Methods:
Interim analysis of a prospective cohort study that included patients over 18 years with CRS who underwent FESS between January 2023 and January 2024 at Hospital del Salvador. Patients received acetaminophen, with ibuprofen as rescue for pain management. Primary outcome was pain assessment using 100 mm visual analog scale (VAS) from postoperative day (POD) 1 to 7. As secondary outcome, variations in pain levels were

analyzed based on various clinical variables. Statistical analysis employed Mann-Whitney U Test.

Results:
17 patients included. Median age was 53 years; 10 women and 7 men. Median pain scores on VAS at POD1 and POD2 were 50 and 45 mm, respectively, decreasing progressively thereafter. Ibuprofen rescue was used by 11/17 patients within first week. Subgroup analysis revealed significant differences in pain scores for patients with cystic fibrosis (CF) on POD2 (p=0.0424) and POD3(p=0.0433), and those undergoing Draf III on POD1(p=0.0388).

Conclusions:
Pain after FESS in CRS appears manageable with acetaminophen and rescue ibuprofen, from POD3 onwards. However, CF patients experienced moderate pain in initial POD, suggesting a need for scheduled analgesics and considering low-potency opioids. Similarly, patients undergoing Draf III had moderate pain throughout the first week, necessitating consideration of low-potency opioids on POD1.

Poster #A142
Post-operative septal perforations among diabetic and non-diabetic patients
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Introduction:
Elevated blood glucose levels can result in poor wound healing. Theoretical factors associated with this observation include chronic inflammation with dysfunctional cellular response, decreased angiogenesis, and microvascular dysfunction. Together, this results in reduced tissue oxygenation and decreased tensile strength of healing tissue. Septal perforations are a primary risk of septoplasty with rates ranging from less than 1% to 6.7%. However, it is unknown whether patients with diabetes are at a higher risk for septal perforations following septoplasty.

Methods:
A large multi-institutional electronic health records (n=115 million patients) database (TriNetX) was queried for patients undergoing septoplasty. Rates of postoperative septal perforation within one year of surgery were compared between diabetic and non-diabetic cohorts. Analyses were performed before and after 1:1 propensity score matching (PSM).

Results:
There were 5,898 septoplasty patients included in this study. 78 had septal perforation within a year of surgery. The average age was 56 years, and 40.5% were female. After PSM for post-operative related risk factors, the risk of septal perforation among septoplasty patients with diabetes was 0.993% compared to 1.604% in non-diabetic recipients, p = 0.04 and odds-ratio = 0.615 (95% confidence interval: 0.385 to 0.983).

Conclusion: Odds for nasal septal perforation following septoplasty were decreased for diabetic patients, and diabetes may have an unknown protective mechanism. As such, diabetes may not associate with increased risk for post-septoplasty septal perforation. Further studies stratifying for specific blood glucose levels or A1C may provide additional insight into this question.

Poster #A143
Predictors of hospital admission in CSF rhinorrhea repair: A national retrospective analysis
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Background:
Cerebrospinal fluid (CSF) rhinorrhea represents a challenging clinical condition, necessitating surgical repair to prevent complications such as meningitis. This study aims to leverage a large, national dataset to elucidate sociodemographic and clinical factors influencing admission rates for patients undergoing CSF rhinorrhea repair.

Methods:
A retrospective cohort study was conducted on 10,267 patients undergoing CSF rhinorrhea repair from the National Inpatient Sample and Nationwide Ambulatory Surgery Sample (2016-2019). Survey-weighted methods assessed

both univariate and multivariate risk factors for hospital admission.

Results:
A total of 10,040 (97.8%) patients were admitted. After adjusting for confounders, our analysis revealed Midwest, South, and West as protective regions against admission (AOR = 0.2421, 0.1749, 0.1275; P <0.001) compared to the Northeast. Private insurance reduced admission odds (AOR: 0.4768; P = 0.034) versus Medicaid. Diabetes mellitus was a significant predictor of admission (AOR: 2.0201; P = 0.017). Pituitary adenomas (AOR: 33.79; P <0.001) and meningiomas (AOR: 14.96; P = 0.0076) emerged as the most prominent clinical predictors. There were no significant associations with age, sex, and urban-rural location. Other clinical factors, such as benign intracranial hypertension and essential hypertension, did not significantly predict admission in the multivariate analysis.

Conclusion:
The findings highlight the need for targeted interventions to manage CSF rhinorrhea repair patients at higher risk of admission, particularly those with diabetes, pituitary adenomas, and meningiomas, aiming to improve patient outcomes and overall healthcare efficiency.

Poster #A144
Predictors of postoperative complications in pediatric transnasal microscopic pituitary surgery
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Background:
Among pediatric patients with pituitary tumors that meet criteria for surgical resection, transsphenoidal surgery presents unique challenges including small anatomic corridors or incompletely pneumatized sphenoid sinuses. There is a lack of large scale studies examining prognosticators of morbidity in this population.

Methods:
Data was obtained using the pediatric National Surgical Quality Improvement Program database for those who underwent pituitary surgery from 2018-2020. Patient demographics, comorbidities, and outcomes were analyzed using descriptive statistics and multiple regression analyses.

Results:
A total of 609 patients were included in the study with an average age of 1.7 months. The most common postoperative complications were wound infection (2.6%), bleeding (2%), and sepsis (1.6%). There were no cases of mortality. Independent predictors of any complication or reoperation included younger age (P=0.028), dependent functional status (P=0.013), and elevated preoperative bilirubin (P=0.035) or alkaline phosphatase (P=0.035). Independent predictors of medical complications include systemic sepsis within 48 hours prior to surgery (P=0.007), operative times (P=0.02), and elevated preoperative levels of albumin (P=0.045), bilirubin (P=0.001), and white blood cells (P=0.034). Independent predictors of increased length of stay included preoperative ventilator dependence (P<.001), weight loss (P<.001), ASA classification (P<.001), operative time (P<0.001), and COPD (P<0.02).

Conclusions:
In this unique patient population, understanding the predictive factors of morbidity following pediatric pituitary surgery can greatly improve overall patient care and identification of high-risk children preoperatively.

Poster #A145
Prevention of the frontal sinus ostium restenosis after endoscopic extended frontal sinus surgery
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Objectives:
Endoscopic extended frontal sinus surgery

(EEFSS) such as modified Lothrop procedure for refractory frontal sinus diseases has come to be widely performed. These procedures are less invasive than external nasal approach, but the frontal sinus ostium restenosis may still occur due to postoperative scarring and bone regeneration. Various flap techniques to prevent restenosis are reported, but they seem to be complicated. We present a simple technique to preserve the patency of the frontal sinus ostium after EEFSS.

Methods:
We applied the new technique to 14 cases with intractable frontal sinus diseases (7; mucocele, 4; inverted papilloma, 3; recurrent frontal sinusitis). 9 of the 14 cases had a history of previous surgeries, and 4 cases had systemic complications (bronchial asthma; 2, diabetes; 2). EEFSS was performed under general anesthesia on all 14 cases. A diamond burr was used to smoothly dilate the frontal sinus ostium. After covering the exposed bone using axillary flap, calcium alginate as wound dressing was inserted to the frontal sinus. Calcium alginate was kept left for 1 week, and then removed. Cases continued nasal rinsing, and were periodically followed up till 1 year after surgery. Patency of the extended frontal sinus ostium was classified into open, narrow, and closed.

Results:
10 of 14 cases showed open and 2 cases showed narrow. 2 cases showing closed ostium were seen. The cause of closure was bone regeneration.

Conclusion:
Calcium alginate is known as the material which facilitates regeneration of the skin or the mucosa. Our simple technique using calcium alginate to prevent the frontal sinus ostium restenosis suggested usefulness in the treatment of refractory frontal sinus diseases.

Poster #A146
PROMs report sclerotherapy to be effective and beneficial in HHT-epistaxis
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Background:
Intranasal injection of 3% sodium tetradecyl sulfate (STS) is used for managing hereditary hemorrhagic telangiectasia (HHT) associated epistaxis. Patients are counseled on rare risk of blindness from inadvertent intra-arterial injection. We studied patient perceived outcomes of sclerotherapy intervention using the Glasgow Benefit Inventory (GBI), as this has not been studied.

Methods:
HHT patients who chose sclerotherapy were invited to an IRB-approved study. Patients assessed benefit of the intervention by the revised GBI [scores −100 (poorest) through 0 (no change) to +100 (best outcome); maximum benefit ≥+50, moderate benefit range +10 to +50]. Epistaxis Severity Score (EpSS; range 0-10; higher worse; weighs bleeding frequency, intensity, duration; anemia, transfusion; treatment) was used to assess pre- and post-therapy bleeding.

Results:
Twelve of 20 invited patients participated. They had undergone 38 sclerotherapy procedures (median 3; range 1-7). Median follow-up was 22.7 months (IQR 39.87). Total GBI showed moderate benefit at (median +44.8; range 0 to +80). GBI subdomains with maximal benefit were “quality of life” (median 83.3; range 0 to+100); “social involvement” (median 83.3; range +16.7 to+100) and “self-confidence” (median 50; range 0 to +100). Moderate benefits were seen in “support”(median 0 (0 to +83.3) and “general health” (median 0; range -16.6 to +100). Post-sclerotherapy mean EpSS dropped to 1.64 (SD+0.99) from EpSS of 6.27 (SD+2.20); $p<0.001$. There was moderate negative correlation between EpSS change and total GBI ($p = 0.0348$) and GBI QOL ($p=0.0343$). No vision loss was reported.

Conclusion:
Patients' reports support effectiveness and benefit of carefully performed intra-lesional sclerotherapy.

Poster #A147
Proposed algorithm for spontaneous cerebrospinal fluid leaks
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Introduction:
Spontaneous cerebrospinal fluid (CSF) leaks are often secondary to elevated intracranial pressure (ICP). Successful closure of a CSF leak does not treat the underlying elevated ICP. Thus, following repair, patients may continue to have symptoms and develop a recurrent CSF leak. Treatment options for elevated ICP include diuretics, weight loss, ventriculoperitoneal shunting (VPS) and venous sinus stenting (VSS). We present one of the largest series to include surgery, VPS, and VSS for the management of spontaneous CSF leaks in the modern era.

Methods:
A retrospective review of spontaneous anterior or lateral skull base CSF leaks treated with surgery was conducted. Radiographic imaging, lumbar puncture opening pressures (LPOP), and outcomes were studied to develop a treatment algorithm.

Results:
165 patients underwent surgery for a spontaneous CSF leak between 2005– 2023. Elevated ICP was managed with VPS in 44 patients, VSS in 6 patients, and a combination of VPS and VSS in 4 patients. 3% of patients experienced a postoperative CSF leak. Following VPS and VSS placement, there were no CSF leak recurrences. 2% and 3% of patients experienced complications after anterior and lateral skull base surgery respectively. After VPS, 27% of patients experienced a complication. There were no complications following VSS in our cohort.

Discussion:
Surgical closure of skull base defects followed by management of elevated ICP is a successful treatment approach for spontaneous CSF leaks. The proposed algorithm supports obtaining LPOP at the time of surgery and trans-stenotic pressure gradients following surgical closure in patients with venous stenosis on imaging to guide medical and surgical recommendations for elevated ICP.

Poster #A148
Pyogenic granulomas in the head and neck
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Objectives:
We review the pathogenesis and management of lobular capillary hemangiomas, benign lesions of the nasal and oral cavities commonly referred to as pyogenic granulomas.

Study design:
Retrospective chart review at a single tertiary academic hospital.

Methods:
The database of surgical specimens and outpatient biopsies from 2014-2023 at a tertiary academic hospital was queried for pathological diagnosis of "pyogenic granuloma" or "lobular capillary hemangioma". Clinicodemographics, treatment modality including location in office or operating room, recurrence, and length of follow up was recorded.

Results:
We identified 63 cases (54% female, mean age 46 [range 1-81 years old]) in the head and neck. The lesions were primarily mucosal within the nasal cavity (54%), oral tongue (16%), and larynx (5%). Cutaneous sites included the scalp (3%), eye lid (6%), cheek (6%), nose (2%), and external auditory canal (3%).
Clinicodemographic data was available for 36 patients (57%). Epistaxis and nasal obstruction

were the primary presenting symptoms. 85% of patients underwent in office resection and 15% in the operating room. The most common method of excision was in-office removal with scissors or scalpel followed by chemical cauterization at the base. However, recurrence was noted in 4 of these patients. In-office diode laser was utilized in 5 patients.

Conclusions:
Given the new understanding that these lesions are histologically hemangiomas and have a recurrence rate of 5-10%, we advocate for total excision of the lesion, which can be difficult in the office setting. Laser photocoagulation, which we demonstrate in this cohort to be safe, effective, and convenient, is an alternative in-office option for mucosal lesions.

Poster #A149
Race in airway foreign bodies
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Objective:
Race has been demonstrated to influence the outcomes and management of patients for various medical procedures. Our study examines the relationships between race and the management of inpatients with airway foreign bodies.

Methods:
The 2017 National Inpatient Sample (NIS) was used to identify adult inpatients with non-elective admissions for a primary diagnosis related to airway foreign bodies. Univariate and multivariable analyses were used to describe statistical associations between races.

Results:
Of the 5,025 inpatients with airway foreign bodies, the majority were male (51.3%), White (69.2%), and had Medicare (72.3%). Patient demographics including age, sex, income, and primary payer status significantly varied by patient race ($p<0.001$). On multivariable analyses adjusting for patient demographics, hospital data, and severity of illness, Black patients had similar total charges (mean $59,873 vs. $49,082, $p=0.068$), greater length of stay (LOS) (6.4 vs. 4.5 days, $p<0.001$), and lower odds for mortality (OR 0.38, 95% CI 0.28–0.53, $p<0.001$) compared to White patients. Hispanic patients had greater total charges ($86,645 vs. $49,082, $p<0.001$), greater LOS (5.7 vs. 4.5 days, $p=0.001$), but similar odds for mortality (OR 1.13, 95% CI 0.84–1.53, $p=0.423$) compared to White patients. Asian and Pacific Islander patients had greater total charges ($205,126 vs. $49,082, $p<0.001$), LOS (13.1 vs. 4.5 days, $p<0.001$), number of procedures undergone (3.4 vs. 2.0 procedures, $p<0.001$), and odds for mortality (OR 2.22, 95% CI 1.47–3.36, $p<0.001$) compared to White patients.

Conclusions:
In a cohort of inpatients with airway foreign bodies, total charges, LOS, number of procedures undergone, and mortality varied by patient race.

Poster #A150
Race in CRSwNP
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Background:
There is evidence that race may have a role in establishing or contributing to chronic rhinosinusitis (CRS) endotype. Particularly, there is data that Asian patients with CRS with nasal polyps (CRSwNP) may have a mixed endotype compared to Caucasian patients from Western Europe and the United States. However, there is a general paucity of research concerning non-Caucasian patients.

Methods:
A systematic scoping review methodology was chosen in order to summarize and map the current findings and potential knowledge gaps on this topic in accordance with PRISMA guidelines. A comprehensive literature search using the Medline, Embase, and Cochrane Library databases was performed using search terms: (chronic sinusitis OR chronic rhinosinusitis OR nasal polyps) AND (race OR ethnicity OR ancestry OR heritage), (chronic

sinusitis OR chronic rhinosinusitis OR nasal polyps) AND (endotype OR phenotype), (chronic sinusitis OR chronic rhinosinusitis OR nasal polyps) AND (specific race OR ethnicity OR country OR continent).

Results:
8877 articles were identified with 2430 excluded as duplicates. A further 1854 non-English articles were excluded. The remaining abstracts were reviewed for relevance. Differences in CRSwNP endotype in Caucasians, Asian, Black, and Hispanic patients are highlighted. Additionally, environmental and socioeconomic factors were addressed as they pertained to intersecting with race.

Conclusion:
There is evidence that race may play a role in contributing to CRSwNP endotype. However, the current literature is limited and further research must be performed in non-Caucasian populations and also controlling for socioeconomic and environmental factors.

Poster #A151
Rare fungal sinusitis in a 61-year-old female
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Objective:
A case of Paecilomyces lilacinus sinusitis in an immunocompetent female is presented. The diagnosis and management is discussed, as well as a review of the literature.

Case Report:
A 61-year-old female undergoing evaluation for migraine headache was found to have incidental right maxillary sinus obstruction with inspissated secretions consistent with a probable fungal infection. She was taken to the operating room for right endoscopic sinus surgery and was found to have findings consistent with noninvasive probable fungal sinusitis. Her pathology was consistent with abundant fungal hyphae a however fungal culture ultimately proved negative. She was managed with steroid irrigations in the postoperative period but developed recurrent maxillary edema and obstruction about 6 weeks later consistent with recurrent visible disease, which could not be debrided in the office. She was taken back to the operating room underwent debridement of the sinus and her histopathology demonstrated growth of Paecilomyces lilacinus. She was maintained on oral steroids postoperatively and irrigations of steroid and amphotericin B for 3 months postoperatively and has done well since that time without recurrent disease.

Significance:
Paecilomyces lilacinus of the paranasal sinuses in immunocompetent hosts has been reported only 5 prior times. Many of those reports required endoscopic debridement and 6 months of oral antifungal agents to cure. The purpose of this study is to bring attention to management of this rare fungal infection in immunocompetent patients, and to demonstrate that endoscopic sinus surgery with topical steroid and antifungal irrigations but without oral antifungal agents is satisfactory.

Poster #A152
Readability of AI generated rhinology patient education materials
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Objective:
To Compare the readability of online patient education materials (PEM) produced by artificial intelligence (AI) large language models (LLM) to those available on the American Rhinologic Society (ARS) website in most common nasal and sinus conditions.

Methods:
PEM for fifteen nasal and sinus conditions were generated using Open AI ChatGPT-3.5 and Google's Bard and compared to those available on the "sinushealth.com" website. Then, the LLM were asked to reword the same materials to a sixth-grade reading level as recommended by the National Institute of Health (NIH). Readability of the material was assessed using Flesch Reading Ease (FRE), Gunning Fog Index (GFI), and SMOG Readability Formula (SMOG) metrics.

Results:
ChatGPT generated material were more difficult to read than the sinushealth website as

evidenced by lower FRE scores (37.9 vs 44.8, p=0.031), as opposed to the material generated by Bard which had similar readability to sinushealth website [(FRE: 46.1 vs 44.8, p=0.602); (GFI: 1.3 vs 1.5, p=0.502); (SMOG: 0.8 vs 1.0, p=0.650). However, when the LLM were reworded to a sixth-grade reading level, both ChatGPT-3.5 and Bard generated more readable PEM that are compliant with the NIH recommendation than the sinushealth website (p<0.001 for all indices).

Conclusion:
this analysis demonstrates that the readability of the education material generated by AI-based chatbots may be a good option for patients depending on the which platform is used. The option to reword the material to a sixth-grade level may be of particular interest.

Poster #A153
Real-time nasal endoscopic analysis with machine learning
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Background:
Machine learning (ML) models hold promise for the automatic interpretation of medical data. However, their computational complexity requires them to run on centralized servers, raising privacy issues which hinders their adoption. A potential solution involves the application of edge-computing, defined as the translation of software from a server to a local environment. We sought to develop a platform using edge-computing principles to interpret real-time video obtained with standard nasal endoscopy (NE) equipment available in the outpatient clinical setting.

Methods:
We applied transfer learning to a ML model called YOLOv8 using a manually labeled dataset of 2111 inferior and middle turbinates. The model was installed on the Nvidia Jetson Orin Nano platform, housed within a 3D-printed plastic enclosure. This was mounted onto the Karl Storz Endoscope Telepack TP-100 System. The system received video input from the TP-100 and outputted predictions overlaid onto the monitor. We performed NE on a volunteer using this system, recorded its inference time, and calculated its accuracy, latency, and throughput in frames per second (FPS).

Results:
The ML-augmented TP-100 was able to delineate the predicted location of the turbinates with 87% accuracy. Predictions occurred within 25.6 milliseconds (ms) with synchronous update of the video feed at a rate of 39 FPS. The total latency between user endoscope movement and predictions displayed on the monitor was 37.6 ms.

Conclusion:
A locally-running ML model can assist with identification of nasal anatomic landmarks during NE in real-time using existing endoscope equipment. This establishes the feasibility of augmenting NE into the clinical workflow in the outpatient setting.

Poster #A154
Real-world impact of Mepolizumab on CRSwNP in biologic-naïve patients
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Rationale:
Real-world evidence on the effectiveness of mepolizumab for reducing surgical burden and oral corticosteroid (OCS) use in patients with chronic rhinosinusitis with nasal polyps (CRSwNP) is limited. This study evaluated OCS use and sinus surgeries in biologic-naïve patients with CRSwNP pre&post-mepolizumab initiation.

Methods:
This retrospective cohort study analyzed data

from the Komodo Research database (>320M US patients). The study population included adults with CRSwNP without severe asthma initiating mepolizumab on/after July 29, 2021 (index date: first dispensing/administration). Patients had ≥2 mepolizumab prescriptions within 6 months after index date, 12 months continuous healthcare enrollment pre-index and ≥6 months post-index, and no use of other biologics during the eligibility period or mepolizumab before index. Sinus surgeries and NP-related OCS use were evaluated per-patient-year (PPY) and compared pre/post-index.

Results:
Of 170 patients included, 72.9% had comorbid mild/moderate asthma. Mean (standard deviation [SD]) total annual NP-related OCS use decreased from 319.2 mg (419.7) pre-index to 105.3 mg (222.0) post-index (rate ratio [RR] [95%CI]: 0.29 [0.21,0.41], P<0.001). NP-related OCS prescriptions PPY decreased between the pre & post-index periods (RR [95%CI]: 0.33 [0.24,0.45], P<0.001), and there was a 64% reduction in the rate of OCS bursts PPY (≥20 mg prednisone equivalents for 2–28 days; RR [95%CI]: 0.36 [0.25,0.51], P<0.001). Mean (SD) sinus surgeries decreased from 1.0 (1.6) to 0.1 (0.6) PPY (RR [95%CI]): 0.16 [0.08,0.32], P<0.001).

Conclusions:
Mepolizumab significantly reduced OCS and surgical burden in biologic-naïve patients with CRSwNP, supporting clinical trial findings.

Poster #A155
Recommendations for post-operative surveillance after resection of uncommon benign sinonasal tumors
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Background:
Uncommon benign sinonasal tumors encompass a range of pathologies that vary in recurrence rates. Given the rarity of these neoplasms, there exists little guidance within the literature regarding optimal post-operative surveillance.

Methods:
We performed a single-institution retrospective study of all adult patients undergoing surgery with intent for gross total resection of a benign sinonasal tumor from January 2010 to June 2023. Malignant tumors, osteomas, and inverted papillomas were excluded. Pathologies were grouped into categories of mesenchymal, vascular, neural, odontogenic, or other.

Results:
Ninety-two patients were included with an average age of 49 years (range 11-86). The most common categories were mesenchymal (n=29, 31.5%) and vascular (n=19, 20.7%). Mesenchymal tumors included fibrous dysplasia or fibro-osseous lesions (n=12) and hemangiopericytoma (n=5) among other pathologies. Vascular tumors included hemangiomas (n=16) and glomangiopericytomas (n=3). There was one mesenchymal and vascular recurrence each (3.5%, 5.3%) occurring at 3 months and 10 months after initial surgery and patients were followed for a mean of 30.3 and 14.1 months, respectively. No recurrences were detected on post-operative imaging or endoscopy more than one year following resection.

Conclusion:
We report a low rate of tumor recurrence post-operatively among vascular and mesenchymal benign sinonasal tumors. Notably, recurrences in these groups were detected within one year of initial surgery by routine post-operative imaging. Our results suggest that patients with benign mesenchymal or vascular sinonasal tumors should be followed for at least one year following resection with routine endoscopy and post-operative imaging.

POSTERS

Poster #A156

Recurrent inverted papilloma requiring rhinectomy, anterior skull base resection, & reconstruction

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Introduction:
Though inverted papillomas (IPs) are benign tumors, their propensity for malignant transformation (5-15%) necessitates complete surgical excision. Despite advances in endoscopic surgery, recurrence rates for IPs are between 13-35%, with multifocality & prior surgery being associated with higher rates of recurrence. We present a case of a patient with multiply recurrent IP who ultimately progressed to locally advanced squamous cell carcinoma requiring total rhinectomy, endoscopic anterior skull base resection, and pericranial flap reconstruction.

Methods:
Case report.

Results:
A 51 year old female with history of multiply recurrent IP presented with cT4aN0M0 squamous cell carcinoma arising from the previously resected IP. She underwent total rhinectomy with invasive carcinoma present at the deep skull base margin on final pathology. After discussion of the patient's case and imaging at tumor board, she underwent endoscopic anterior skull base resection. Reconstruction was done in a multilayered fashion using Duragen, tissue sealants, and a large pericranial flap. She recovered well from this procedure & is being fit for a nasal prosthesis to fill her rhinectomy defect.

Conclusion:
Locally advanced squamous cell carcinoma arising out of multiply recurrent IP is challenging to manage, especially once the anterior skull base is involved. We describe a case of successfully resected extensive IP requiring total rhinectomy, endoscopic anterior skull base resection, & reconstruction of the anterior skull base with a pericranial flap. While none of these operative techniques are unique by themselves, case reports of successful management of such extensive IP in the literature are absent outside of this report.

Poster #A157

Regional density of and neuropeptide expression in cadaveric nasal submucosal glands

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Background:
Chronic rhinitis may be allergic, nonallergic or mixed and causes various nasal symptoms. Neuropeptide release from sensory and autonomic nerves to nasal submucosal glands (SMGs) plays a significant role in rhinitis pathophysiology, but has been incompletely studied. The purpose of this study was to explore regional densities of and neuropeptide expression in nasal SMGs.

Methods:
Full-thickness nasal mucosal specimens were harvested from the anterolateral nasal wall and posterolateral wall of the middle meatus in 10 cadavers. Specimens were formalin-fixed, sectioned, and stained with hematoxylin and eosin (H&E), for neuropeptides (substance-P, calcitonin gene-related peptide, neurokinins-A and B (NKA/NKB), vasointestinal peptide (VIP), neuropeptide Y), and enzymes choline acetyltransferase (CHAT) and tyrosine hydroxylase(TH). Relative densities of serous versus mucinous SMGs and neuropeptide/enzyme staining were analyzed qualitatively until electronic density calculations are completed.

Results:
At abstract submission, 4/10 cadavers were processed with H&E and most neuropeptide/enzyme stains (pending VIP and NKB). On H&E, serous SMGs predominated in anterolateral mucosa, whereas mucinous SMGs either predominated or equaled serous SMGs in posterolateral mucosa. NKA, CHAT, and TH stained most prominently, and localized mainly to serous SMGs. NKA stained most diffusely, followed by CHAT and TH. Other neuropeptides were scant to absent.

Conclusion:
On preliminary qualitative analysis, serous SMGs were more prevalent in anterolateral compared to posterolateral nasal mucosa. NKA then by CHAT and TH were the most expressed neuropeptides in or around serous SMGs. NKA may be a greater regulator of nasal SMGs than previously.

Poster #A158
Resolution of pulmonary symptoms following CSF leak repair: A case report and literature review
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Background:
Cerebrospinal fluid (CSF) rhinorrhea may occur with skull base disruption, and surgical repair of persistent CSF leak is indicated to reduce the risk of meningitis. Pulmonary sequelae are lesser known but reported with growing frequency. We present the case of a patient whose pulmonary symptoms and function improved after surgical CSF leak repair.

Case Description:
An obese 35-year-old female presented with one year of recurrent lower respiratory infections. Computed tomography (CT) of the chest revealed upper lobe predominant ground glass opacities. She also had right-sided rhinorrhea refractory to allergy therapy and thus was referred for rhinology assessment. Nasal drainage was beta-2-transferrin positive. Sinus CT suggested a possible leakage site at the right lateral lamella of the cribriform plate. Following endoscopic CSF leak repair, repeat chest CT showed resolution of ground glass opacities and pulmonary function testing (PFT) confirmed an increase in spirometric lung volumes.

Discussion:
CSF leak repair led to resolution of asthma-like airway inflammation and radiographic improvement in pneumonitis. Pulmonary disease secondary to CSF microaspiration is likely underdiagnosed. Existing studies report post-surgical resolution of ground-glass opacities on chest CT and symptom improvement. Asymptomatic cases also exist. Inflammation from aspirated CSF may be driven by transit of nasopharyngeal bacteria. Further investigation is needed to determine if components of aspirated CSF itself or bacterial transit drive inflammation.

Conclusion:
In patients with lower airway inflammation and obstruction as well as findings of unexplained aspiration pneumonitis, a high index of suspicion for CSF rhinorrhea is warranted.

Poster #A159
Revision rates in sinonasal endoscopic surgery
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Introduction:
Chronic sinonasal conditions significantly impact patient quality of life, often necessitating surgical intervention for management. This study aims to evaluate revision rates and potential disparities among patients undergoing sinonasal endoscopic surgery with variations in adjunct procedures, including septoplasty and nasal valve repair (NVR).

Methods:
Utilizing TriNetX, a large de-identified database, we generated patient queries to categorize participants into three groups: (1) those receiving endoscopic surgery only, (2) endoscopic surgery with septoplasty, and (3) endoscopic surgery with septoplasty and NVR. Primary outcome was revision rates overall and among demographic groups.

Results:
There were 70,122 patients in group 1, 43,693 in group 2, and 2,160 in group 3. The endoscopic-only group had the highest revision rate (10.3%, $p<0.0001$), whereas the group receiving septoplasty + NVR showed a significantly lower revision rate (4.4%, $p<0.0001$). White patients had lower revision rates than Black/African American patients in both the endoscopic surgery only and the septoplasty + NVR groups ($p=0.0012$ and $p<0.0001$, respectively). Females in the endoscopic surgery + septoplasty group had a

higher revision rate (p=0.0069) than males.

Discussion:
The study highlights the importance of adjunct procedures in reducing revision rates for patients undergoing sinonasal endoscopic surgery. Additionally, it underscores significant demographic disparities in surgical outcomes, particularly regarding race and gender. These findings suggest the need for tailored surgical planning and potential interventions to address and mitigate these disparities, ensuring equitable healthcare outcomes in sinonasal surgery.

Poster #A 160
Rhinitis medicamentosa - RM10 questionnaire to asses symptoms and withdrawal treatment protocol
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Background:
A long-term use of decongestant nasal spray will cause a paradoxical rebound effect with chronic inflammation and edema, called Rhinitis Medicametosa. The study asses the Physiologic and mental symptoms and suggest a withdrawal protocol.

Methods:
A prospective cohort of 47 patients, diagnosed with Rhinitis Medicamentosa between 2021 to 2023. The patients answered a questionnaire we developed – RM10, addressing the physiological and mental symptoms, followed by a withdrawal treatment protocol.

Results:
Forty-seven patients were diagnosed with Rhinitis Medicamentosa and answered the questionnaire. Average use of decongestants was 4.63±4.29 times a day, for was 7.17±11.69 years. The mean RM10 score was 30.4±9.2. Twenty-seven (61.7%) patients managed to withdrawal from the use of decongestants with our protocol and their RM10 score decreased to 4.8±3.89 (p<0.001).

Conclusions:
RM10 questionnaire enables to quantify the physiologic and mental aspects of patients with Rhinitis Medicamentosa. The suggested withdrawal protocol addresses those aspects and enables patients to stop using the decongestant nasal sprays.

Poster #A161
Rhinologic procedural volume trends during and after the COVID-19 pandemic
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Background:
The COVID-19 pandemic was associated with fewer procedures in its early stages, particularly in rhinology practices. However, it is unknown if procedural volume has returned to pre-pandemic levels. We aimed to characterize the volume trends of common rhinologic procedures throughout the COVID-19 pandemic.

Methods:
We identified the 30 most common rhinology CPT codes, and utilized the TriNetX US database to collect counts of each code from 52 healthcare organizations (HCO). Data was collected in quarterly intervals from January 1st 2018 to December 31, 2019 (pre-COVID) and April 1st 2020 to December 31 2023 (COVID). Counts were averaged by number of reporting HCOs. Aggregates for endoscopic sinus surgery (ESS), inferior turbinate reduction (ITR) ± septoplasty, CSF leak repair, balloon ostial dilation, diagnostic nasal endoscopy, and total were calculated. Student's t-tests comparing pre-COVID and COVID quarterly mean procedural volumes were calculated.

Results:
On average 31 HCOs reported data yielding 12,715 procedures per HCO during COVID. Total procedures were decreased throughout 2020 (peak change: -51.3%; p<0.0001) with a subsequent increase 2021 Q2 to 2023 Q3 (peak change: +20.4%; p<0.0001), and ultimate return to baseline 2023 Q4 (+0.90%; p=0.65). Diagnostic nasal endoscopy, CSF leak repair, and ITR showed similar trends. ESS (peak

change: -44.9%; p<0.0001) and balloon ostial dilation (peak change: -27.8%; p<0.0001) were significantly decreased at a majority of timepoints, and have yet to return to baseline.

Conclusion:
While total rhinology procedures have been trending back to baseline, ESS and balloon ostial dilation have remained significantly decreased compared to pre-pandemic levels.

Poster #A162
Rhinology open payments
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Introduction:
In recent years, the relationships between industry and physicians have garnered attention.
We sought to understand factors contributing to academic rhinologists' receipt of industry payments, and explore possible disparities with an updated analysis of the Open Payments Database.

Methods:
Utilizing the AAMC list, program websites were searched for rhinology faculty, and fellowship training status was verified through public sources. Demographics, practice region, years in practice, and academic rank were recorded. Total non-research payments for all available years, number of payments, and category of payments were recorded. Up to the top 5 companies per physician were also collected. Univariate and multivariate analyses were performed.

Results:
217 fellowship trained rhinologists were identified, with 207 having data from 2016-2022 in the open payments database. Mean overall payments were $36,957.8 ± $110,321.0, and median number of payments was 26 (IQR: 62). Men (n=156) received higher total compensation ($43,494.8 ± $122,658.8) compared to women (n=51, $15,753.4 ± $51,540.7), however, when accounting for years in practice this difference was not significant (p=0.365). Late career (>20 years) rhinologists had the highest total compensation ($149,298.3 ± $254,084.6) compared to mid (10-20 years, $50,087.2 ± $93,773.5) and early (<10 years, $6507.2 ± $15,531.5) career rhinologists (p<0.001).

Conclusion:
It is important for academic rhinologists to collaborate with industry, guiding the development of much needed advancements in our field. As more women continue to enter and establish themselves in rhinology, accruing similar years of practice to men, we anticipate that compensation gaps will narrow.

Poster #A163
Risk and outcomes of chronic rhinosinusitis after COVID-19 infection
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Kevin Hur, MD

Background:
We aimed to understand how prior history of COVID-19 affects the risk of developing chronic rhinosinusitis (CRS) and subsequent outcomes.

Methods:
Using the TriNetX US collaborative database, patients 18 years or older with a healthcare visit from March 2020 to June 2021 were retrospectively followed for 2 years. Patients with a history of cystic fibrosis, sinonasal malignancies, prior CRS, or prior nasal polyposis were excluded. The cohort was stratified into patients with or without a prior history of COVID-19 and propensity score matched by age, sex, race, ethnicity, and history of asthma. CRS patients were further stratified to compare secondary outcomes between those with prior COVID-19 to COVID-19 naive patients. The primary outcome was first-time CRS diagnosis. Secondary outcomes included endoscopic sinus surgery (ESS), antibiotics, and oral steroids following CRS diagnosis.

Results:
Of the 1,339,766 patients included, a majority were female (54.9%), White (59.1%), and non-

Hispanic or Latino (61.7%). 10.7% of patients had a prior history of asthma. COVID-19 diagnosis was associated with a higher 2-year risk for CRS compared to COVID-19 naive patients [OR 1.52; 95%CI(1.48-1.57)]. However, within 2 years, CRS patients with prior COVID-19 were less likely to undergo ESS [OR 0.596; 95%CI(0.529,0.672)] compared to CRS patients without COVID-19 history. Furthermore, these same patients did not exhibit a significant difference in antibiotic or oral steroid usage compared to CRS patients without COVID-19 history.

Conclusion:
Patients with a history of COVID-19 are at a higher risk of developing CRS. However, CRS patients with a prior history of COVID-19 are less likely to undergo ESS.

Poster #A164
Risk factors associated with prolonged length of stay in CSF rhinorrhea repair
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Background:
Endoscopic repair of cerebrospinal fluid (CSF) rhinorrhea is a critical rhinologic intervention. This study aims to identify risk factors and complications associated with prolonged length of stay (PLOS) in these patients.

Methods:
A retrospective cohort study was conducted on 10,040 patients undergoing CSF rhinorrhea endoscopic repair from the National Inpatient Sample (2016-2019). Survey-weighted methods assessed both univariate and multivariate risk factors for PLOS (75th percentile or >7 days).

Results:
A total of 2,435 patients experienced a PLOS. Upon multivariate analysis, age emerged as a protective factor (AOR: 0.983; P <0.001). Hispanic patients faced higher odds of PLOS compared to White patients (AOR: 1.564; P = 0.010). Private insurance was associated with decreased odds of PLOS (AOR: 0.550; P <0.001). Clinically, hydrocephalus (AOR: 3.365; P <0.001), cerebral edema (AOR: 2.306; P <0.001), coagulopathy (AOR: 5.104; P <0.001), stroke (AOR: 4.492; P <0.001), renal complications (AOR: 1.900; P = 0.026), unintentional weight loss (AOR: 3.049; P = 0.002), fluid/electrolyte disorders (AOR: 3.627; P <0.001), and anemia (AOR: 2.080; P <0.001) significantly predicted PLOS. Patients with pituitary adenomas were less likely to experience PLOS (AOR: 0.498; P <0.001). Intra/postoperative endocrine complications (OR: 1.889; P = 0.037), nervous system complications (i.e. hemorrhage, punctures) (OR: 2.197; P <0.001), and wound disruption/infection (OR: 6.318, P <0.001) were significantly associated with PLOS.

Conclusion:
Several clinical conditions may increase the risk of PLOS and post-operative complications in CSF rhinorrhea repair patients. These insights can guide perioperative strategies to optimize patient care.

Poster #A165
Risk factors for inpatient treatment of orbital cellulitis
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Background:
Orbital cellulitis in children despite being rare, can lead to serious complications and necessitate hospitalization for management.

Objective:
This study aims to evaluate the risk factors for inpatient treatment and longer hospital stay in children with orbital cellulitis who were treated medically.

Methods:
A retrospective cohort study was conducted of children referred to West Virginia University Children's Hospital from January 2012 to July 2022, diagnosed with orbital cellulitis. Patients' characteristics, CT imaging, medical treatment, and etiology of the orbital cellulitis were reviewed. Orbital cellulitis was diagnosed based on clinical symptoms, exam findings, and CT

scan imaging. Cases who required surgical intervention were excluded.

Results:
One hundred children met the inclusion criteria, with 70 requiring inpatient management. No statistically significant difference was found in patients' demographics, age, and sex. 64.3% of children who required inpatient treatment had acute rhinosinusitis (ARS) vs 16.7% of those who were treated as outpatients (p<0.001). Additionally, those who were treated as inpatient were more likely to have postseptal cellulitis (p<0.001), a higher CT Lund-Mackay score (6 vs 1.3; p<0.001), and more likely to have a subperiosteal abscess (25.7% vs 3.3%, p=0.009). Logistic regression analysis including age, ARS status, presence of postseptal orbital cellulitis, and abscess presence showed that concomitant ARS was a predictor for inpatient management and for longer hospital stay.

Conclusion:
In children who were successfully treated medically, ARS as the etiology of orbital cellulitis is the main predictor for inpatient treatment and for longer hospital stay.

Poster #A166
Risk factors for mental health disorders in sinonasal malignancies
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Background:
Patients with head and neck cancers, particularly sinonasal malignancies, experience a rise in mental health disorders (MHD) post diagnosis. This study aims to uncover associations among different demographic and clinical risk factors and the occurrence of MHDs.

Methods:
A retrospective cohort study on 8,900 patients with sinonasal malignancies from the National Inpatient Sample (2016-2019).

Results:
1,850 (20.6%) patients had MHD. Univariate analysis found older age, female gender, and White ethnicity were significantly associated with MHD (p = .012, p < .001, p < .001, respectively). MHD patients had longer hospital stays (p < 0.001) and higher incidence of lung and bronchus issues (p = 0.038). Multivariate analysis showed adults aged 18-44 had increased MHD odds than other age cohorts (AOR: 1.4679, p=0.041). Females had higher odds than males (AOR: 1.6875, p<0.001), while White patients were more susceptible than Black and Asian/Pacific Islander patients (AOR: 0.301, .3478, respectively; p<0.001, p<0.001, each). Clinical predictors included neoplasm-related pain, hypertension, pulmonary circulation disorders, obesity, weight loss, and fluid and electrolyte disorders (AOR: 2.4991, 1.4123, 1.5045, 1.6538, 1.4452, 1.3538, respectively; p<0.001, p=0.008, p=0.041, p=0.014, p=0.028, p=0.020, each).

Conclusion:
Older age, female gender, and White ethnicity are associated with MHD in sinonasal malignancy patients, and clinical risk factors for MHD include neoplasm-related pain, hypertension, pulmonary circulation disorders, obesity, weight loss, and fluid and electrolyte disorders. Mental health screening may be important in these patients.

Poster #A167
Risk of nasal septal perforation following nasal packing for epistaxis in the emergency department
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Introduction:
While nasal packing, such as rhino rockets and nasal balloons, are frequently used in the emergency department (ED) for epistaxis refractory to conservative measures, patients may be at risk for nasal septal perforation (NSP) due to decreased vascular supply to the nasal septum. No study to date has characterized the impact of nasal packing on the risk of NSP.

Methods:

Of all individuals who received non-absorbable nasal packing in the ED at our institution, we identified 19 individuals diagnosed with NSP afterward and randomly selected 50 patients without NSP for comparison. T tests and Chi square tests were utilized to compare numeric and categoric variables respectively and a multivariable logistic regression model was developed.

Results:
At baseline, individuals with NSP did not differ from those who did not develop NSP in history of cocaine use, hypertension, diabetes, autoimmune disease, nasal surgery, nasal spray use, CPAP use, or home oxygen use. Interestingly, individuals with NSP had a lower rate of tobacco use (4(21%) vs 32(64%) current/former users, p=0.004). On univariable analysis, we found that individuals found to have a NSP had a longer mean duration of packing (5 vs 3 days, p=0.001) and bilateral packing (42% vs 18%, p=0.078). On multivariable analysis, we found that each additional day of packing was associated with 77% increased odds of NSP and compared to unilateral packing, bilateral packing was associated with 4x the odds of NSP.

Conclusions:
These findings demonstrate the importance of choice of nasal packing and follow up care after packing to ensure timely removal of packing. Further large-scale studies are needed to fully identify patients at risk for NSP after packing in the ED.

Poster #A168
Role of the weekend effect in patients admitted for facial fractures
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Objective:
The “Weekend Effect” describes the possible poorer quality of care and outcomes for patients admitted on the weekend relative to a weekday. Our study examines the associations between weekend admissions and outcomes in the management of facial fractures.

Methods:
The 2017 National Inpatient Sample (NIS) was used to identify adult inpatients with a non-elective admission and primary diagnosis of a facial fracture. Univariate and multivariable analyses were conducted to characterize statistical associations with weekend admissions.

Results:
Of the 41,940 inpatients with facial fractures, 13,575 (32.3%) were admitted on a weekend. On univariate analysis, weekend admits were more likely to be younger (mean 45.9 vs. 49.0 years, p<0.001), male (73.8% vs. 70.7%, p<0.001) and abuse alcohol (22.2% vs. 16.9%, p<0.001) than weekday admits. Weekend admits were less likely to have congestive heart failure (3.7% vs. 5.0%, p<0.001) and hypertension (29.5% vs. 34.1%, p<0.001). On multivariable analyses adjusting for demographics, hospital characteristics, and severity of illness, weekend and weekday admits had similar total charges ($83,716 vs. $82,145, p=0.433), number of procedures undergone (2.6 vs. 2.5 procedures, p=0.068), and time from admission to first procedure (1.3 vs. 1.3 days, p=0.563). Weekend admits had shorter length of stay (LOS) (4.4 vs. 4.6 days, p<0.001) and decreased odds for mortality (OR 0.79, 95% CI 0.67–0.92, p=0.004) when compared to weekday admits.

Conclusions:
In a cohort of inpatients with facial fractures, those admitted on the weekend had similar charges, underwent a similar number of procedures, had slightly shorter LOS, and had lower mortality than those admitted on a weekday.

Poster #A169
Running on fumes: Volatile organic compounds (VOCs) and sinonasal symptomatology
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POSTERS

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Introduction:
Volatile organic compounds (VOCs) are common components of polluted air although their effects on sinonasal outcomes are poorly understood.

Methods:
The 2013-2014 US National Health and Nutrition Examination Survey dataset was analyzed including demographic information, questions regarding sinonasal symptoms (e.g. nasal congestion, frequent sinus infections), exposure data (e.g. utilization of gas strove in the home), blood formaldehyde levels and urinary levels of volatile organic compounds—benzene, xylene, and toluene. We used logistic regression modeling to examine the relationship between sinonasal symptoms and individual urinary VOCs. We utilized both an unadjusted model as well as a model adjusting for age, sex, rate, income, smoking status, facial/head trauma history, and natural gas utilization.

Results:
We identified a cohort of 706 patients (mean age 59, 52.0% female). Female respondents were more likely to report frequent sinus infections ($p<0.001$) as well as individuals with a head trauma history ($p=0.03$), non-Caucasian respondents ($p<0.001$) and those of lower income ($p=0.016$). Females were more likely to report nasal congestion ($p < 0.001$); no other covariates were found to be significant. There was no significant relationship between blood formaldehyde levels and urinary VOC levels and reported history more than 2 sinus infections or symptoms of nasal congestion in our statistical models.

Conclusion:
Females, non-Caucasian respondents, individuals with history of facial trauma, and respondents with lower income showed increased susceptibility to frequent sinus infections in this population-based study. The VOCs studied did not appear to affect sinonasal symptomatology in this cohort.

Poster #A170

Saddle nose deformity and nasal septal perforation in GPA vs. Non-GPA

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Background:
Saddle nose deformity (SND) may occur in association with nasal septal perforation (NSP). Both SND and NSP are observed in granulomatosis with polyangiitis (GPA) patients. The objective of this study was to compare the prevalence and severity of SND in GPA versus non-GPA patients with NSP.

Methodology:
NSP patients who visited a tertiary Rhinology clinic from 01/01/2010 – 01/01/2024 were grouped into GPA and non-GPA cohorts. In patients of SND with NSP ≥1cm in length, SND was graded using the Daniel and Brenner's classification (higher is worse), and compared between GPA vs. non-GPA group.

Results:
168 patients with NSP were identified; 18 in GPA and 150 in non-GPA group. Thirteen GPA patients and 12 non-GPA patients had SND. The odds ratio of developing saddle nose deformity in GPA-associated nasal septal perforations compared to non-GPA perforations was 29.9. For patients of SND with medium-to-large perforations, the area of perforation was larger in GPA (median: 900mm2) vs. non-GPA group (median: 225m2); $p<0.001$, and grade of SND was higher in the GPA group (Class IV – 5 patients, class III - 2, class II - 1, class I – 1) SND, compared to non-GPA group (class IV – 0 patients, class III - 2, class II - 2, class I – 4); $p=0.048$.

Conclusion:
In the presence of NSP, patients with GPA are nearly 30 times more likely to have SND. Besides factors such as vasculitis and avascular necrosis in GPA patients, larger sized perforation is probably an important associated factor with a higher grade of SND. Longitudinal studies with larger cohort are needed to study this association in detail.

POSTERS

Poster #A171

Sex in facial fractures

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Objective:
Patient sex has been demonstrated to influence the clinical outcomes of various procedures. Our study examines the associations between patient sex and the management, charges, and outcomes of adult inpatients with facial fractures.

Methods:
The 2017 National Inpatient Sample (NIS) was queried to identify adult inpatients with a non-elective admission for a primary diagnosis related to facial fracture. Univariate and multivariable analyses were used to describe correlations with patient sex.

Results:
Of the 41,940 inpatients with facial fractures, the majority were male (71.7%) and White (59.4%). On univariate analysis, males were more likely to be younger (mean 44.0 vs. 58.5 years, $p<0.001$) and abuse alcohol (20.6% vs. 11.4%, $p<0.001$) compared to females. Males were less likely to have hypothyroidism (2.2% vs. 14.2%, $p<0.001$) and congestive heart failure (3.0% vs. 8.5%, $p<0.001$) compared to females. Males and females had a similar incidence of traumatic subdural hemorrhage (11.1% vs. 10.8%, $p=0.381$). On multivariable analyses, adjusting for demographics, hospital data, severity of illness, and traumatic subdural hemorrhage, males had greater total charges ($87,614 vs. $70,087, $p<0.001$), length of stay (LOS) (4.7 vs. 4.3 days, $p<0.001$), and number of procedures undergone (2.8 vs. 1.9 procedures, $p<0.001$) than females. Males had increased odds for mortality (OR 1.30, 95% CI 1.09–1.56, $p=0.003$) and undergoing mandible resection procedures (OR 1.64, 95% CI 1.54–1.75, $p<0.001$).

Conclusions:
In a cohort of adults hospitalized for facial fractures, males had greater total charges, LOS, number of procedures undergone, odds for mortality, and odds for undergoing mandibulectomy procedures than females.

Poster #A172

SII in CRS: Investigating prognostic efficacy

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Background:
CRS is a multifactorial pathology associated with inflammatory comorbidities including asthma, allergic rhinitis and nasal polyposis. SII has been shown to have prognostic efficacy in gauging systemic inflammation. We aim to study the SII as a prognostic metric for extent of surgery and CRS mediated comorbidities in ESS patients.

Methods:
13-year retrospective study of 148 adults undergoing ESS with preoperative platelet, neutrophil, and lymphocyte counts for SII calculation ((platelets x neutrophils)/ lymphocytes). Lund-Mackay scores, surgery extent, and comorbidities were collected. For analysis, numeric versus categorical utilized a two-tailed t-test, categorical versus categorical utilized a chi-square test of independence. Significance set at $p<.05$.

Results:
148 patients met criteria, 76 had CRS and 72 had other conditions. Average SII was 1080.6±1134.6 (range 0-8119, median 735). Significant difference in average SII existed between CRS and other sinonasal disorders (1479±1186 vs. 1007±1082, $p=.0129$). No significant differences found in Lund-McKay scores between CRS patients with SII above or below thresholds (SII>330 or >895.6). Significant inverse correlation observed between comorbidities and SII in CRS patients; those with SII<895.6 had statistically significant higher prevalence of asthma ($p=.0012$) and allergic rhinitis ($p=.0143$). No correlation found between SII and nasal polyps, or between number of sinuses opened during surgery and SII.

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Conclusion:
CRS Patients requiring ESS had higher SII than those with other indications. Our study found SII to not be prognostic for CRS mediated systemic inflammation with respect to asthma, allergic rhinitis, nasal polyposis, or predictive of surgery extent.

Poster #A173
Sinonasal and ear malignancies and socioeconomic status
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Introduction:
Socioeconomic factors have been linked to worsened health outcomes, including cardiovascular disease and some types of cancer. However, its impact on the incidence of sinonasal and ear cancers (SEC) is largely underexplored. We analyzed the relationship between Area Deprivation Index (ADI) and SEC incidence-rate in a nationally representative ecological sample.

Methods:
SEC incidence-rate was determined in 608 US counties from 2011-2019 using the SEER Program from the NCI. ADI was collected from the Center for Health Disparities at University of Wisconsin. Additional sociodemographic information was collected from SEER and data on smoking and alcohol intake from CDC data frames (county level). Flexible semi-nonparametric regression models were used to test the relationship between ADI and SEC incidence-rate, adjusting for confounders.

Results:
Low socioeconomic status counties had higher incidence-rate ratios (IRR) of SEC controlling for confounders in our primary analyses (IRR=1.07, 95% CI 1.01, 1.13, p=0.02 per 5 units decrease in ADI score). This relationship was maintained after adjusting for multiple testing (FDR, p=0.04) and in ordinary least squares (OLS) regression (β=0.67, 95% CI 0.01, 1.17, p=0.02). Smoking was also significantly associated with SEC in our primary (IRR=1.07. 95% CI 1.04, 1.10, p<0.01, per 1 unit increase in smoking) and secondary analyses (FDR=0.03; OLS regression, β=0.07, 95% CI 0.05, 0.09, p<0.01).

Conclusions:
This is one of the initial studies to relate increased SEC incidence-rate to low socioeconomic status. Additionally, smoking was robustly associated with SEC. Future longitudinal studies are necessary to confirm causation in this relationship.

Poster #A174
Sinonasal inverted papilloma - Relevance of radiological anatomy in disease recurrence
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Purpose:
To describe radiological anatomy of patients with inverted papilloma (IP) and to evaluate association between radiological findings and disease recurrence.

Materials and methods:
Retrospective observational study of patients with inverted papilloma who underwent surgery between January 2010 and December 2019. Radiological and surgical data were collected and analyzed.

Results:
Among the 117 patients, zygomatic recess was the most prevalent maxillary recess. Commonest recess affected in both primary and recurrent groups was palatonasal recess. Anterior ethmoid (p=0.047), frontal recess (p=0.017) and frontal sinus (p=0.026) showed significantly higher radiological involvement in recurrent cases compared to primary cases. Among the recurrent cases, involvement of posterior ethmoid (p=0.030), frontal recess (p=0.017), intraorbital extraconal compartment (p=0.036) and Krouse stage T4 (p=0.002) were significantly higher in those with repeated disease recurrence (RwR). Within the maxillary sinus, the most common sites of recurrence were the lateral wall and floor.

Conclusions:
In recurrent IP, predictors of further recurrence include site of origin of disease being frontal recess/sinus region, involvement of posterior ethmoid, frontal recess and intraorbital

extraconal compartment and Krouse stage T4 at time of diagnosis.

Poster #A175
Sinonasal malignancies with orbit invasion
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Sinonasal cancers often invade the orbit. The approach to treating sinonasal cancer invading the orbit can vary depending on the expertise, medical center, and the extent of the invasion. The definitive treatment strategy, whether it involves preserving the orbit or not, varies on a case-by-case basis and leads to different prognosis outcomes for the disease. Currently, a multimodal treatment approach, which includes surgery, chemotherapy, radiotherapy (RT), or concurrent chemoradiotherapy (CCRT), is frequently employed for sinonasal cancers. This study aims to evaluate the clinical characteristics of sinonasal cancers with orbit invasion. We conducted a retrospective review of patients with primary sinonasal cancers invading the orbit who were treated at Seoul National University Hospital and Seoul National University Bundang Hospital between 2009 and 2018. We examined factors such as cancer pathology, the extent of orbit invasion, treatment strategies, recurrence rates, and survival rates. Out of 141 patients, the most common pathology observed was squamous cell carcinoma (SqCC). Patients with SqCC exhibited a significantly lower disease-free survival (DFS) rate compared to other pathologies. Overall survival (OS) and DFS rates did not significantly differ based on the grade of orbit invasion. In subgroup analysis of SqCC cases, when tumor resection with orbit preservation was performed as the definitive treatment, DFS was significantly longer compared to cases where surgery was not the definitive treatment (RT, CCRT). There was no significant difference in DFS between those who underwent orbit exenteration as the definitive treatment and those who underwent tumor resection with orbit preservation as definitive treatment.

Poster #A176
WITHDRAWN

Poster #A177
Sinus surgery and stroke in chronic rhinosinusitis
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Objective:
Chronic rhinosinusitis (CRS) has been associated with many comorbid conditions. Previous studies have found a correlation between CRS and risk of stroke. Our study investigates the influence of sinus surgery on mitigating risk of stroke in CRS patients.

Study Design:
Retrospective database study.

Methods:
The 2017 National Inpatient Sample (NIS) was queried to identify adult inpatients with a primary diagnosis of CRS. CRS was identified (ICD–10: J321-J324, J328, J329). Univariate and multivariable analyses were used to identify statistical associations with sinus surgery status in CRS patients.

Results:
Of the 139,570 inpatients diagnosed with CRS, the majority were female (54.9%), White (70.9%), and did not have sinus surgery (97.7%). Mean patient age was 60.1 years. On multivariable analysis, adjusting for patient demographics and comorbidities, odds for ischemic stroke were decreased in CRS patients that underwent sinus surgery (OR 0.494, 95% CI 0.38–0.64) compared to patients that did not undergo sinus surgery (p-value < 0.001). Additionally, odds for hemorrhagic stroke in CRS patients (OR 0.943, 95% CI 0.62-1.40) did not vary by sinus surgery status (p-value greater than 0.05).

Conclusions:
In a national CRS cohort, inpatients that underwent sinus surgery had decreased odds for ischemic stroke.

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Poster #A178

SinusMAP: A national peer mentorship program

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Support to educate rhinologists on new medications (i.e. biologics) and technologies in the field of chronic rhinosinusitis with nasal polyps (CRSwNP) is inconsistent and depends highly on personal networks, which is suboptimal both for patient safety and for achieving maximal effectiveness. To generate a more consistent and longstanding support network, a national mentorship program entitled SinusMAP: CRSwNP Mentorship Advancement Program has been launched for expert and community rhinologists across Canada. The program includes community rhinologists enrolled in six regional "pods" led by an expert rhinologist mentor with significant experience in the use of biologics. Throughout the one-year pilot program, mentors and their participants will attend three national learning events and four regional pod meetings. The national learning events will include expert speakers to share recent data and experiences in the field. The regional pod meetings will facilitate small group discussion, focused on participant cases, and allow participants to share learnings and seek mentor advice on optimal CRSwNP management. During the program, physicians will also have access to a community of practice, a gated online platform where they can access a national discussion forum and resources, to identify frequent challenges and useful teaching points for the larger ENT community. It is expected that this program will help improve physician confidence in a rapidly evolving area, ensure that patients are treated with the most up-to-date information available and identify and disseminate best practices related to CRSwNP as they evolve.

Poster #A179

SNOT-22 questionnaire completion trends

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Introduction:
Patient reported outcome measures (PROM) are surveys that evaluate a patient's subjective experience; however, unanswered questions may compromise their predictive validity. The SNOT-22 survey is a widely used PROM tool in rhinology but completion rates for each question are unknown. Our study aims to assess responses of the SNOT-22 survey to improve response rates and predictive utility.

Methods:
SNOT-22 surveys were collected from Cedars-Sinai Medical Center and Kentuckiana ENT Center. Surveys with at least one question unanswered were included. Completely unanswered surveys were excluded. T-test and spearman's correlation were used to analyze response trends.

Results:
1034 SNOT-22 surveys were collected. 184 surveys (18%) had at least one question unanswered. Questions 8 (Ear fullness) and 22 (Embarrassed) had the most unanswered responses, 47 (4.5%) and 43 (4.2%) respectively, while Questions 1 (Need to blow nose) and 2 (Nasal blockage) had the fewest, with 27 (2.6%) and 28 (2.7%) unanswered questions respectively. No strong correlation was seen between the survey length and missing responses (rs=0.51). There was no significant difference in mean SNOT-22 scores for completed surveys of 27.01 versus incomplete surveys of 30.19 (p=0.072).

Conclusion:
The data shows no significant difference in mean scores between partial and full completed surveys. Thus, SNOT-22 interpretation should focus more on specific questions answered rather than solely using the overall score to guide treatment. Questions regarding nasal symptoms received more responses than those about ear and emotional issues. This variation

underscores areas of improvement in question clarity and relevance to enhance predictive utility of the survey.

Poster #A180

Society membership preferences of rhinology fellowship graduates: An educational survey

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Objective:
This survey asked recent Rhinology + Skull Base fellows about their perceptions and preferences of specialty professional societies.

Methods:
Anonymous independent survey of ARS and non-ARS fellow graduates in 2018-23 who were emailed. We collected demographics, practice data, membership priorities, and perceptions of professional societies on representation, inclusion, cost, and engagement opportunities. Data was analyzed with descriptive statistics.

Results:
We surveyed 107 fellow graduates and 73% responded: 65% White, 3% Black, 18% Asian, 10% Hispanic, 44% Female, and 66% work in academics. Membership frequencies: 87% ARS; 57% AAO-HNS; 44% NASBS; 23% AAOA; 14% TRIO. Most males belong to 2-3 societies vs 1-2 for females. The top 3 priorities of society membership for both sexes included "opportunity for engagement" and "opportunities for mentorship", but males listed "society/ meeting cost", while females listed "engagement of women". Perception trends by sex: females generally perceive "engagement of women" and "opportunity for advancement" as a greater strength than males. Trends were consistent in all but one society. Only ARS and AAO-HNS had >10 Non-White surveyed members. Perception of "opportunity for advancement" was discordant between White and Non-White members.

Conclusion:
Fellow graduates often belong to >1 society. The sexes have some overlapping and some divergent membership priorities. Societies with robust programs to engage female members generally are perceived as having greater opportunities for female engagement and advancement. Few societies have significant Non-White members and there is room for improvement in perceived "opportunity for advancement" among Non-Whites members.

Poster #A181

Socioeconomic deprivation and the incidence and healthcare utilization for chronic rhinosinusitis

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Introduction:
Single-institution studies have correlated lower socioeconomic status (SES) with greater severity of Chronic Rhinosinusitis (CRS). We conducted a cohort study of the US population to explore the association of community socioeconomic deprivation with CRS incidence and subsequent healthcare utilization.

Methods:
The Merative® MarketScan® Databases were used to identify adult CRS cases between 2007- 2019. Within each geographic subunit, we calculated the annual number of newly diagnosed CRS cases per capita (newCRS), and the annual frequency of CRS-related outpatient visits (CRS-OV) per 1000 well checkups (WC). Area-level SES was measured using the Social Deprivation Index (SDI), a 100-point metric of social disadvantage across geographic regions. We developed multivariable linear and negative binomial regression models to estimate the association between SDI and the rates of newCRS and CRS-OV, respectively. Models adjusted for demographics and respiratory comorbidities, with cluster-adjusted standard errors.

Results:
Among a cohort of ~4 billion visits, the annual mean newCRS was 3.3 cases per 100 enrollees (SD 1.3, range 0.5-12.7) and the annual median CRS-OV was 164 visits per 1000 WCs (IQR 110-267, range 26-4114). Higher SDI scores, indicative of increased

social deprivation, were associated with higher newCRS and CRS-OV rates. Specifically, every 20-point rise in SDI was associated with 0.4 more newCRS cases per 100 enrollees/year (adjusted β 0.36, 95% CI 0.10-0.63) and a 20% increase in CRS-OV per 1000 WCs/year (adjusted IRR 1.20, 95% CI 1.06-1.35).

Conclusion:
Community socioeconomic deprivation is associated with increased incidence of CRS and higher frequency of CRS-related outpatient visits.

Poster #A182
Socioeconomic impact of AIFRS
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Background:
Acute invasive fungal rhinosinusitis (AIFRS) is a life-threatening process with high mortality. Socioeconomic status has been associated with worse outcomes in multiple conditions but has not been thoroughly evaluated in AIFRS. The primary aim of this study was to evaluate the role of socioeconomic factors on patient outcomes in the treatment of AIFRS.

Methods:
Patients with a confirmed diagnosis of AIFRS treated at a tertiary rhinology center between 2014-2024 were included in this study. Data regarding patient socioeconomic factors and clinical outcomes was extracted from patient records. Socioeconomic status (SES) markers investigated included: race, sex and insurance type. Associations between SES and mortality were assessed.

Results:
108 patients with AIFRS were included in the study cohort with an average age of 58.4±16.9 years and male predominance (62,57.4%). Caucasian patients were the largest racial group (45,46.4%) and 46.3%(n=50) of patients were Hispanic/Latino. Nearly equal proportions of patients had government (42,45.2%) and private (45,48.4%) insurance. The overall cohort mortality was 49.5%. Male patients experienced significantly worse mortality rates than female patients (61.2%vs36.6%,OR0.37,95%CI0.16-0.86). There was no significant association between race (Chi square5.1,p=0.27) or insurance type (OR1.05,95%CI0.43-2.6) and mortality. There was no association between ethnicity and mortality (OR0.87,95%CI0.38-2.03) or spoken language and mortality (OR1.33,95%CI0.47-3.76).

Conclusion:
AIFRS is an aggressive disease process with high mortality despite advances in antifungal and surgical treatment. Male gender was associated with worse outcomes in AIFRS with no other significant socioeconomic differences.

Poster #A183
Structured histopathology reporting in chronic rhinosinusitis
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Background:
High tissue eosinophilia (HTE) in chronic rhinosinusitis (CRS) has been associated with increased diseased severity and poor treatment outcomes. Although histopathology can help identify patients with HTE, adoption of structured histopathology reporting beyond tissue eosinophilia remains limited, potentially hindering personalized patient management.

Objective:
To evaluate the current literature for associations between specific histopathological variables and their relationship with CRS

prognosis following endoscopic sinus surgery (ESS).

Methods:
A systematic review using PRISMA guidelines was conducted. Articles were classified into; (1) immunologic response, (2) fungal elements, or (3) remodelling changes, based on their respective histopathologic analysis. Associations with CRS recurrence and treatment responsiveness were reviewed. A modified Cochrane Risk of Bias Assessment Tool was used for quality evaluation.

Results:
Of the 41 included articles (n = 8144), 40 articles focused on immunologic response examining HTE, with 20 relating to CRS treatment response and 28 to disease recurrence. HTE ranged from 5 to >100 eosinophils per high-power field and was largely associated with poor treatment outcomes. Additionally, nine articles examined fungal elements, while 20 articles explored remodeling changes. Notably, basement membrane thickening (BMT) was identified as a potential indicator of poor outcomes.

Conclusion:
HTE appears to confer increased risk of recurrence and poor treatment outcomes in CRS patients undergoing surgical intervention. Further studies are required to better elucidate the relationship between additional histopathological factors such as BMT and CRS prognosis.

Poster A184
Subjective outcomes after EMLP
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Background:
EMLP is performed to manage refractory frontal sinusitis after failed ESS. However, there are few studies addressing the subjective outcomes, and there is no study investigating the outcome in different eosinophilia status.

Methods:
This cohort study collected the CRS patients who underwent EMLP during Jan 2015 to June 2022. We investigated the treatment effects on the basis of visual analog scale (VAS) and Sino-Nasal Outcome Test 22 (SNOT-22) over 6 months. Subgroups were stratified as follows: tissue eosinophils >=10/HPF and tissue eosinophils <10/HPF.

Results:
A total of 58 participants completed the study. There were 16 female patients (27.6%), and the overall mean age was 47.8±13.9 years old. ECRS was noted in 38 patients□65.5%). The mean pre-operative VAS scores was 36.5± 18.2, drop to 16.3± 12.2 at 1-month, 10.2± 10.9 at the 3-month, 8.0± 9.7 at the 6-month, and all showed significant differences. Similar pattern was noted in SNOT-22 analysis. Patients with ECRS had higher pre-operative VAS scores. The VAS changes were significantly greater in patients with ECRS at 1-month, 12- and 24-week visits after surgery. Similarly, the SNOT-22 outcomes had the same presentations. We used generalized estimating equations(GEE) for longitudinal data analysis, and the outcome results showed no significant difference between different eosinophilia status.

Conclusions:
EMLP did improve SNOT-22 and VAS scores. Patients with ECRS had higher pre-operative VAS and SNOT-22 scores. The subjective parameters improved in both groups over time, and they did differ significantly between the NCRS and NECRS groups in every single time point. However, they did not show differences in GEE longitudinal data analysis.

Poster #A185
Surgical management of moderate to severe epistaxis in HHT: System
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Background:
Epistaxis is one of the most predominant and debilitating symptoms of heredity hemorrhagic telangiectasia (HHT), significantly impacting

patients' quality of life. While various medical and surgical interventions exist for managing epistaxis in patients with HHT, patients with moderate to severe epistaxis are high health-care utilizers.

Methods:
A systematic review following PRISMA guidelines was conducted on studies evaluating outcomes in adults with HHT with moderate or severe epistaxis who had undergone surgical interventions. Studies that included medical therapy, sclerotherapy, or embolization or did not report post-operative outcomes were excluded. We compared the outcomes for pre- and post-operative epistaxis severity, need for further interventions or transfusions, and estimated blood loss, surgery length, complications, and patient satisfaction.

Results:
Twenty studies (546 patients total) were included. The most common surgeries were nasal closure and laser photocoagulation. Eleven studies used the epistaxis severity score (ESS) to measure patient-reported epistaxis outcomes, which all found a significant reduction in ESS following surgical intervention. Eleven studies found a decrease in the number of transfusions and rise in hemoglobin levels. Common complications reported were partial dehiscence of nasal closure, septal perforation with ablation, and continued bleeding requiring re-operation. Most patients report improved quality of life and positive patient satisfaction with surgical intervention.

Discussion:
Surgical management for epistaxis in the setting of HHT is generally favorable. However, significant heterogeneity in epistaxis outcome measures and follow-up limits the generalizability.

Poster #A186

Surgical outcomes in combined rhinoplasty and endoscopic sinus surgery

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Background:
Nasal obstruction and chronic rhinosinusitis may require surgery. Some rhinoplasty and endoscopic sinus surgeries (ESS) can be done concurrently to address concomitant pathology and reduce costs and recovery time. However, there are risks associated with combined surgery.

Objectives:
To characterize the major and minor complications of combined surgeries and surgical variables that change the risks of these complications.

Methods:
In this retrospective study of 2008-2019 Marketscan®, we compared the risk of major and minor complications between rhinoplasty-only, ESS-only, and combined surgeries. Multivariable logistic regression, adjusting for the available social determinants of health and the Charlson Comorbidity Index, evaluated the surgical approach as the primary determinant of complication.

Results:
Relative to ESS-only or rhinoplasty-only groups, combined surgeries have a higher risk of minor complications with epistaxis and anosmia as the primary contributors. While combined surgeries have a higher risk of major complications relative to rhinoplasty-only surgeries, they carry a similar risk compared to ESS-only surgeries. Stroke and pneumonia, also high in ESS-only surgeries, are the most common major complications in combined surgeries. In subgroup analyses, graft use and an increased number of sinuses were associated with a higher risk of any complications.

Conclusion:
While combined surgery may be safe, surgeons should be cautious when operating on a higher number of sinuses and using grafts. They should specifically be cognizant of major complications such as stroke and pneumonia and minor complications such as epistaxis and anosmia in these operations.

Poster #A187
SVI in sinonasal disease
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Background:
Social vulnerability refers to the susceptibility of external stressors on human health due to negative effects on the community in which one resides. Social vulnerability can be measured by the Social Vulnerability Index (SVI), a composite score of sixteen social factors such as socioeconomic status, housing type, and transportation. Recently, SVI has been used to better understand the prognosis and outcomes of patients with oral cavity cancer, disordered breathing, and sinonasal cancers. We hypothesize that those with higher social vulnerability will have higher Sinonasal Outcome Test (SNOT-22) scores.

Methods:
Patients with chronic rhinosinusitis, allergic rhinitis, allergic fungal rhinitis, and acute rhinosinusitis were included (n=334). Data extracted included SNOT-22, Lund Kennedy, and surgical history. Using home address, SVI was determined using the National SVI 2020 Database by Census Tract.

Results:
The overall median SNOT-22 score for patients with sinonasal disease was 25 (IQR=12, 47). The median SVI in patients was 0.41 (IQR 0.22, 0.67). Additionally, 50% of the sinonasal cohort had sinus surgery. On multivariate linear regression controlling for age and sex, as SNOT-22 increased, the SVI of the total cohort (n=438) increased (beta coefficient of 13.74 ($p = 0.002$)).

Discussion:
SVI is a significant predictor of increased symptom severity in SNOT-22 scores of patients with sinonasal disease. It is unclear if this is due to increased objective disease severity or subjective symptoms; however, a better understanding of the interplay between SVI and its effect on sinonasal health will help to optimize treatment strategies and improve the quality of life of those living with sinonasal disease.

Poster #A188
The effect of BMI on treatment outcomes in chronic rhinosinusitis
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Introduction:
Obese body mass index (BMI) patients may be at increased risk of developing chronic rhinosinusitis (CRS) with (CRSwNP) and without nasal polyposis (CRSsNP), but how BMI affects treatment has not been studied. This population-based study uses a federated electronic medical record (EMR) database to investigate the role of BMI on CRS treatment outcomes.

Methods:
EMR data from the TriNetX Global Collaborative Network was queried for adults with a diagnosis of unspecified CRS (ICD-10 J32) or CRSwNP (J33). Patients were stratified by BMI into normal (18.5-24.9), overweight (25.0-29.9), and obese (≥30) cohorts. Endoscopic sinus surgery (ESS), antibiotic, and steroid use up to 20 years after CRS diagnosis were queried. CRSwNP patients were also queried for dupilumab use. Propensity-score matching was conducted for patient demographics, cardiovascular and pulmonary disease, and nicotine use.

Results:
Obese CRS+CRSwNP patients were less likely to undergo ESS than normal BMI patients (OR=0.964, p=0.003). However, obese CRSwNP only patients were more likely to undergo ESS (OR=1.15, p<0.0001) and be prescribed dupilumab (OR=1.22, p=0.002) than normal BMI CRSwNP patients. Overweight and obese CRS+CRSwNP patients were more likely to be prescribed antibiotics (OR=1.09, p<0.001; OR=1.12, p<0.001) and steroids (OR=1.15, p<0.001; OR=1.22, p<0.001) than their normal BMI counterparts.

Conclusion:
This study found that obese CRS+CRSwNP patients had increased odds of antibiotic and steroid use compared to normal BMI patients. Notably, obese CRSwNP patients had increased odds of ESS and dupilumab therapy compared to normal BMI patients. Further research is needed to elucidate the etiology of these associations.

Poster A189
The first reported pediatric free flap reconstruction for advanced maxillary sinus osteoblastoma
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A seven-year-old female patient presented to the emergency department with a three-month history of right-sided proptosis. Physical exam showed noticeable proptosis, right periorbital edema and erythema, and depression of the hard palate. CT imaging showed an expansile right maxillary sinus mass with extension into the orbital apex. Biopsy was obtained via a Caldwell-Luc approach the following day with pathology indicating osteoblastoma. The decision was made to undergo total resection of the tumor and free flap reconstruction with the fibula free flap reconstructing the anterior maxilla with an attached plate reconstructing the orbital floor.

In this case study, an unusual and advanced case of maxillary sinus osteoblastoma extending into the orbital in a pediatric patient is presented. The resection and reconstructive considerations for the patient's midface free flap reconstruction and her post-operative recovery are discussed. To the authors' knowledge, this is the first reported free flap reconstruction for a maxillary sinus osteoblastoma for a pediatric patient. This case study also includes a literature review of the body of knowledge that exists for head and neck osteoblastoma and midface free flap reconstruction.

Poster #A190
The impact of bacterial infection and high tissue eosinophilia on outcomes of revision ESS
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Julisa Núñez, Medical Student
University of Miami

Bacterial infection and eosinophilic CRS are correlated to worse disease after primary ESS. Limited study exists if these factors relate to more severe outcomes after revision ESS (rESS). We described the effect of infection and tissue eosinophilia on patient-reported and objective outcomes after rESS.

Method:
This single center retrospective review included adult CRS patients post-rESS from 2020-23. Culture-confirmed bacterial infection intra-op and sinus tissue eosinophilia (>10 eos/HPF) were determined.We measured outcomes as percent change in Sinonasal Outcomes Test-22 (SNOT-22) and modified Lund-Kennedy Endoscopy (LKE) scores, pre-op & 3-6 months post-op. A priori 10% difference in percent change was considered clinically significant.

Results:
151 subjects were included (54 mean age; 59% males; 85% white; 46% Hispanic). 45% (n=68) had bacterial infection & 66% (n=100) had tissue eosinophilia. Infected subjects had clinically significantly less improvement in SNOT22 with 36% decrease (mean 45.3 pre vs 29.7 post) compared to those not infected with 50% decrease (40.5 pre vs 21.6 post); the difference was not statistically significant. Both groups had 60% improvement in LKE scores. Subjects without tissue eosinophilia had clinically significantly more improved LKE scores with 70% decrease (4.14 pre vs 1.65 post) compared with eosinophilia 54% decrease

(6.66 pre vs 2.45 post, p>0.05).They had comparable improvement in SNOT22 (45% & 41% respectively).

Conclusion:
Those with infection had clinically significantly reduced SNOT22 post-rESS, but less improvement compared to those without infection. Tissue eosinophilia may relate to worse LKE scores postop. Research with well-powered sample size is warranted to confirm this correlation.

Poster #A191
The impact of neo-osteogenesis on outcomes of revision ESS: A single-center experience
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The impact of neo-osteogenesis on disease severity after revision ESS (rESS) is unclear. We studied its effect on patient-reported and objective outcomes after rESS in our center.

Method:
We conducted a single center retrospective review of CRS patients post-rESS in 2020-23. Presence & locations of osteoneogenesis were identified as described in operative notes.We measured outcomes as percent change in Sinonasal Outcomes Test-22(SNOT-22) & modified Lund-Kennedy Endoscopy(LKE) scores, preop & 3-6 months postop. A priori 10% difference in percent change was clinically significant.

Results:
151 CRS patients had rESS (mean age 54;41% females;85% white;10% Black);61% had nasal polyps.Neo-osteogenesis was present in 58% (n=88).Half (n=43) had osteoneogenesis in the frontal sinus,42% (n=37) in ethmoids,23% (n=21) in sphenoid & 13% (n=12) in maxillary. Overall, all subjects had a clinically significant improvement in SNOT22 and LKE, regardless of neo-ossification status.Patients with osteoneogenesis tended to have less improvement in SNOT22 with 40% decrease(mean 44 pre to 27 postop) vs those without osteoneogenesis with 49% decrease(41 pre to 23 post)(p>0.05; not statistically significant).However, cohorts had clinically significantly different LKEs improvement postop: without neo-ossification had 69% improvement(5.8 pre to 1.8 post) vs those with neo-ossification with 52%(5.8 pre to 2.4 post) (p>0.05)

Conclusion:
Majority of rESS in our center had neo-osteogenesis,most common in frontal sinus.All subjects had clinically significantly reduced SNOT22 and LKEs after revision.Subjects with osteoneogenesis had trend with less SNOT22 improvement & had clinically significantly less LKE improvement.Larger well-powered study is needed to confirm this.

Poster #A192
The ophthalmologic crescent blade in endonasal surgery
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The close collaboration of rhinologists with other specialists such as neurosurgeons and ophthalmologists has allowed for sharing of ideas and innovative use of instruments across specialties. The crescent blade is primarily an ophthalmologic instrument known for its use in manual small incision cataract surgery. In this presentation, we discuss the use of a disposable 2.0 mm crescent blade in endoscopic endonasal surgery.

The crescent blade's angled tip and small size provide versatility for its use in a variety of endonasal procedures. The crescent blade enables cutting along 180 degrees from the tip ensuring a tangential cut through the mucosa which is important for flap viability. The disposable nature of the blade ensures that it is always sharp allowing for its use in mucosal and cartilaginous cuts. In this presentation, we demonstrate the use of the Crescent blade in a variety of procedures including septoplasty, septal perforation repairs, free mucosal graft harvest, and endoscopic dacryocystorhinostomy.

In summary, the crescent blade is a versatile

instrument that can be used for a variety of endoscopic endonasal procedures. Familiarity with this instrument can assist the surgeon in tackling certain technically challenging procedures. Adoption by a wider cohort of surgeons is necessary to validate the true impact of this instrument.

Poster #193
The role of perceived social support in chronic rhinosinusitis
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Julisa Nunez
Laura Wild
Corinna Levine, MD, FARS

Objective:
Perceived social support can impact care and outcomes. The role of social support on initial chronic rhinosinusitis (CRS) presentation and patient-reported measures is unknown.

Methods:
This retrospective study compared social support cohorts in CRS patients undergoing sinus surgery. Subjects completed an 8-item Medical Outcomes Study Social Support Survey (MOS) measuring social support (R=0-100%, higher=better). MOS scores <67% defined “Low-support” cohort (LSC). Sociodemographic, clinical, and patient-reported outcomes were collected. Fisher’s exact test and Kruskal-Wallis rank sum test compared cohorts. Clinical significance was defined as 10% difference.

Results:
111 CRS patients were included: 44% female; 85% White; 10% Black, 47% Hispanic; 19% Spanish-speaking. LSC included 26 subjects. No significant association was found between MOS score and sex, race/ethnicity, income, preferred language, polyp status, or revision surgery. Compared to the High-support cohort (HSC), LSC tended to report a shorter duration of CRS symptoms at presentation, difficulty with written health information, and lower confidence completing medical forms ($p>0.05$). Cohorts had similar endoscopic baseline scores and 3mo post-op improvement. Baseline SNOT-22 scores were similar; however, HSC had a clinically significantly greater mean improvement in post-op SNOT-22 (21 vs 30; $p>0.05$).

Conclusion:
This unpowered exploratory study indicates that level of social support may be associated with delay in CRS care, health literacy, and post-op SNOT-22 scores in medically recalcitrant CRS patients. Further investigation is warranted to understand how social support impacts CRS care and treatment outcomes.

Poster #A194
The tubes, an endoscopic technique for the comprehensive assessment
Osama Marglani

With modern nasal endoscopes the Preoperative endoscopic examination along with computed tomography (CT) imaging assessment has become the mainstay in surgical planning before endoscopic surgery and allows for identifying the anatomical variants predisposing patients to surgical complications this study aims to raise awareness of the possibility of patients having variable anatomies, we propose a comprehensive novel pre-op endoscopic mnemonic to ensure identifying the major endoscopic surgical landmarks to become familiar for best surgical orientation.

Data source:
This method included a comprehensive analysis of 15 cadaveric specimens to facilitate educative purposes. The study was conducted at Umm Al-Qura University in Makkah, Saudi Arabia.
Additional anatomical data was obtained from well-recognized otolaryngology – head and neck literature and the latest publications published during the last five years.

Review methods:
This paper included a comparative analysis of several methodologies used in preoperative evaluation for patients undergoing surgical care, in addition to the intraoperative expertise of highly skilled surgeons. This led us to adopt this strategy and compose this novel description.

Conclusions:
Surgeons should be aware of their anatomy before operating on any patient, and there are sometimes variations in patient anatomy. Implication for practice: Increase recognition of the prospect that patients may have diverse

anatomies. This study suggests a systematic approach to functional endoscopic sinus surgery using the preoperative endoscopic assessment utilizing the mnemonic

Poster #A195

Time is money: An analysis of cost drivers in ambulatory sinus surgery

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Introduction:
Functional endoscopic sinus surgery (FESS) is one of the most commonly performed Otolaryngologic procedures and is associated with significant cost variability.

Methods:
We performed a retrospective analysis of all inflammatory sinus surgeries at a single tertiary care medical center from July 2021 to July 2023. The electronic medical record was reviewed for patient factors and cost variables for each procedure, and multivariable analysis was performed.

Results:
Two hundred and twenty-one patients were included in analysis with a mean age of 48.2 years. There was a 44.7% incidence (n=99) of nasal polyps and 31.2% (n=69) of cases were revision surgeries. The average total cost for the surgical encounter was $8960.31 (standard deviation $1967.97). Operating room time represented $4912.46, 54.8% of all costs while average operating room supply costs were $2397.96 (26.8%) and recovery room costs were $919.48 (10.3%). Total costs were significantly associated with length of surgery ($7.83/minute, p=0.04), in addition to presence of nasal polyps ($531.96, p=0.04). There was no significant association between total costs and the remaining clinical and demographic factors.

Conclusions:
Costs associated with ambulatory FESS for inflammatory sinus disease vary across patients and this cost variability is predominantly driven by time efficiency. Operating room time and recovery costs, which are passed along to the patient, collectively comprise nearly two-thirds of total costs. Our findings suggest that a systems-based approach focused on streamlining efficiency across the entire ambulatory surgery encounter will have the greatest impact on reducing health care expenses for both the patient and the health system.

Poster #A196

To evaluate multiple clinical complications and management of chronic suppurative otitis media

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Aim:
To evaluate multiple clinical complications and management of chronic suppurative otitis media

Study design:
A retrospective study

Place and Duration:
This study was conducted at Jinnah Post Graduate Medical Centre Karachi Pakistan from June 2020 to June 2021.

Methodology:
All patients of chronic suppurative otitis media with intra or extra cranial complications who were admitted to the ENT Department were included in this study. Clinical data, related complications, care, and follow-up were all analyzed. In all patients, pure tone audiometry was used to assess their hearing. Every patient had a high-resolution computer tomography (HRCT) temporal bone scan and all other relevant investigations including aural pus swab for culture and sensitivity done . Every patient with CSOM-related intracranial problems had a Magnetic Resonance Imaging (MRI) brain scan.

Results:
During the trial of 280 individuals, 42 patients with CSOM complications were observed. A total of 19 of them had intracranial complications, while 23 had extra cranial complications. The youngest patient was five years old, while the oldest was 58 years. The

majority of the cases were observed in 11 to 20 years age groups. Only 6 of the 42 individuals had bilateral CSOM, whereas the remaining 36 had unilateral CSOM.

Conclusions:
CSOM-related problems are still widespread, despite the availability of broad spectrum antibiotics. Patients should be given higher doses of intravenous antibiotics (that breach the blood-brain barrier) followed by mastoid surgery. Early detection of concomitant intracranial complications using HRCT and MRI and adequate antibiotic treatment, abscess drainage, and mastoid surgery as soon as possible are all essential to prevent

Poster #A197
WITHDRAWN

Poster #A198
Transnasal endoscopic sphenopalatine artery ligation (TESPAL) in the Medicare population
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Background:
Transnasal endoscopic sphenopalatine artery ligation (TESPAL) is used for epistaxis recalcitrant to conservative measures. TESPAL has been proposed as a first line therapy for intractable epistaxis before posterior nasal packing and embolization. The study aim is to describe the utilization of the TESPAL Current Procedural Terminology (CPT) code in the Medicare population after its introduction in 2018 and compare the utilization of alternative codes for other treatments of epistaxis.

Methods:
We used publicly available content management system (CMS) data from the Medicare website to analyze CPT code utilization from 2013 to 2021. We examined TESPAL (31241), embolization for epistaxis (61626), and endoscopic control of epistaxis (31238). Welch Two Sample t-test was used to compare CPT code utilization.

Results:
From 2018 to 2021, use of the TESPAL CPT code (31241) averaged 379 instances annually while CPT codes 61626 and 31238 averaged 1,450 and 3,873 respectively. The overwhelming majority of TESPAL utilization was in the inpatient setting (at least 97%). There was a decline in CPT code 31238 use after 2018 ($p<0.05$), however no significant change in CPT code 61626 usage was found before and after 2018 ($p>0.05$).

Conclusion:
Epistaxis management by embolization exhibited stable utilization patterns over the study period. Despite the advantages of TESPAL over embolization, CPT code reporting for this procedure has been relatively low in the Medicare population since implementation in 2018. These results may warrant further action by the American Rhinologic Society. Decline in reporting of code 31238 in the inpatient setting may reflect increased use of TESPAL code and embolization.

Poster #A199
Treatments and outcomes in early-stage olfactory neuroblastoma
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Introduction:
Olfactory neuroblastoma (ONB), a rare sinonasal malignancy, is conventionally treated with surgical excision including craniofacial resection, and often supplemented with adjuvant radiotherapy, particularly in advanced stages. Despite this, challenges persist in formulating optimal treatment strategies for early-stage ONB.

Method:
41 Patients diagnosed with early-stage ONB, whose Dulguerov stage was 3 or below, without any overt orbital invasion or cervical lymph node metastasis, in two tertiary hospitals from 1992 to 2023 were reviewed.

Results:
There was no significant difference in disease-free survival according to treatment modality (definitive RT vs surgery-based treatment, log-

rank p=0.731), extent of resection (mass resection vs craniofacial resection, log-rank p=0.262), adjuvant RT (with vs without adjuvant RT, log-rank p=0.37, and Hyams grade (low vs high, log-rank p=0.443). However, among the patients who underwent resection only, disease-free survival tended to be higher for those who had adjuvant RT (log-rank p=0.089) with significantly higher local free survival (log-rank p=0.009). Among those patients who underwent craniofacial resection, none showed local recurrence, and there was no significant difference in disease-free survival according to adjuvant RT (log-rank p=0.370)

Conclusion:
In early-stage ONB, overall survival seems favorable regardless of the chosen treatment modality, but the role of definitive RT remains uncertain. Adjuvant radiotherapy has been shown to mitigate local recurrences in patients who underwent mass excision alone, yet its efficacy remains uncertain for patients who underwent craniofacial resection. Further studies with larger patient cohorts are warranted.

Poster A200
Trends in number of women speakers
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Elizabeth Stevens, BS
Deanne King, MD PhD
Alissa Kanaan, MD

Objective:
The efforts for gender equality in otolaryngology are gaining recognition. Several studies emphasize the need for better gender representation at conferences. The number of women speakers at the ARS has yet to be studied. This study aims to review those numbers to identify a shift or, a lack thereof, in gender representation among conference speakers.

Method:
The number of males and females in different roles at ARS annual and COSM meetings were retrospectively tracked from 1999 to 2022. Pearson correlation test was used to examine gender differences across 3 main categories: panelists/moderators, oral/poster presenters, and named lecturers/keynote speakers.

Result:
A total of 824 opportunities for moderator/panelist roles were identified. 23.4% of these were filled by women, while 76.6% by men. Despite the low number of women representations, there was a strong correlation between increasing years and ratio of women panelists or moderators from 1999 to 2022 ($\rho = 0.87$; 95% CI, 0.73-0.94). Furthermore, there was a total of 1330 first-author presenters of which 18.9% were female. A strong correlation was observed between the progression of years and the rise in the ratio of women presenters ($\rho = 0.83$; 95% CI, 0.63-0.92). Of the named lecturers/keynote speakers, 12 were men, while 2 were women.

Conclusion:
There's a notable yearly upward trend in the participation of women as panelists, moderators, oral and poster presenters. This positive shift reflects the evolving demographics of ARS participants over the years. Despite this positive trend, significant disparity still exists and efforts to rectify imbalances are encouraged.

Poster #A201
TRPM8 and rational inferior turbinate surgery
Francesca Viola, MD
Mattie Rosi-Schumacher, Resident
Eugene Kern, Professor

They do not exist, that is guidelines for managing inferior turbinate (IT) "hypertrophy" in adults or children.

There's morbidity associated with IT resection and the possibility of producing empty nose syndrome (ENS).
The 2021 Nobel Prize in Physiology or Medicine went to Dr. David Julius and Dr. Ardem Patapoutian for their findings of thermal and mechanical transducers, especially transient receptor potential melastatin 8 (TRPM8) which is a cold and menthol-sensitive nonselective cation channel found in the respiratory tract. TRPM8 was found to play a significant role in nasal patency perception (normal nasal breathing).

The sense of nasal patency depends on mucosal cooling, which requires sufficient

functioning TRPM8 receptors to detect temperature changes.

Turbinectomy removes these TRPM8 receptors responsible for sensing normal breathing. Electrocautery (400º C) to the turbinate mucosa destroys the TRMP8 receptors directly or indirectly by obliterating the submucosal blood supply to the mucosal receptors.

Turbinectomy or altering the head of the IT changes nasal aerodynamics causing less turbulent airflow producing less mucosal contact with less activation of these TRPM8 receptors, resulting in a feeling of nasal obstruction, difficulty breathing, or suffocation.

Passali et al. compared several surgical techniques for IT reduction and concluded that IT submucosal “cold knife” resection plus out-fracture had the most successful results in adults studied at four and six years.
Prevention of disturbed breathing (with possible ENS) is accomplished by treatment of IT “hypertrophy” as advocated by Passali et al; acknowledging the critical role of these TRPM8 receptors.

Poster #A202
Tuning in: Synchrony of eustachian tube dysfunction and sinus disease severity in AERD patients
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Simon Chiang
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Introduction:
Patients with aspirin-exacerbated respiratory disease (AERD) often present with co-morbid otitis media and eustachian tube dysfunction (ETD), often significantly impacting quality of life. The aims of this study were to evaluate the prevalence of otologic disease in AERD patients and determine the relationship between chronic rhinosinusitis (CRS) disease severity and ETD using objective radiographic scores.

Methods:
The incidence of ear disease was evaluated through the Brigham and Women’s ARD registry (BWH), and a corresponding radiographic study was performed at the University of Pittsburgh Medical Center (UPMC) evaluating the differences between patients with AERD, CRS with polyps, or CRS without polyps. CT scans were analyzed using both the Lund-Mackay staging system (LMS) and a temporal bone opacification (TBO) grading scale.

Results:
43.98% AERD patients (n=307/698) reported a diagnosis of hearing loss. 28.30% (n=536/1894) were diagnosed otitis media with effusion and 41.64% (n=787/1890) had received oral antibiotics to treat a middle ear infection as an adult based on the BWH registry. For the radiographic study, 51 AERD patients were compared with 28 patients with CRSwNP, and 21 CRSsNP. There was a significant correlation between LMS and TBO ($p<0.01$) and AERD patients had worse TBO than patients with CRSsNP ($p<0.01$), but not compared to CRSwNP.

Conclusion:
Eustachian tube dysfunction was demonstrated in a significant proportion of patients with AERD in our cohort. Increased temporal bone disease severity correlated with sinus disease by comparison of radiographic opacification scores.

Poster #A203
Update on rhinitis of pregnancy
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Sacramento ENT

Rhinitis of pregnancy (ROP) is a well-known, poorly understood nasal condition that is thought to be driven by hormonal changes occurring during pregnancy. The hallmark of ROP is nasal congestion that either manifests or worsens in the pregnant patient. Traditionally, treatments options are lacking for this condition, likely due to the risks of therapy to the unborn fetus. The advent of minimally invasive, office-based treatments offers opportunities for either prophylactic or therapeutic intervention. Research is needed to explore the epidemiology and underlying causes of this condition. We studied the

prevalence and relevant medical histories of patients to better understand the natural history of this condition. Patients in an obstetric practice were surveyed in the pre-partum and immediate post-partum settings and were asked questions relevant to nasal conditions in hope of better understanding this common, bothersome condition.

Poster #A204

Use of artificial intelligence to develop novel research ideas in chronic rhinosinusitis

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Purpose:
To evaluate artificial intelligence (AI) software's ability to propose novel research topics in chronic rhinosinusitis with nasal polyposis (CRSwNP).

Design:
Mixed-method observational study and review

Methods:
ChatGPT-3.5 and Google Bard were tasked to produce novel systematic review ideas on topics in the management of CRSwNP, including medical, surgical, and biologic treatments. A manual literature search of Pubmed and Cochrane databases for each topic was performed to determine the novelty of each idea. Numeric grades of 1 to 5 (with 1 being superior) were then assigned to each idea by two independent authors to evaluate its quality and clinical pertinence.

Results:
A total of 20 systematic review ideas were created in each ChatGPT and Google Bard for each topic addressing the surgical, medical, and biologic management of CRSwNP (total of 120 ideas). We determined that ChatGPT's overall rate of producing a novel, unpublished systematic review ideas was 62% with an average quality grade of 1.88. Meanwhile, Google Bard's rate of producing novel systematic review ideas was 77% with an average quality grade of 2.05. There was no statistically significant difference between the quality of ideas generated by the AI software (p=0.440), or the number of novel ideas generate (p=0.076). The most novel and clinically pertinent ideas were found to be related to the biologic treatment of CRSwNP.

Conclusion:
Both ChatGPT and Google Bard were proficient at producing quality, novel research topics about chronic rhinosinusitis with nasal polyposis.

Poster #A205

Utility of modified frailty index for functional endoscopic sinus surgery outcomes

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Background:
Frailty has been shown to be a better predictor of postoperative adverse outcomes for various surgeries. Few studies have examined the effect of frailty on postoperative functional endoscopic sinus surgery (FESS) complications. We aimed to determine the effect of frailty, using the modified frailty index-5 (mFI-5), on postoperative outcomes in chronic rhinosinusitis (CRS) patients who undergo FESS.

Methods:
We used the TriNetX US Collaborative Network platform to conduct a retrospective study. We stratified adult CRS patients by their mFI-5 score (0-5). We propensity matched by age decade at index, Black/African American race, and female gender. We also stratified patients by age during FESS (18-64 and 65-90 years old). Our primary outcomes include 6-month post-operative mortality and overall FESS complications (orbital, skull base, and hemorrhage).

Results:
76,762 patients had CRS and FESS. We compared mFI-5=1-3 (1=7,124 patients, 2=2,684, 3=629) to mFI-5=0 (n=43,115) patients. Too few patients had outcomes for mFI-5=4 and 5. mFI-5=1 had mortality odds ratio (MOR) of 4.35 [95% confidence interval: (2.52, 7.50)] and complications odds ratio (COR) of 1.34 (1.11,1.62). mFI-5=2 had MOR of 7.85, (4.05,15.22) and COR of 2.14

(1.61,2.85). mFI-5=3 had MOR of 5.43, (2.73,10.80) and COR of 1.80, (1.02,3.18). Comparing 65-90 (n=61,685) to 18-64 (n=15,076) age groups, there was a MOR of 2.94 (2.2,3.81), and COR of 1.32 (1.18,1.48).

Conclusions:
The mFI-5 score can be used to identify patients that may have poorer outcomes from FESS and is a stronger predictor of mortality and complications than age. Identifying these patients pre-operatively may help clinicians focus resources to improve their outcomes."

Poster #A206
Utilization of biologics in US patients with CRSwNP in 2018-2023
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Introduction:
Patients with chronic rhinosinusitis with nasal polyposis (CRSwNP) often have persistent symptoms and reduced quality of life despite treatment with intranasal and oral corticosteroids (OCS). With recent approval of three biologics for CRSwNP (dupilumab, mepolizumab, omalizumab), this study aims to characterize US patients with CRSwNP and those treated with biologics.

Methods:
This retrospective cohort study analyzed linked data (JUL2018-JUN2023) from IQVIA's longitudinal medical and pharmacy claims databases to characterize (1) adult patients with prevalent CRSwNP (overall cohort, index=first observed NP diagnosis), and (2) those who received ≥2 doses of the same biologic with 12 months of baseline and 24 months of follow-up data (biologic cohort, index=first biologic).

Results:
Of 74,480 CRSwNP patients, 8,716 (12%) received a biologic; 2,208 met criteria for the biologic cohort (dupilumab 90%, mepolizumab 5%, and omalizumab 5%). Relative to the overall cohort, the biologic cohort was younger (53 vs 58 yrs), had more females (54% vs 46%) and a higher baseline prevalence of asthma (72% vs 31%), allergic rhinitis (71% vs 37%), NP surgery (16% vs 6%), OCS use (84% vs 52%), and antibiotic use (67% vs. 51%). 63% of CRSwNP patients had the index NP visit with ENTs vs. 19% with allergist/immunologists, while 61% of index biologics were prescribed by allergist/immunologists vs. 24% by ENTs.

Conclusions:
Of all patients with CRSwNP, 52% received OCS and 12% received biologics. Biologic recipients were more likely to have asthma, allergic rhinitis, and receive NP surgery, OCS, and antibiotics in the year before receiving biologic. Biologics were disproportionately prescribed by allergist/immunologists compared to ENTs.

Poster #A207
Validating a cadaveric training model for endoscopic orbital tumor resection
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Background:
Resection of orbital tumors via endoscopy requires dissection close to critical structures. With increasing preference for endoscopic endonasal approaches worldwide, despite the rarity of these tumors, there is a need for effective training models. This study aims to validate a cadaveric model designed to enhance skills necessary for managing endoscopic orbital tumors.

Methods:
To simulate orbital tumors, superabsorbent polymer beads soaked in Iohexol contrast were inserted into the medial orbits of six fresh-frozen cadavers (12 orbits) through a transcaruncular approach. Nine otolaryngology

residents and three attending otolaryngologists were recorded performing endoscopic endonasal resection on the beads. Participants then assessed the model using a 5-point Likert scale for face and content validity, while expert surgeons rated the videos to evaluate construct validity, using similar scales and competency indicators.

Results:
Analysis of 12 simulated tumor resections demonstrated an average time of 8 minutes 2 seconds from lamina papyracea incision to bead retrieval. Participants found the model to closely mimic the real conditions of endoscopic orbital surgery (mean rating 4.9 ± 0.3) and that it was a valuable training tool (mean rating 4.8 ± 0.4). Expert surgeons confirmed the model's efficacy in differentiating surgical competence levels, with a 1.70 increase in global rating score for every additional level of training (p= 0.05).

Conclusions:
The cadaveric training model for endoscopic resection of orbital tumors demonstrated strong face, content, and construct validity. This affirms its value as an effective tool for cultivating the advanced skill set necessary for this complex surgical practice.

Poster #A208
Validation of the trilayer graft technique for closure of anterior skull base defects
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Background:
Multiple reconstruction techniques exist to repair defects arising from expanded endonasal approach (EEA) surgeries targeting anterior skull base tumors. These repairs aim to minimize post-operative complications such as cerebrospinal fluid (CSF) leak. In 2022, our group described the ""trilayer graft,"" a repair method that incorporates two layers of a collagen matrix graft stitched to a fat graft. The initial data demonstrated a reduction in the rate of CSF leaks following the adoption of this method. This study evaluates the surgical practice of a single surgeon with access to the trilayer technique and the post-operative outcomes.

Methods:
Retrospective chart review encompassing all EEAs to anterior skull base tumors performed by a single otolaryngologist (JGG) from January 2019 to September 2023 at a tertiary care center.

Results:
Of 236 cases meeting inclusion criteria, 38 (16.1%) involved trilayer graft reconstruction. Postoperative CSF leaks occurred in 3 subjects (1.3%), with none of these cases involving trilayer grafts. Trilayer grafts were used more frequently in revision cases (p = 0.028) and when intra-operative CSF leaks were encountered (p<0.001). There was no difference in average BMI, age, tumor dimension, or the frequency of lumbar drain insertion between the groups with and without trilayer grafts (p>0.05).

Conclusion:
The trilayer graft is an efficient and useful tool in the armamentarium of an anterior skull base surgeon. This technique may decrease rates of postoperative CSF leak with limited additional morbidity. Larger multicenter studies are warranted to validate this potential benefit given the relative rarity of this complication.

Poster #A209
Variability of spray characteristics of intranasal corticosteroids
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Introduction:
Intranasal corticosteroids (INCS) are first line treatment for patients with allergic rhinitis; however, treatment failure is common. The anatomic site of drug deposition likely affects the efficacy of INCS and can be modified by angle of insertion, head position, respiratory cycle and spray characteristics. To better understand the variability in spray characteristics, we performed a study

characterizing droplet dynamics of three common over the counter INCS.

Methods:
We choose three commonly used, widely available over the counter INCS. Using Lagrangian particle tracking (LPT), we were able to simultaneous measure global and local characteristics of nasal sprays, including probability density functions of droplet size and velocity angle, vertical velocity profiles, and local mass flux distributions.

Results:
Spray angle differed significantly between INCS1 to INCS3 from 13.36-25.95 degrees. The range of particle size also varied significantly from INCS1 25.12 – 735 µm, INCS2 - 25.12 – 184.79 µm and INCS3 34.15 – 292.87 µm. The total droplet mass delivered per actuation were given as 6.34 mg, 25.25 mg, and 30.53 mg for INCS1 to INCS3. Furthermore, the drug delivery efficiency of INCS were determined as 97.61%, 13.21% and 44.06%, respectively.

Conclusions:
There was significant variability in spray characteristics from three commonly used over the counter INCS. These factors were previously uncharacterized; however, likely contribute to the overall distribution, absorption and efficacy of these products. Future studies aimed at defining how these spray characteristics affect drug efficacy and symptom improvement are necessary to help optimize drug delivery, minimize side effects, and improve patient's symptoms.

Poster #A210
Variation in national postoperative debridement patterns
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Introduction:
Postoperative debridements (PDs) are routinely performed in patients undergoing endoscopic sinus surgery (ESS). However, there is no consensus on how many PDs are necessary in the postoperative period. While PDs are associated with reduced synechiae, excessive PDs may cause avoidable patient discomfort and higher costs of care. This retrospective cohort study used a large national insurance claims database to better understand variation in PD patterns.

Methods:
We used insurance claims from the Merative™ MarketScan® Database between 2015 and 2022 to identify U.S. patients ages 18-65 undergoing ESS. We counted the number of PDs each patient had within 90 days of ESS. Ordinary and random-effects linear regressions were performed to analyze predictors of number of PDs and to quantify the amount of variation in PDs that depends on the individual surgeon using National Provider Identification numbers.

Results:
A total of 69,170 patients were included. Number of PDs ranged from 0 to 15. The median was 1 PD, and 96% of patients had 0-3 PDs. Mean payment per PD was $702, and mean out of pocket cost to patient per PD was $73. Patients undergoing bilateral ESS or septoplasty had more PDs performed while patients in rural areas had fewer. The random-effects regression found a large proportion (39%) of the variation in the number of PDs performed was explained at the surgeon level.

Conclusion:
Most U.S. surgeons perform 0 to 3 PDs after ESS. A large proportion of the variation in number of PDs performed depends on the individual surgeon. These results underscore a lack of consensus regarding the number of PDs performed and suggest a need for additional studies to further characterize this variation and formulate guide.

Poster #A211
Weight loss in sinonasal malignancy
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Objective:
Preoperative weight loss (WL) has been demonstrated to influence the management of patients admitted for the treatment of various malignancies. Our study characterizes the impact of abnormal unexplained pre-admission

WL on the hospital course of patients diagnosed with sinonasal malignancy.

Methods:
The 2017 National Inpatient Sample (NIS) was queried to identify adult inpatients with a primary diagnosis related to malignant neoplasm of the nasal cavity or accessory sinuses. Univariate and multivariable analyses were implemented to identify statistical associations with WL status.

Results:
Of the 1,600 inpatients diagnosed with sinonasal malignancy, 225 (14.1%) had WL. Most patients in this cohort were male (64.1%) and White (66.2%). Patient demographics including race, primary payer status, and severity of illness varied significantly by WL status ($p<0.001$). WL patients had a higher incidence of nutritional deficiency anemias (24.4% vs. 12.4%), fluid and electrolyte disorders (48.9% vs. 14.5%), and metastatic cancer (31.1% vs. 20.7%) than non-WL patients ($p<0.001$). On multivariable analyses adjusting for patient demographics, hospital data, and severity of illness, WL patients had greater total charges ($184,581 vs. $103,370, $p=0.005$) and length of stay (LOS) (13.2 vs. 5.6 days, $p<0.001$) than non-WL patients. WL and non-WL patients had similar mortality (OR 1.14, 95% CI 0.51–2.56, $p=0.756$).

Conclusions:
WL inpatients diagnosed with sinonasal malignancy had greater total charges and LOS, but similar mortality compared to non-WL inpatients.

Poster #A212
World Trade Center exposure levels and incidence of sinonasal surgery
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Introduction:
43.5% of World Trade Center (WTC) responders experience chronic rhinosinusitis (CRS). Patients unresponsive to medical management often undergo sinonasal surgery. We investigated hnow exposure levels affect the incidence of surgery in a diverse cohort of WTC responders with CRS.

Methods:
A retrospective review of 1162 CRS patients with WTC exposure treated between 2010-2023 collected demographics, diagnoses, and sinonasal surgery records. Exposure levels (low, intermediate, high, and very high) were derived as a composite variable based on having worked on the pile, dust exposure on 9/11, and days worked. Descriptive statistics characterized the cohort and a logistic regression analysis estimated the odds of surgery for different exposure level groups, adjusting for age, BMI, sex, and obstructive sleep apnea (OSA).

Results:
A total of 355 (30.6%) CRS patients underwent sinonasal surgery. Surgery patients were younger (mean age at exposure 50.3 vs 51.9, $p=0.0002$) and more likely to have OSA (52.1% vs 44.6%, $p=0.01$) than non-surgery patients. There were no significant differences between surgery vs non-surgery groups in sex (84.5% male vs 81.0%), BMI (30.1 ± 4.8 vs 30.6 ± 5.3 kg/m^2), and exposure levels (low: 12.8% vs 10.5%; intermediate: 62.3% vs 69.9%; high: 19.1% vs 14.3%, and very high: 4.9% vs 5.3%). Logistic regression analysis showed that exposure level was not significantly associated with incidence of surgery (intermediate vs low: OR 0.74 (95% CI: 0.48, 1.14), high vs low: OR 1.08 (95% CI: 0.64, 1.81), and very high vs low: OR 0.75 (95% CI: 0.36, 1.57)).

Conclusion:
WTC exposure level is not a significant predictor of sinonasal surgery incidence. Other factors may play a more prominent role, including OSA.

SAVE THE DATE 2025

COSM 2025
May 15-16, 2025
Hyatt Regency New Orleans
New Orleans, LA

Highlights:
- Keynote speakers
- President's Reception
- Expert panels
- Cutting edge research
- Poster presentations

ARS 14th Annual
Summer Sinus Symposium
Best Sinus Course in the World:
Improving Rhinology from Office to OR

July 10-12, 2025
Manchester Grand Hyatt
San Diego, CA

Highlights:
- Women in Rhinology Networking Event
- Cadaver Prosections
- Allergy Program
- Signature Event
- Symposia Sessions

ARS 71st
Annual Meeting
October 10-11, 2025
Indianapolis, IN

Highlights:
- Annual David Kennedy Lectureship
- Women in Rhinology, Mentorship, Residents & Fellows, and Diversity Programs
- Annual Hwang Family Lectureship
- Symposia Sessions
- Fall Film FESStival
- Guest Countries

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