NASAL TRYPTASE FOLLOWING DISTILLED WATER PROVOCATION

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Purpose: Distilled water (10 cc per jet nebulizer during 10-min inhalation) nasal challenge significantly increases unilateral but not total nasal resistance. Mastocyte activation is involved in hyperreactive response. Correlation between mastocyte activation and nasal resistances is analyzed.

Methods: A group of 22 nontreated hyperreactive patients (12 allergic, 10 nonallergic perennial rhinitis) were subjected to nasal challenge by inhalation of 10 cc of distilled water. Active anterior rhinomanometry (PC 200, Atmos, BRD) was performed before and after the challenge. Data are presented as better side and worse side resistance before provocation. Postprovocation nasal lavage with 0.3 cc of saline per nostril was performed (without prewashing) and tryptase levels in lavage samples determined by the fluorometric method (Unicap, Pharmacia Upjohn, Sweden). Unilateral nasal resistances were correlated with the same side nasal tryptase levels.

Results: There was no significant difference between tryptase levels on more and less patent sides of the nose before provocation, but their correlation was significant ($r = 0.98$). Challenge leads to significant increase on the better patent side before provocation and to significant decrease on the worse side. Correlation coefficient for the better side tryptase and postchallenge resistance was $r = 0.82$ and on the worse side, $r = 0.67$.

Conclusions: Although worse side tryptase is higher, the response to provocation is negative. Nasal tryptase in the allergic patients is higher than in nonallergic group. Our data suggest that mastocyte activation is involved in distilled water provocation, at least in allergic patients.

Poster 2

DECREASED IGA PLASMA CELL COUNTING IN NASAL MUCOSA OF UNDERNOURISHED RATS

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Purpose: A comparative study of nasal mucosa of 32 rats exposed to a hypoprotein diet was done using light microscopy of hematoxylin-eosin (HE)-stained slides and immunohistochemical labeling for IgA.

Method: Thirty-two rats were submitted to a hypoprotein diet (casein 1%) until a 40% weight loss was achieved compared with the control group (29 rats). After this, all rats were sacrificed and nasal mucosa was fixed in 10% formalin and submitted to histopathological and immunohistochemical study, using HE and peroxidase-antiperoxidase for IgA-stained slides. Type of epithelium; presence of metaplasia, inflammatory exudate, and lymphoid follicles; and plasma cells in 10 high-power fields (400x) were noted.

Results: No statistical significance could be demonstrated between the 2 groups on histopathologic study. IgA plasma cell counting revealed a significant decrease in undernourished rats (χ^2, $P < 0.5$).

Conclusion: Hypoprotein diet caused a significant decrease in IgA plasma cells in nasal mucosa of undernourished rats.

Poster 3

PRIMARY AND SECONDARY ASPECTS OF CILIARY ORIENTATION IN PRIMARY CILIARY DYSKINESIA

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Purpose: Ciliary orientation (COR) is an important ultrastructural parameter of mucociliary clearance, but its pathogenesis and pathophysiology in primary ciliary dyskinesia (PCD) are not known.

Methods: COR was measured in biopsy specimens and after ciliogenesis in 179 non-PCD and 59 PCD patients and related to ciliary beat frequency and acquired ultrastructural abnormalities (SCD).

Results: In non-PCD patients, COR correlated with SCD: from 15 ± 7° (n = 54) when SCD < 5% to 28 ± 8° (n = 16) when SCD > 25%. COR correlated also with ciliary immotility, and COR was always normal after ciliogenesis. When corrected for SCD, COR was expected in cases of ciliary immotility at 25°. In PCD with central complex abnormalities, COR was random (38 ± 10°, n = 12), obviously explained by the primary defect. In dynein deficiency (n = 32), COR was increased and higher in biopsy specimens (28 ± 11°) than after ciliogenesis (24 ± 10°), which can be explained by the absence of SCD after ciliogenesis (1% versus 14% in specimens). The overall high values of COR are in agreement with ciliary immotility. The high COR in specimens from normal PCD patients (21 ± 7°, n = 15) is in agreement with the 12% SCD. After ciliogenesis COR is even higher (25 ± 8°), which may be explained by the increase in ciliary immotility. The single, primary abnormality was never at random orientation.

Conclusion: Ciliary disorientation is an acquired abnormality, correlating with both % SCD and ciliary immotility.

Poster 4

THE EFFECT OF SO_2 EXPOSURE ON CYTOKINE RELEASE OF CULTURED HUMAN NASAL EPITHELIAL CELLS

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Purpose: There is rising evidence that human nasal epithelial cells (HNEC) play an important role in the pathogenesis of upper airway diseases. The aim of our study was to evaluate the influence of SO_2 on cytokine release of cultured HNEC.

Methods: HNEC were obtained from turbinate resections performed during functional endoscopic sinus surgery (FESS) from patients with chronic rhinosinusitis (CRS) (group 1; $n = 8$) or patients undergoing septoplasty (group 2, $n = 4$). HNEC cultures were exposed to either filtered air or filtered air with SO_2 added at controlled concentrations in air-liquid interphase technique. After 3, 12, and 24 h of exposure, cytokine release of interleukin (IL)-1b, IL-5, IL-6, IL-8, RANTES, granulocyte-macrophagecolony-stimulating factor (GM-CSF), and tumor necrosis factor (TNF)-a were measured in culture supernatants by enzyme-linked immunosorbent assay.

Results: Cytokines IL-1b, IL-5, IL-6, IL-8, RANTES, GM-CSF, and TNF-α were not detectable in the culture medium. After 7 d of culture, we observed high initial cytokine releases in 3 unexposed cell cultures of group 1 and in 2 of group 2 (IL-6, 96.6; GM-CSF, 129.7 [medians; pg/mL]). IL-1b, TNF-α, and Il-5 were not detectable. Twenty-four-h exposure to SO2 led to a significantly increased release of IL-1b (4.3 to 11.1 [medians; pg/mL]) in group 1 ($P < 0.05$).

Conclusions: Cultured HNEC are able to produce several cytokines. Furthermore, our results show that even short in vitro exposure to SO_2 contributes to an increased release of cytokines. However, further studies are necessary to clarify the relationship between in vitro results and airway inflammation in vivo.

Poster 5

RHINOSINUSITIS IN HUMAN IMMUNODEFICIENCY VIRUS PATIENTS: CLINICAL AND MICROBIOLOGIC ASPECTS

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Studies have reported an increase in chronic and recurrent rhinosinusitis in human immunodeficiency virus (HIV)-infected patients, and this accounts for the severity and difficulty of treatment, trying to define the etiology and correct antimicrobial treatment.

Purpose: Cultures obtained by sinus puncture in normal people and in HIV patients were obtained and compared.

Methods: Twenty-one HIV patients and 14 normal patients with chronic and recurrent rhinosinusitis were going through antral maxillary puncture to canine dimple or endonasal surgery. This material was examined by a microbiologist for aerobic, anaerobic, mycobacterial, and fungal agents. Clinical, laboratory, and radiologic features were avaliable.

Results: Negativity was observed in 33.32% and 28.57% of the antimicrobial cultures on HIV and non-HIV patients, respectively. In HIV patients, the material was positive for *Staphylococcus aureus* in 16.65% and for *S epidermidis, Streptococcus pneumoniae*, and *Peptostreptococcus* species in 11.10%. In non-HIV patients, material was positive for *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* in 18.18%.

Conclusion: We observed most positivity to aerobic gram-positive coccus and anaerobic agents in HIV patients with chronic rhinosinusitis, without special positivity to *Pseudomonas aeruginosa*, as in some other studies. In non-HIV patients, the gram-negative rods were most frequent.

Poster 6

ACTINOMYCOSIS OF THE RHINOPHARYNX

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Purpose: Cervicofacial actinomycosis is an infectious chronic disease usually caused by *Actinomyces israelii*. In the literature, actinomycosis of the rhinopharynx has been reported in a few cases. Male predominance is common. We reported a case that occurred in a rhinopharyngeal location 6 y after nasal surgery.

Methods and Results: The diagnosis was confirmed by both biopsy and anaerobic culture of the debris from the nasopharynx.

Conclusions: Treatment requires high, prolonged doses of antibiotics in combination with surgical excision.

Poster 7

LONG-TERM TREATMENT WITH MOMETASONE FUROATE NASAL SPRAY DOES NOT SUPPRESS GROWTH OF PEDIATRIC PATIENTS

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Purpose: To measure pediatric growth over 1 y during treatment of allergic rhinitis with mometasone furoate nasal spray (MFNS) or beclomethasone dipropionate (BDP).

Methods: Data are from randomized, placebo-controlled, double-blind, multicenter studies. Patients were 3 to 9 y old, with a history of at least 1 y of allergic rhinitis. Patients were treated with MFNS 100 mg every day (qd) (n = 49) or placebo (n = 49) in 1 study, and intranasal BDP 168 mg twice a day (bid) (n = 51) or placebo (n = 49) in a separate study. Height was measured with a calibrated stadiometer throughout 1 y of treatment. Cortisol response to cosyntropin stimulation was measured at baseline, 6 mo, and 12 mo.

Results: Patients treated with MFNS had a similar rate of growth averaged over all time points (P > 0.80) and a slightly greater increase in mean height at 1 y (P = 0.04), compared with their control group. Patients treated with BDP showed a reduced rate of growth (P < 0.01) and a smaller increase in height (P < 0.01) compared with controls. All treatments were well tolerated. No differences in adverse events were seen between groups. No hypothalamic-pituitary-adrenal axis suppression was detected in any group at any test point.

Conclusions: MFNS 100 mg qd was well tolerated in pediatric patients as young as 3 y old. MFNS did not suppress growth when chronically administered over 1 y. However, although intranasal BDP 168 mg bid did not detectably suppress plasma cortisol measurements, BDP treatment did significantly suppress growth rates in pediatric patients.

Poster 8

EFFECT OF DOSE OF ADJUNCTIVE MOMETASONE FUROATE NASAL SPRAY AND PRIOR EPISODES ON EARLY RELIEF OF SYMPTOMS OF ACUTE SINUSITIS

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Purpose: To find the earliest observable relief of symptoms during therapy of patients with acute or recurrent acute sinusitis using oral antibiotics and mometasone furoate nasal spray (MFNS).

Methods: In both studies, acute sinusitis in patients > 12 y was diagnosed by symptomatology and confirmed by computed tomography scan. Symptom severity was scored (0-3 scale) for congestion, facial pain, headache, postnasal drip, purulent rhinorrhea, and cough. Patients received MFNS 200 μg twice daily (bid) (acute study only), MFNS 400 μg bid (both studies), or placebo (both studies) in addition to treatment with amoxicillin clavulanate potassium (875 mg bid) for 21 d in randomized, double-blind trials. Patient-recorded individual symptom scores from Day 1 through Day 7 were analyzed for improvement over baseline.

Results: In acute sinusitis, both MFNS 200 μg bid and 400 mg bid produced significantly greater relief of congestion, facial pain, and total symptom scores beginning on Day 4 of treatment compared with placebo (P < 0.05). MFNS 400 mg bid showed significantly better relief of purulent rhinorrhea (P < 0.029 vs. placebo) by Day 6. In recurrent acute sinusitis, MFNS 400 mg bid produced significantly greater relief compared with placebo of facial pain and headache by Day 5, congestion by Day 6, and total symptoms by Day 7 (P < 0.05).

Conclusions: Adjunctive MFNS provided significantly more rapid relief of symptoms than antibiotics alone. Relief with 400 μg bid was more consistent than with 200 μg bid. Relief of recurrent acute sinusitis was slower than that of an individual acute occurrence.

Poster 9

COMPARISON OF TWO DOSES OF MOMETASONE FUROATE NASAL SPRAY FOR ADJUNCTIVE TREATMENT OF ACUTE SINUSITIS

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Purpose: To test relief of acute sinusitis with adjunctive mometasone furoate nasal spray (MFNS) 200 μg twice a day (bid) and MFNS 400 μg bid compared with antibiotic treatment alone.

Methods: Acute sinusitis in patients ≥ 12 y old was diagnosed by symptomatology and confirmed by computed tomography scan. Symptom severity was scored (0-3 scale) for purulent rhinorrhea, postnasal drip, congestion, headache, facial pain, and cough. Patients received MFNS 200 mg bid (n = 282), MFNS 400 mg bid (n = 292), or placebo (n = 290) in addition to treatment with amoxicillin clavulanate potassium (875 mg bid) for 21 d in a randomized, double-blind trial.

Results: Baseline scores were moderately severe (mean total, > 11.5 of 18 maximum). MFNS 200 μg bid and 400 μg bid decreased the average Day 1-21 total symptom score by 56% and 55%, respectively, compared with 50% for placebo (both $P < 0.03$). Over Days 1-21, both doses of MFNS relieved congestion better than placebo (both $P < 0.026$ vs placebo). MFNS 400 μg bid relieved both facial pain and purulent rhinorrhea better than placebo ($P < 0.033$). Both doses of MFNS also decreased the total symptom score better than placebo over Days 1-15 ($P < 0.05$), and MFNS 400 μg bid was better than placebo over Days 16-21 ($P < 0.05$). Therapy-related local adverse events were not significantly different between groups. Responses to cosyntropin stimulation gave no evidence of hypothalamic-pituitary-adrenal axis suppression.

Conclusions: Adjunctive MFNS 400 μg bid gave significantly better relief of acute sinusitis symptoms than antibiotics alone. MFNS at 200 μg bid was effective to a slightly lesser degree.

Poster 10

ADDED RELIEF IN TREATMENT OF ACUTE RECURRENT SINUSITIS WITH ADJUNCTIVE MOMETASONE FUROATE NASAL SPRAY

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Purpose: To test the hypothesis that adjunctive treatment with intranasal corticosteroid mometasone furoate nasal spray (MFNS) can increase symptom relief of acute sinusitis during oral antibiotic therapy.

Methods: All patients were ≥ 12 y, had a history of recurrent sinusitis, and had their current episode of acute sinusitis diagnosed by symptomatology and confirmed by computed tomography scan. Symptom severity was scored (0-3 scale) for congestion, facial pain, headache, postnasal drip, purulent rhinorrhea, and cough. Patients were randomized to receive MFNS 400 mg twice daily (bid) (n = 200) or placebo (n = 207) in addition to treatment with amoxicillin clavulanate potassium (875 mg bid) for 21 d in a double-blind trial. Symptom scores for headache, facial pain, congestion, purulent rhinorrhea, postnasal drip, and cough were recorded twice daily by the patient at baseline and throughout treatment. Individual scores and total score were averaged over Days 1-15, 16-21, and 1-21 of treatment.

Results: Averaged over Days 1-15, 16-21, or 1-21, adjunctive treatment with MFNS significantly reduced the total symptom score ($P < 0.01$) and scores of individual inflammatory symptoms associated with swelling/obstruction (congestion, facial pain, and headache) compared with placebo. Symptoms associated with secretory processes improved to a lesser degree. Therapy-related local adverse events were not significantly different between groups.

Conclusion: The addition of intranasal corticosteroid, MFNS 400 μg bid to antibiotics significantly reduced symptoms of acute sinusitis compared with antibiotic treatment alone.

Poster 11

REDUCTION OF INFLAMMATION OF ACUTE SINUSITIS BY ADJUNCTIVE TREATMENT WITH MOMETASONE FUROATE NASAL SPRAY ASSESSED BY COMPUTED TOMOGRAPHY

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Purpose: To compare reduction of radiographic evidence of sinusitis inflammation by amoxicillin clavulanate potassium 875 mg twice daily (bid) alone (n = 207) with adjunctive mometasone furoate nasal spray (MFNS 400 μg bid, *n* = 200).

Methods: All patients showed evidence of sinusitis in baseline computed tomography (CT) imaging. CT images were repeated after 21 d of treatment, blinded to timing and treatment, and reread by an independent radiologist (S.J.Z.), who scored 10 structures for signs of sinusitis. Frontal recess, middle meatus, and infundibulum were rated as: 0 = patent, 1 = obstructed; agger nasi cell, ethmoid bulla, and sinus lateralis were scored as: 0 = nonopacified, 1 = opacified; and frontal, maxillary, posterior ethmoid, and sphenoid sinuses were scored as: 0 = opacification < 25%, 1 = opacification ≥ 25%. Maximal total score was 10.

Results: Day 21 total score of 49% of MFNS patients was reduced to 0, while only 30% of placebo patients reached 0. Mean change in total score was -1.8 for MFNS patients vs. -1.1 for placebo patients (Wilcoxon *P* = 0.09). Infundibulum and middle meatus became patent in 28% and 26% of MFNS patients, respectively, compared with only 16% and 21% of placebo patients. Sinus lateralis became nonopacified in 26% of MFNS patients, but only 17% of placebo patients. Local radiologists noted normal CT sinus images in 17% of MFNS patients vs. 14% of placebo patients at Day 21.

Conclusions: Radiologic evidence of underlying inflammation associated with acute sinusitis may persist beyond symptom resolution. Greater radiologic improvements occurred with the use of adjunctive MFNS.

Poster 12

ALLERGIC FUNGAL SINUSITIS: ENDOSCOPIC SINUS SURGERY AND ENDOSCOPIC STAGING

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Purpose: The purpose of this study was to assess the results of endoscopic sinus surgery (ESS) in allergic fungal sinusitis (AFS) using endoscopic staging proposed by Kupferberg.

Methods: Thirteen patients with AFS were identified in a group of 32 fungal sinusitis patients (7 females, 6 males; age = 18-60 y). ESS was performed in these patients to remove polyps and fungal debris. Endoscopic findings were graded according to the following staging: stage 0, no evidence of disease; stage I, edematous mucosa and allergic mucin; stage II, polypoid mucosa and allergic mucin; and stage III, polyps and fungal debris.

Results: In 7 patients, cytologic examination revealed the presence of hyphae; 11 patients presented sheets of eosinophils. Fungal culture was positive in 12 patients; *Aspergillus* was identified in 7 patients, *Alternaria* sp in 1; *Candida* sp in 1, *Fusarium* in 1, *Trichoderma* in 1, and *Schizofilum* sp in 1. All patients received postoperative systemic steroids for 3 mo; topical intranasal sprays were used for maintenance. Nine patients received additional systemic steroids in the recurrence period and 3 received oral antifungals. In terms of endoscopic staging, 4 patients were classified as stage 0; 4 patients as stage I; 3 as stage II; and 2 patients as stage III.

Conclusion: ESS must be considered as part of the AFS treatment. The endoscopic staging is useful in the evaluation of the outcome and detection of recurrences.

Poster 13

HOW I DO IT: ENDOSCOPIC INFERIOR MEATAL ANTROSTOMY FOR POSTOPERATIVE MAXILLARY SINUS MUCOCELE BY MICRODEBRIDER

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Purpose: Postoperative maxillary sinus mucocele (PMSM) is an expansive, cystic, and destructive lesion associated with natural ostium obstruction of the maxillary sinus that occurs after the Caldwell-Luc operation. Surgical therapy is usually indicated. Postoperative cystic, fibrotic, or sclerotic bony change of the sinuses challenges revised surgery. In addition, concomitant revised surgery for underlying recurrent sinusitis is usually needed. Powered endoscopic sinus surgery (PESS) by soft-tissue blade and inferior meatal antrostomy by burr in 1 system appears to be advantageous. Since 1998, I have managed 4 cases of PMSM by this method.

Methods: All cases of the PMSM had the Caldwell-Luc operation (average, 11 y previously). The patients had cheek swelling, exophthalmos (1 case), and nasal polyposis. PESS was performed by soft-tissue blade for sinusitis followed by inferior meatal antrostomy by burr for PMSM, mainly with local anesthesia and sedation. Exposing the inferior meatus by pushing the inferior turbinate medially, the burr gradually followed the least resistant pathway to achieve antrostomy along the sclerotic medial maxillary wall. Real-time irrigation, suction, drilling, and precise tissue removal were accomplished smoothly.

Results: All patients had relief of the cheek swelling and were dismissed soon after the procedure. All patients showed symptom relief at 3-mo follow-up.

Conclusions: Antral mucocele occurs infrequently except as PMSM, a complication of Caldwell-Luc operation. PESS by soft-tissue blade and burr is probably an ideal operative choice for PMSM.

Poster 14

MUCUS CIRCULATION BETWEEN THE NATURAL AND ACCESSORY OSTIA OF THE MAXILLARY SINUS

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Purpose: Endoscopic findings and computed tomography (CT) findings of the mucus circulation between the natural and accessory ostia of the maxillary sinus in the middle meatus or through the maxillary sinus have been reported. We report the clinical and CT findings of 10 patients with the recirculation phenomenon.

Methods: Ten patients who had recirculation findings from their CT were entered into our study. Seven were male and 3 were female. The ages ranged from 25 to 55 y, with an average of 46.7 y.

Results: The most common chief complaint was the sense of postnasal discharge in 5 patients. These findings were in 2 patients who had no nasal symptoms. Four kinds of CT findings were noted.

Conclusions: The mucus circulation between the natural and the accessory openings of the maxillary sinus is a cause of chronic maxillary sinusitis. Endoscopic findings and CT findings are important for diagnosis.

Poster 15

THE DIAGNOSIS AND TREATMENT OF ISOLATED SPHENOID SINUS DISEASES

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Purpose: Isolated sphenoid sinus disease (ISSD) is uncommon. The present study reviewed retrospectively 138 patients with ISSD treated at Shanghai Medical College (122 cases) and Hyogo College of Medicine (16 cases) and at their satellite hospitals over 25 years.

Methods: Diagnosis was made on the basis of signs, nasal endoscopy, and computed tomography (CT) and magnetic resonance imaging (MRI). The final diagnosis of ISSD was established after histopathologic and microbiologic examinations of the excisional specimen.

Results: The pathologic diagnoses were sphenoid sinusitis, cysts, fungal diseases, inverted papilloma, polyp, foreign body, malignant tumors, etc. The first and second most common symptoms were headache and vision changes. Fourteen patients with ISSD and headaches first consulted the Department of Neurosurgery, and 17 patients with ISSD and vision disturbances first consulted the Department of Ophthalmology. After the introduction of imaging techniques with CT and MRI and diagnostic nasal endoscopy, the numbers of early ISSD increased.

Conclusions: CT, MRI, and nasal endoscopic ostial sphenoidotomy are useful for making a precise pathologic diagnosis and for safe and immediate treatment, especially for benign cases, before the sequential extension to adjacent vital structures.

Poster 16

MAXILLARY SINUSITIS OF DENTAL ORIGIN IN JAPAN

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Purpose: Maxillary sinusitis of dental origin is not uncommon, but the details of this disease are not known well. The purpose of this study is to demonstrate the clinical features of this disease on the basis of our experienced cases.
Methods: Rhinologists and dentists saw 55 patients with maxillary sinusitis of dental origin simultaneously in ENT Clinic of Kyorin University Hospital and investigated the incidence, age distribution, sexual difference, symptoms, affected sides, causative teeth, shapes of maxillary sinus base, and past history of dental treatment.
Results: Maxillary sinusitis of dental origin occupied 43.3% of unilateral maxillary sinusitis. There was no particular age distribution up to the 7th generation and no sexual difference. The most prominent symptom was nasal discharge with odor. There was no dominant affected side. The 1st and 2nd molars played important roles as causative teeth.
The most interesting finding was the fact that the Causative teeth had been treated by dentists in 36 of 55 cases, but only 4 (9%) of 46 cases had proper root canal treatment, treatment of dental caries.
Conclusion: The incidence of this disease in unilateral maxillary sinusitis seems to be very high in Japan. This high incidence is probably due to improper treatment of dental caries. This disease may be iatrogenic in some cases.

Poster 17

TRANSTREPHINATION ENDOSCOPIC SINUS SURGERY OF LATERAL FRONTAL MUCOCELE: REPORT OF A CASE

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Purpose: An approach is presented to treat frontal mucoceles without involvement of the ostiomeatal complex (OMC).

Methods: A 38-y-old man presented with diplopia and downward orbital displacement of 4-mo duration. Computed tomography (CT) scan revealed a left-sided frontal mucocele localized to lateral portion of left frontal sinus not associated with pathology at OMC and medial portion of sinus. The patient underwent endoscopic sinus surgery extranasally. After introducing a 30° 4-mm endoscope through the trocar into the medial side of the frontal sinus, the laterally seated mucocele was exposed. Then the medial wall of the mucocele was removed by forceps introduced through another trocar.

Result: At follow-up visit both clinical and CT findings showed complete resolution of mucocele; diplopia and orbital downward displacement were improved.

Conclusion: Transtrephination endoscopic sinus surgery could be a minimally invasive treatment method for some frontal sinus mucoceles.

Poster 18

NASAL ENDOSCOPY EVALUATION OF THE NASOPHARYNX FREE SPACE AFTER RAPID MAXILLARY EXPANSION

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Purpose: The aim of this study was to evaluate, by nasal endoscopy, a possible nasopharynx free space alteration due to rapid maxillary expansion.

Method: Fiber nasal endoscopy was performed in 25 patients, aged 5 to 10 y, before and after undergoing rapid maxillary expansion. Nasopharynx images were recorded on a videocassette tape and then printed out on a Hitachi DY–170 printer. Tonsils and nasopharyngeal free space were traced on a transparency sheet and scanned into a monocromatic bmp format. These images were then submitted to a relative area calculation software using pixels as units.

Results: A significant statistical difference was observed among the images of the nasopharynx free space (Wilcoxon nonparametric test, P = 0.05) before and after rapid maxillary expansion ($P < 0.001$).

Conclusion: Nasopharynx free space increased in patients submitted to rapid maxillary expansion.

Poster 19

PARANASAL SINUS OSTEOMAS AND GARDNER SYNDROME

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Purpose: Although most osteomas asymptomatic, symptoms can include headaches, facial pain, rhinorrhea, and sinusitis. They occur most often in the fronto-ethmoid region (75% of time). Osteomas are also seen as part of Gardner syndrome. In affected individuals, the risk of developing colon cancer approaches 100%. Osteomas most commonly appear in the skull, mandible, maxilla, and paranasal sinuses. In some patients, the osteomas are detected 10 to 15 y before colon polyps appear. The aim of this study is to emphasize the work-up of patients with paranasal sinus osteomas in terms of early recognition and diagnosis of Gardner syndrome.

Methods: Patients (n = 3) with ethmoid osteomas and chronic sinusitis are presented. All patients required endoscopic sinus surgery with excision of osteomas.

Results: None of the patients had evidence of Gardner syndrome. If gastrointestinal (GI) symptoms or a positive family history is present, then further clinical evaluation needs to be performed, usually by sigmoidoscopy, colonoscopy, or barium enema examination. Gardner syndrome has been shown to be associated with mutations of the adenomatous polyposis gene (APC) on the long arm of chromosome 5. Identification of the APC gene mutation can be used to diagnose patients with Gardner syndrome.

Conclusion: Otolaryngologists should be aware of the possibility of Gardner syndrome in patients with paranasal sinus osteomas. Patients should be questioned about GI symptoms and a family history of colon polyps or cancer. Patients thought to have Gardner syndrome should have a complete work-up.

Poster 20

ONODI CELL IN ADULT THAI CADAVERS

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Purpose: To study 1) the prevalence of the Onodi cell in adult Thai cadavers, 2) the prevalence of an overriding ethmoid cell and its posterosuperior extensions in relation to the anterior sphenoid wall, and 3) the least thickness of bone between the optic nerve and the Onodi cell.

Methods: Sixty-five adult half-head embalmed cadavers were meticulously dissected. The Onodi cell was defined as a posterior ethmoid cell with an endoscopically identifiable bulging of the optic canal, even if it was minimal. The presence of the Onodi cell was assessed by consensus of 2 researchers using a 30∞ nasal endoscope. Cadavers with an Onodi cell were evaluated for the presence of an overriding ethmoid cell. Posterosuperior extensions of the overriding ethmoid cell were measured in relation to the anterior sphenoid wall. The least thickness of the bone between the optic nerve and the Onodi cell was measured in millimeters with a micrometer.

Results: The prevalence of the Onodi cell was 60%, and the overriding ethmoid cell was present in 37% of those with Onodi cells and in 22% of all specimens. The superior and posterior extensions of the overriding ethmoid cell in relation to the anterior sphenoidal wall were 5 to 15 mm (mean, 7.6 mm) and 4 to 16 mm (mean, 10.1 mm), respectively. The least thickness of bone between the optic nerve and the Onodi cell was 0.03 to 0.54 mm (average, 0.12 mm).

Conclusion: The prevalence of the Onodi cell in adult Thai cadavers was higher than the prevalence in studies from Western countries. Endoscopic sinus surgeons should be aware of these anatomic variations.

Poster 21

FUTURE OF COMPUTER-AUGMENTED ENDOSCOPIC SINUS SURGERY

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Purpose: To discuss the following questions regarding computer-augmented endoscopic sinus surgery (C-A ESS). Should we use intraoperative image guidance during ESS, even for the procedures done with minimal possible morbidity? Are the experienced surgeons not doing ESS with a reasonable amount of accuracy and safety even in high-risk areas like frontal recess, sphenoid sinus, and medial wall of the orbit? Will the less experienced residents perform C-A ESS with the same accuracy in these high-risk areas? Is C-A ESS a boon for surgeons who do not have good knowledge and experience of the related anatomy and disease process? Will C-A ESS become a routine procedure? Should there be some specific and absolute indications for C-A ESS? What are the basic advantages and disadvantages of C-A ESS? Can the patients in developing countries afford this technology?

Methods: The pertinent literature has been reviewed to answer these questions. The opinions of different schools of thought on the subject are critically discussed.

Results: Intraoperative image guidance is needed where visualization is difficult. It is not foreseen to be of increased benefit to procedures in which access and visualization are easy. C-A ESS assists the surgeon in cases of revision surgery with deformed structures and in removing the tumor thoroughly. Only real-time intraoperative image guidance provides image feedback that allows the surgeon to reliably assess the changes in the tissue. Few centers can afford this expensive facility.

Conclusions: This system is not a substitute for thorough understanding of the sinus region's anatomy.

Poster 22

RHINOTOMY-MEDIAL MAXILLECTOMY IN JUVENILE NASOPHARYNGEAL ANGIOFIBROMA

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Purpose: Juvenile nasopharyngeal angiofibroma (JNA) is a benign tumor of the nasopharynx composed of fibrous connective tissue and an abundance of endothelium-lined vascular space.

Methods: Eight patients with advanced lesions of JNA were managed surgically by using the rhinotomy-medial maxillectomy approach.

Results: Complete removal of the tumor was achieved in all patients. The most common complication related to this approach was nasal cavity crusting. Follow-up in 8 patients up to 43 mo revealed no incidence of tumor recurrence.

Conclusions: The main advantages of this approach are a) excellent exposure, b) en bloc removal of tumor, c) minimal bleeding, and d) cosmetically acceptable. The rhinotomy-medial maxillectomy approach seems to be excellent to remove high-stage JNA.

Poster 23

CLINICAL AND HISTOPATHOLOGIC COMPARISONS OF WEGENER GRANULOMATOSIS, T-CELL LYMPHOMA, SUBSTANCE ABUSE, AND FACTITIAL CAUSES

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Purpose: Because the clinical presentation of upper airway involvement can be quite similar in patients having several different clinical entities, it is not surprising to find some confusion regarding their diagnosis and management. We tried to distinguish these entities.

Methods: We used data from managing upper airway involvement in more than 500 patients with Wegener granulomatosis, 30 patients with nasal and nasopharyngeal angiocentric T-cell lymphomas, 10 patients with substance abuse lesions, and 3 patients with major factitial injuries of the upper airway. We present the different clinical manifestations of these patients, describe the precise histologic appearances, and review the pertinent laboratory procedures that further help distinguish these lesions.

Results: Patients who have Wegener granulomatosis with nasal involvement have diffuse disease involving the nose, nasopharynx, and paranasal sinuses. In contrast, patients with T-cell lymphoma lesions usually have localized, “explosive” ulceration involving the nose unilaterally, often with aggressive soft tissue and orbital involvement. Anti-neutrophil cytoplasmic antibodies (c-ANCA) test results are negative in patients with T-cell lymphomas, and the histologic findings are quite different (granulomas and vasculitis in Wegener granulomatosis; angiocentric lymphocytic proliferation in T-cell lymphomas). Patients with nasal ulceration due to substance abuse or factitial injury are the real challenge, because the histologic features are nonspecific, the behavioral history is often evasive, and often these patients are overtreated with immunotherapy, radiation therapy, or both.

Conclusion: The diagnosis of Wegener granulomatosis has been helped enormously by development and refinement of the c-ANCA test.

Poster 24

PSEUDOANEURYSM OF THE INTRACAVERNOUS INTERNAL CAROTID ARTERY CAUSING MASSIVE EPISTAXIS

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Purpose: Epistaxis is a frequent complication after head trauma. Although it is normally caused by mucosal laceration or lesion of a branch of the anterior ethmoid or sphenopalatine artery, in rare cases it can be due to trauma to the internal carotid artery, in the form of an aneurysm, pseudoaneurysm, or carotid-cavernous fistula. These cases are much more dramatic and require rapid intervention to prevent death.

Methods and Results: We present a case of a young man who developed massive epistaxis after head trauma. The bleeding was difficult to control, so angiography was performed. We found that the hemorrhage was caused by the rupture of a pseudoaneurysm of the intracavernous internal carotid artery. He was successfully treated with angiographic embolization, but an extensive cerebral ischemia with hemiplegia developed as a consequence of the procedure. Three months later, the patient presented with total recovery of the neurologic deficits.

Conclusion: The rupture of a pseudoaneurysm results in a dramatic situation, with profuse epistaxis. Because of that, and knowing that this bleeding can occur a long time after the trauma, it is important to have this diagnosis in mind, providing a quick intervention to stop the hemorrage. In spite of its complications, we still believe that angiographic embolization is the procedure of choice for these cases.

Poster 25

HOLMIUM:YAG LASER TO CONTROL EPISTAXIS IN PATIENTS WITH HEREDITARY HEMORRHAGIC TELANGIECTASIA

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Purpose: Recurrent epistaxis is the major presentation of patients with hereditary hemorrhagic telangiectasia (HHT). Traditional surgical treatments have been effective but not long lasting. There is increasing interest in the use of lasers in the management of these patients.

Methods: Holmium:YAG (Ho:YAG) laser was used in the treatment of 6 patients with HHT. The instrumentation and technique of surgery are described. The severity of epistaxis and outcome of treatment are judged according to classification by Rebeiz.

Results: Six patients required a total of 20 sessions of laser treatment. All procedures were performed under general anesthesia. Excellent control was obtained for small lesions, whereas a useful reduction in frequency and severity of epistaxis resulted in all cases.

Conclusion: We describe the first use of Ho:YAG laser in the treatment of HHT. We conclude that the 2.1 mm Ho:YAG is a useful wavelength for the management of chronic epistaxis in HHT.

Poster 26

TRANSNASAL SPHENOPALATINE ARTERY ELECTROCAUTERY FOR POSTERIOR EPISTAXIS

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Purpose: To evaluate the effects of sphenopalatine artery electrocautery for the treatment of recurrent posterior epistaxis.

Methods: Nine patients aged 32 to 85 y were enrolled in the study. There were 7 patients with hypertension, 2 with diabetes, 2 receiving irradiation for nasopharyngeal carcinoma, 1 with congestive heart failure, and 1 was a heavy drinker. Three patients needed blood transfusion for profound blood loss. The sphenopalatine artery electrocautery was performed transnasally with an endoscope. After identifying the sphenopalatine foramen through dissecting posteriorly the mucosa of the middle meatus 1 cm from the choana, the neurovascular bundle in the sphenopalatine foramen was cauterized.

Results: A minor epistaxis developed in 1 patient 2 mo after operation and the bleeding was controlled with medical treatment. The other patients had no recurrent epistaxis after operation. Thus, epistaxis was well controlled in all patients. The follow-up duration was 2 to 14 mo after operation, with a mean of 10 mo. There were no complications.

Conclusion: Transnasal sphenopalatine artery electrocautery is a simple, effective, and safe method for the treatment of posterior epistaxis.

Poster 27

AN ENDOSCOPIC STUDY OF THE INTRANASAL OSTIUM IN THE POSTOPERATIVE PERIOD OF AN EXTERNAL DACRYOCYSTORHINOSTOMY

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Purpose: The dacryocystorhinostomy (DCR) has been the choice of treatment in cases of chronic dacryocystitis for several decades. Although successful reports of this surgery have frequently been described in the literature, little is known with respect to the evolution and structural alterations that occur in the postoperative period, relating to the intranasal ostium. The purpose of this study is to verify changes in the intranasal ostium during surgical healing.

Methods: External DCRs were done on 24 patients with chronic dacryocystitis. Patients were examined on the 7th, 30th, and 60th postoperative days by use of nasal endoscopy with a telescope of 30°, carrying out vertical (V) and horizontal (H) measurement of the ostium with a millimetered L-shaped measure. The area was calculated using the formula for calculation of elliptic area.

Results: Structural alterations were found as follows. The ostium was oval-shaped in 20 patients, rounded in 4. Falling of nasal mucus flap occurred in 4 patients. Modification of the area of the ostium between the 30th and 60th day: increase in area, 4 patients; decrease in area, 13 patients; unaltered, 7 patients. Granulation tissue in the intranasal ostium, 16 patients. Total occlusion of the ostium by scar tissue, 0. Persistence of epiphora, 1 (presence of ostium with much reduced area).

Conclusions: In all patients, the final area of the intranasal ostium was less than the surgical opening. Systematic endoscopy of the evolution of the intranasal ostium permitted an objective postoperative control, making it possible to determine the probable causes that trigger relapses.

Poster 28

THE EFFECTS OF ENDOSCOPIC SINUS SURGERY ON THE NASAL CYCLE AS ASSESSED BY ACOUSTIC RHINOMETRY

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Purpose: Previous studies have demonstrated that acoustic rhinometry has a considerable utility in measuring nasal patency and in detecting the nasal cycle. This study was performed in 10 patients with chronic rhinosinusitis who were submitted to endoscopic sinus surgery.

Methods: Acoustic rhinometry was used to determine minimum nasal cross-sectional area and volume as the indices of nasal patency in all patients on the day before the surgery and 3 months postoperatively.

Results and Conclusions: We did not find any significant alteration when comparing the pattern of the fluctuation, the periodicity, and the amplitude of the nasal cycle demonstrated by patients in the preoperative and postoperative periods, confirming that this surgery does not have any adverse effect on this physiological cycle.

Poster 29

NASAL POLYPS AND ACOUSTIC RHINOMETRY MEASUREMENTS

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Purpose: To find the most typical region for nasal polyposis development from the acoustic rhinometry (AR) curve.

Methods: Sixty-four patients with confirmed nasal polyposis (primary polyps, *n* = 31; polyps with aspirin-sensitive asthma, *n* = 14; polyps with non-aspirin asthma, *n* = 19) were included into the study. All patients had AR measurements. The results were compared with mean value of acoustic rhinometry of 25 healthy subjects and were analyzed by the method of the Z statistic.

Results: The highest negative (minus) values of Z statistic shows the most probable region of the appearance of nasal polyps. Our results suggest that although nasal polyps narrow the nasal cavity in almost its whole length, the most typical place for nasal polyposis development is situated between points 4.33 and 5.00 cm of the AR curves. Cross-sectional area has the lowest values at point 4.67 for all nasal polyp cases compared with healthy subjects.

Conclusion: The typical place for nasal polyp localization is between 4.33 and 5.00 cm of AR curves and cross-sectional area 4.67 cm.

Poster 30

THE AIRSTREAM IN THE INFLOW AREA IN NORMAL AND PATHOLOGIC NOSES

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Purpose: A sufficient knowledge of the correlation between morphology and respiratory function of the nose is the precondition for functional rhinosurgery. This was the motivation for fluid dynamic experiments in nasal models.

Methods: Transparent models were constructed by taking casts from patients' noses at the beginning of rhinosurgery operations. Water was run through the models. Flow was visualized with the help of traces of dye injected into the water. Stream lines and turbulence behavior were observed.

Results: In a normal nose the vestibule is shaped and acts like a bend and a nozzle. The inspired air is redirected into the region of turbinates, and laminar flow behavior is stabilized. The concave shape of the internal ostium facilitates distribution of the airstream throughout the entire region of turbinates. Because of its increase in cross-sectional area, the anterior cavum has the effect of a diffuser, increasing turbulence and decreasing flow velocity. These are important prerequisites for a sufficient contact of all streaming particles with the mucosa. In a nose with tip ptosis, stream lines run through the superior part of the nasal cavity, bypassing the inferior nasal meatus. Abnormal flow patterns in a saddle nose are characterized by stream lines running through the inferior part of the nasal cavum, while a slow backward motion is found in the upper parts of the nasal cavity. In unilateral cleft-lip nasal deformity, the flow is redirected in the upper cavum, and the onset of turbulence is disturbed.

Conclusions: The inflow area is located within the external nose. Therefore, structural abnormalities of the external nose cause impairments of flow in the functional area of turbinates.

Poster 31

MIDCYCLE REST AND NASAL PHYSIOLOGY

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The well-known function of the nose is cleansing of air before it enters into the lungs physiologically. Past studies have shown that our nasal function displays several forms (ie, normal, increase, irregular, suppression, flat top, others) and specific midcycle rest (MCR). MCR is important to functions that the nose subserves and that have much clinical significance. We have an experience of apnea, as we call MCR during nasal respiration in daily normal life. This review is on the MCR of the respiratory function on normal subjects and patients who have bilateral maxillary sinusitis. Thus far, no paper explores or analyzes the causes and mechanism of MCR and disturbance of O_2 and CO_2 were observed in maxillary sinusitis. These results document an effect on nasal respiration but do not provide insight into the fundamental physiology.

Poster 32

THE EFFECTS OF FREQUENT ANTRAL IRRIGATION IN CHRONIC SINUSITIS OF CHILDREN

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Purpose: In chronic paranasal sinusitis of children, the nasal symptoms usually develop at age 2 or 3 y and worsen at age 4 to 8 y and then either improve or become chronic. Chronic paranasal sinusitis in children is characterized by more severe disease than in adult patients, and children often have complicating disorders in the ear and lower respiratory tract, but treatment is limited. We used the SinoJect (Atos Medical AB, Hörby, Sweden) as well as medical treatments as conservative treatment for chronic paranasal sinusitis of children and analyzed the effects.

Methods: We injected SinoJect into the maxillary sinus and frequently irrigated with hypertonic saline until discharge was clean in 76 cases, and we evaluated the effects of the procedure with pre- and postoperative comparisons of radiographic and symptomatic changes.

Results: Radiographic findings showed significant improvement ($P < 0.01$) and symptoms also improved.

Conclusions: Frequent maxillary irrigation therapy is effective as determined by radiographic evaluation of pre- and postoperative states ($P < 0.01$). The ethmoid shadow is also improved radiographically after frequent maxillary irrigation. We suggest that frequent antral irrigation using SinoJect is endurable and can be a comfortable method to use at home, so it can be a useful therapeutic modality for chronic pediatric sinusitis.

Poster 33

MICROBIOLOGIC STUDY OF CHRONIC SINUSITIS IN CHILDREN

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Purpose: The microbiology of chronic sinusitis in children can be anticipated according to the patient's age, clinical presentation, and immunologic state. In the acute stage, viral upper respiratory tract infections frequently precede bacterial superinfection by *Streptococcus pneumoniae, Haemophilus influenzae*, and *Moraxella catarrhalis*. In contrast to acute sinusitis, β-hemolytic Streptococcus, coagulase-negative Staphylococcus, and *Staphylococcus aureus* are common in chronic sinusitis, which may be caused by exacerbations of infection with the bacterial species that cause acute disease. The use of empiric antibiotics directed at the most offending organism is usually appropriate and effective in clinical situations, but the increasing occurrence of antibiotic resistance has increased the failure rate.

Methods: In this prospective study, 50 patients with the diagnosis of chronic sinusitis were evaluated microbiologically by Sinoject (Atos, Sweden)-guided aspiration.

Results: We cultured β-hemolytic Streptococcus in 14 patients, coagulase-negative Staphylococcus in 4, *Staphylococcus aureus* in 3, gram-positive bacilli in 2, and *Streptococcus pneumoniae* in 1. The results of polymerase chain reaction for *Hemophilus influenzae, Streptococcus pneumoniae*, and *Moraxella catarrhalis* were 32%, 20%, and 10%, respectively, and it showed higher detection rates than conventional culture test.

Conclusions: We advise that all bacterial isolates of cultures of chronic sinusitis in children undergo the appropriate typing and antibiotic sensitivities so that the appropriate antibiotic treatment can be used.

Poster 34

TREATING STENOTROPHOMONAS MALTOPHILIA CHRONIC SINUSITIS WITH INTRAVENOUS ANTIBIOTICS

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Purpose: *Stenotrophomonas maltophilia* is a nonfermentive, gram-negative rod whose importance in clinical infections has increased over the last decade. S maltophilia can behave as a true pathogen. Initially thought to be only a nosocomial pathogen, it has now been described in community-acquired infections. Risk factors for S *maltophilia* infections include prior antibiotic therapy, presence of central venous catheter, neutropenia or cytotoxic chemotherapy, prolonged hospitalization, admission to intensive care unit, mechanical ventilating or tracheotomy, underlying disease, malignancies, corticosteroid therapy, exposure to patients with *S maltophilia* wound infections, and transportation to the hospital by airplane. Clinical syndromes associated with *S maltophilia* include bacteremia, endocarditis, and infections of the respiratory tract, central nervous system, eyes, urinary tract, skin and soft tissue, bones and joints, and gastrointestinal tract.

Cases: *S maltophilia*-associated chronic sinusitis was diagnosed in 4 patients (3 adults, 1 child). All had previous surgeries secondary to sinusitis. Cultures were obtained endoscopically by ear, nose, and throat physicians. At the time cultures were obtained, all patients had clinical and radiographic evidence of sinusitis and had been on prolonged oral antibiotic therapy with ciprofloxacin.

Conclusions: Optimal therapy for *S maltophilia*-associated infection is difficult because current methods of in vitro susceptibility testing show tremendous variation. Each patient was treated with combination intravenous therapy in which ticarcillin/clavulanic acid was used in conjunction with a secondary agent (trimethoprim/sulfamethoxazole or cefepime). Each patient received antibiotics intravenously for 6 to 8 wk. Each patient showed clinical and radiographic improvement of sinusitis. Posttherapy cultures showed no growth.

Poster 35

LONG-TERM RESULTS OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY ON SYMPTOMS OF CHRONIC RHINOSINUSITIS

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Purpose: The preferred method of treatment of chronic rhinosinusitis (CRS) is functional endoscopic sinus surgery (FESS). The aim of this study was to evaluate long-term results of FESS on patients' CRS-related symptoms.

Methods: Two hundred of 1,087 patients treated with FESS for CRS in our department during the last 3 y were included in this prospective series. These patients rated CRS-related complaints (nasal obstruction, postnasal drip, headache, hyposmia, dry upper respiratory tract syndrome [DURTS], asthmatic complaints, reduced quality of life) pre- and postoperatively in questionnaires, using ranking scales from 0 (no complaints) to 4 (intolerable complaints). Statistical analysis was performed with Wilcoxon test.

Results: Most common symptoms were nasal obstruction (91.8%) and postnasal drip (84.5%) preoperatively. The quality of life was restricted by CRS in 94.9% (intolerable/severe symptoms in 79.4%). After a mean postoperative follow-up of 26 mo, nasal obstruction remained improved in 95.5% ($P < 0.001$), postnasal drip in 82.9% ($P < 0.001$), headache in 80.1% ($P < 0.001$), hyposmia in 63.6% (not significant), DURTS in 63.2% ($P < 0.001$), and asthmatic complaints in 51.4%. Quality of life was improved in 88.7%, remained unchanged in 9.3%, and worsened in 2.0% postoperatively.

Conclusions: FESS is highly effective on CRS-related symptoms. Our results add further support that FESS is the treatment of choice for CRS, achieving long-term improvements in the majority of patients with CRS.

Poster 36

OLFACTION IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Purpose: In Austria, about 0.08% of the entire population suffers from primary hyperparathyroidism (PHPT). So together with diabetes mellitus and diseases of the thyroid gland, PHPT is one of the most common endocrine diseases. All of these patients have 1 or more adenomas of the parathyroid glands. Laboratory blood tests typically find a hypercalcemia and an elevated level of parathyroid hormone.

Methods: From April 2000 on we tested 40 patients for their ability to smell and taste. Psychophysical testing of olfactory function was performed by means of the "Sniffin' Sticks." The taste solutions we used were prepared in 8 dilutions in 50% steps starting from 300 mg/mL for sucrose, 60 mg/mL citric acid, 80 mg/mL sodium chloride, and 20 mg/mL caffeine. As the dendritic release of fast neurotransmitters relies on N and P/Q-type calcium channels and the magnitude of dendrodendritic transmission is directly proportional to dendritic calcium influx, we were interested whether the elevated calcium in the serum would change the olfactory acuity.

Results: There were no changes regarding the sense of smell, but the sense of taste was impaired. We found a significant elevation of the thresholds for salty and bitter stimuli.

Conclusion: The role of calcium is still not completely understood, but there seems to be evidence that the concentration of the extracellular calcium can influence taste perception, but olfactory perception remains, at least by the tools of psychophysiologic testing, unaffected.

Poster 37

THE RELATIONSHIP BETWEEN OLFACTORY ACUITY AND CHRONIC SINUSITIS

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Purpose: Nasal and sinus disease is among the most common causes of loss of olfaction. Contrary to sensorineural loss, a loss secondary to nasal and sinus disease is thought to be conductive, which means the odorant cannot reach the olfactory epithelium to stimulate the appropriate receptors. Nevertheless, it has been shown that patients suffering from abnormalities of the osteomeatal complex may have olfactory disorders but do not complain about nasal obstruction. Whereas no effective therapies for sensorineural loss have been found yet, inflammatory or obstructive abnormalities in the nose impeding olfactory transport should certainly be amenable to further treatment.

Methods: Twenty consecutive patients suffering from chronic sinusitis and olfactory disturbances were evaluated before and after surgical treatment. Olfactory function testing was performed by means of a psychophysiologic examination (using Sniffin'-Sticks).

Results: All patients reported a gradual onset of hyposmia (which was revealed in 18 patients; only 2 were completely anosmic). Patients were tested 3 to 6 wk after surgery. Complete recovery of olfactory function (age- and sex-adjusted data) was observed in 75% of our sample. In the performance of the olfactory function test, 15% improved, although subjectively they did not recognize a change in daily life. Finally, 2 patients failed to show any improvement after surgery. No prognostic factor was detected to predict the effect of surgery on olfaction.

Conclusion: We suggest olfactory function testing should be performed before nasal surgery.

Poster 38

EFFECT OF WEB 2170 BS, PLATELET-ACTIVATING FACTOR RECEPTOR INHIBITOR IN THE RABBIT MODEL OF NASAL INFLAMMATION

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Purpose: Platelet-activating factor (PAF), a potent inflammatory mediator, is a biologically active phospholipid. PAF may play an important role in the pathogenesis of inflammation. WEB 2170 BS has been shown to be a PAF antagonist both in vitro and in vivo. In this study, anti-inflammatory effects of WEB 2170 BS were investigated in a rabbit model of sinusitis induced by the maxillary sinus inoculation of killed Staphylococcus aureus after mechanical occlusion of each animal's anatomic ostium.

Methods: Either WEB 2170 BS solution or placebo was administered intraperitoneally 2 h before sinus inoculation and was repeated twice daily for 4 d. Outcome of treatment was determined by measurement of myeloperoxidase activity in the samples of sinus mucosa and by histopathologic evaluation.

Results: Myeloperoxidase activity in the WEB 2170 BS-treated group was found to be significantly lower than that in the control group. Histopathology of nasal mucosa indicated decreased inflammation in the treated group compared with the controls.

Conclusion: These results demonstrate that WEB 2170 BS can produce significant anti-inflammatory effects in this model of sinusitis.

Poster 39

PERMANENT VISION LOSS AFTER ACUTE SINUSITIS

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Purpose: With improved diagnostic methods, new antibiotics, and new surgical techniques, the management of acute sinusitis is easier and complications occur less frequently. However, orbital complications still occur in many cases, demanding quick and effective intervention to prevent permanent damage. We present the case of a young man, without correlated disease, who came to us with acute sinusitis and vision loss.

Methods and Results: In spite of immediate surgical drainage and intravenous antibiotics, the patient did not recover his vision.

Conclusions: Vision loss in the presence of acute sinusitis is a rhinologic emergency. The decision to use a surgical approach must be prompt to avoid permanent amaurosis. Computed tomography is not totally reliable in determining the difference between an orbital abscess and cellulitis. Therefore, any change in vision status, or worsening of orbital symptoms, indicates the need for immediate surgical drainage.

Poster 40

PREVALENCES OF THE ASSOCIATED DISEASES IN KOREAN PATIENTS WITH SLEEP-DISORDERED BREATHING

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Purpose: Many reports have been written on the associations between sleep-disordered breathing (SDB) and systemic diseases such as hypertension, ischemic heart disease, and cerebrovascular disease. The aim of this study was to evaluate and analyze the prevalences in Korean patients of diseases associated with SDB diagnosed by polysomnography.

Methods: The subjects were 462 Korean patients (395 men and 67 women, aged 20 to 75 y) who complained of snoring and sleep apnea and who had polysomnography performed. Their medical records were reviewed retrospectively. The prevalences of associated diseases were surveyed according to severity of the respiratory disturbance index (RDI) and minimal O2 saturation (Min. SaO2).

Results: The prevalences of hypertension, ischemic heart disease, arrhythmia, diabetes, endocrine disease without diabetes, cerebrovascular disease, and chronic pulmonary disease in patients with SDB were 31.2%, 9.5%, 3.7%, 8.2%, 3.9%, 6.1%, and 5.2%, respectively. The prevalences of hypertension and ischemic heart disease were correlated with severity of RDI but other associated diseases showed no correlation with RDI. In patients with severe SDB (RDI > 40), prevalence of hypertension was 53.8% and prevalence of ischemic heart disease was 20.4%.

Conclusion: Systemic hypertension and ischemic heart disease were common in Korean patients with SDB. Therefore, otolaryngologists should include evaluation of cardiovascular diseases in the management of patients with SDB.

Poster 41

POSTADENOIDECTOMY INFLAMMATORY PSEUDOTUMOR

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Purpose: The nasopharynx in children is the site of masses, both malignant and benign. Hypertrophied adenoids is considered the leading cause of benign tumor of the nasopharynx.

Methods: Multiple postadenoidectomy complications have been alluded to in the literature. Among these are bleeding, nasopharyngeal stenosis, torticollis, and C1-C2 subluxation. The appearance of nasopharyngeal mass postadenoidectomy presents a real challenge to the otolaryngolologist. The differential diagnosis of such a condition varies depending on the clinical, radiologic, and pathologic parameters.

Results: In our case, the diagnosis of a postadenoidectomy inflammatory pseudotumor was confirmed radiologically as well as by histopathologic evaluation. Although benign and rare, inflammatory pseudotumor in the head and neck area has been reported in the nasal sinuses, oral cavity, larynx, cervical column, and central nervous system.

Conclusion: With an unknown etiology, management of such a condition has been subject to considerable debate. Being the first case to be reported in the literature, following an adenoidectomy, we will elaborate on our experience in diagnosing and managing this entity in the nasopharynx.

Poster 42

THE DIFFERENCE BETWEEN SERUM ECP AND BLOOD PLASMA ECP

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Purpose: The eosinophil cationic protein (ECP) is one of the granule proteins of the eosinophil. The value of the serum ECP seems to reflect well the disease states of asthma and nasal allergy. However, ECP does not exist in the blood shed. It is detected in the serum of the blood preserved in the test tube with coagulation accelerant for 1 h. The reason for the difference between serum ECP value and blood plasma ECP value should be examined.

Methods: Blood was collected in 3 different test tubes containing blood coagulation accelerant, anticoagulant, and additive-free. One hour after blood collection, the blood was centrifuged and ECP was measured in serum and blood plasma. The cruor was collected from the test tubes with blood coagulation accelerant and additive-free. Buffy coat was from the test tube with anticoagulant. The eosinophils in cruor and buffy coat were observed by electron microscopy.

Results: The highest ECP value was detected in serum with blood coagulation accelerant, the lowest ECP value was in blood plasma, and the middle value was in the additive-free serum. The eosinophils in buffy coat had intact plasma membrane. The eosinophils in cruor frequently showed destroyed plasma membrane. The rate of plasma membrane destruction was higher in cruor with blood coagulation accelerant than additive-free.

Conclusion: ECP in serum was released from destroyed eosinophils in test tube after the blood collection.

Poster 43

NECESSITY OF COMPUTED TOMOGRAPHY IN THE EVALUATION OF PATIENTS WITH OLFACTORY DISORDER

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Purpose: Impairment of the sense of smell can arise from nasal obstruction or neurologic damage to the olfactory system. Nasal and sinus disease are among the most common causes of olfactory loss, accounting for 15% to 27% of patients presenting to taste and smell centers. However, many authors suggest categorically a computed tomography (CT) with coronal views of the sinuses and the olfactory cleft as first step in the evaluation process of smell disorders.

Methods: We studied 138 consecutive patients suffering from chemosensory disorders. The routine evaluation of their disorder included a standardized history on nasal symptoms, anterior rhinoscopy, nasal endoscopy, chemosensory testing ("Sniffin' Sticks"), and a coronal CT scan of the nasal sinuses.

Results: In 101 patients, CT scans showed no pathologic changes. In 17 cases, there was no concordance with suggested cause of the olfactory loss due to the clinical evaluation. Five patients showed unexpected obstruction of the olfactory cleft (eg, patients with head trauma) and 12 cases that were highly suggestive of chronic sinus disease did not show an obstructed olfactory cleft. However, a strongly suggestive history, anterior rhinoscopy, and nasal endoscopy were able to detect the causes of the olfactory disorders in about 85% correctly.

Conclusion: Therefore, a CT scan of the nose and paranasal sinuses, being the most definitive way to rule out a conductive etiology, may not be necessary in cases clearly related to sinus symptoms but should be performed in all other cases.

Poster 44

SPHENOCHOANAL POLYPS: REPORT OF FOUR CASES

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Purpose: Choanal polyps (CPs) generally originate from the maxillary sinus mucosa and are called antrochoanal polyps. Less frequently, CPs originate from the mucosa of other structures of the nose and paranasal sinuses. The purpose of this study is to present 4 cases of CPs originating from the sphenoid sinus (sphenochoanal polyp [SCP]).

Methods: A retrospective analysis of 4 consecutive patients with SCP was performed. All patients were treated surgically between 05/96 and 03/00.

Results: Three patients were female and one was male, with ages ranging from 10 to 53 y. In all cases diagnosis was made from nasal endoscopy associated with computed tomographic scans of paranasal sinuses. One patient was referred after a previous surgery with the Caldwell-Luc technique. All 4 patients had endoscopic sinus surgery and have been followed-up with no signs of recurrence.

Conclusion: In our experience, SCPs should be treated with an endoscopic approach, which allows a total removal of the polyp and its origin from the sphenoid sinus with a minimal disruption of the anatomy and physiology of this region.

Poster 45

NEW THEORY ON POLLINOSIS FROM AIRBORNE TREE POLLENS

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Purpose: Over a period of 1 year in Beijing, we investigated all airborne tree pollens.

Method: The study used electron microscopy (EM).

Results: The projections from the pollen bodies could be classified as granular, crest, biting, long-needle, sharp-needle, villous or hooked types or club or cudgel. Pollen grains with a needle form (long superficial and solid, thick or columnar interiors) seem to be more likely to invade the nasal mucous membrane. The disadvantage to nasal mucous membrane fall sick nasal symptoms such as allergy, sneezing, nasal obstruction. For these reasons, we postulate that pollinosis is caused by morphologic characteristics of pollen grains. Furthermore, we measured nitric oxide (NO) in the nasal cavity of Cedar allergen experimental model rats. Accordingly, we made a study on the significance of NO as air pollution and Cedar pollinosis.

Conclusion: From the EM analysis of pollen grains and NO study, the authors have proposed a new theory of grass pollinosis.

Poster 46

CYTOKINE EXPRESSION IN ALLERGIC VERSUS NONALLERGIC EOSINOPHILIC NASAL POLYPS

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Purpose: The purpose of our study was to examine the relationship between cytokine expression and tissue eosinophilia in chronic hyperplastic sinusitis with nasal polyposis and to compare the cytokine profile of patients with allergy versus patients without allergy.

Methods: Nasal polyp tissue samples from 20 patients and nasal turbinate biopsy specimens from 12 controls were examined for the expression of interleukin (IL)-1b, IL-6, and IL-10 cytokine messenger RNA species. The amount of specific mRNA was detected with a colorimetric microplate assay. Densitometric levels of mRNA were compared between patients and controls and between the allergic and nonallergic subgroup using the Mann-Whitney test.

Results: Tissue eosinophilia was detected in 17 patients; 8 of these had positive allergy skin test results. Patients with both allergic and nonallergic eosinophilic nasal polyps, as compared with controls, had significantly higher IL-1b mRNA expression and significantly decreased IL-10 mRNA expression. There was no difference in IL-6 mRNA expression between these groups. The allergic and nonallergic subgroups did not differ from each other in terms of IL-1b, IL-10, or IL-6 mRNA expression.

Conclusions: Tissue eosinophilia is a prominent feature of allergic and nonallergic chronic sinusitis. This process seems to be under the control of local cytokine production. Cytokine expression profile suggests a dysregulation of pro- and anti-inflammatory cytokines in eosinophilic nasal polyps. These mechanisms are likely to exist in both allergic and nonallergic chronic sinusitis.

Poster 47

THE INFLUENCE OF FUNGI ON THE GROWTH AND DEVELOPMENT OF NASAL POLYPS

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Purpose: The etiology and pathogenesis of nasal polyps are not clear yet. The main aim in this research was investigation of fungal microflora influence on growth and development of nasal polyps.

Methods: We examined 30 patients with nasal polyps. The complex examination includes endoscopic investigation of nasal cavity, microbiological investigation, and study of antitryptic activity in polyp tissue. The control group for this test was mucosal tissue from inferior turbinate of patients with hypertrophic rhinitis (10 patients).

Results: In 50% we revealed fungi in the nasal cavity and in 100% in polyp tissue. If we observed fungi in the nasal cavity, no other bacterial microflora were found. Antitryptic activity in the control group was 0. In polyp tissue from long-term patients, 9.71 ± 0.40 U on 1 g of protein was found and 2.68 ± 0.20 U on 1 g of protein from new patients.

Conclusions: We revealed an important role of fungi in development of polyps in nasal cavity. Fungi produced a high level of trypsinlike substances, which break collagen and influence the normal reparative process in tissue.

Poster 48

CHANGES OF SUPEROXIDE FREE RADICAL AND ANTIOXIDANT ENZYMES AFTER STEROID THERAPY IN ALLERGIC RHINITIS

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Purpose: The purpose of this study was to reveal the steroid effect on the generation of oxygen free radicals and to examine the activities of various antioxidant enzymes in human allergic rhinitis after topical and systemic steroid therapy.

Methods: Forty patients who received partial mucosa resection of inferior turbinate under preoperative consents were classified into 4 groups: 10 patients, no medication (group I); 10 patients, oral steroid medication (group II); 10 patients, oral steroid with intranasal topical steroid (group III); 10 patients, no allergy as control (group IV). We measured the generation of oxygen free radical and activities of superoxide dismutase (SOD), reduced glutathione-superoxide (GHS-Px), and catalase and compared these among the groups.

Results: The generation of oxygen free radicals was low in groups II, III, and IV compared with group I. Group IV showed the lowest level in the generation of oxygen free radicals. The activities of SOD, GSH-Px, and catalase, which are specific scavengers of oxygen free radicals, increased significantly in groups III and IV ($P < 0.05$).

Conclusions: The results suggest that oxygen free radicals play an important role in the formation of allergic rhinitis, and the mechanism of the intranasal, topical, and peroral steroid in treatment of allergic rhinitis may be the result of the increase of the activity of antioxidant enzymes.

Poster 49

SOME IMMUNOLOGIC DETERMINANTS IN LEBANESE PATIENTS WITH ALLERGIC RHINITIS

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Purpose: Mucosal allergic reactions are dependent on various factors. These reactions are initiated by the interactions of allergen with specific immunoglobulin (Ig) E antibodies on the surface of mast cells, resulting in the release of inflammatory mediators with concomitant generation of classic allergic symptoms.

Methods and Results: In a prospective study of 113 patients with rhinitis, concentrations of allergen-specific IgE measured against a panel of 10 allergens and levels of polyclonal IgE, peripheral eosinophilia, and interleukin (IL)-4 and IL-5 were correlated with the patients' symptoms. The patients were divided into 4 groups; 74 of 113 were labeled as allergic rhinitis (groups 1 and 2). Group 1 (41 of 74 patients) had detectable specific IgE and elevated polyclonal IgE levels. Group 2 (33 of 74 patients) had detectable specific IgE and normal polyclonal IgE levels. Group 3 (32 of 113 patients) had undetected specific IgE and normal polyclonal IgE levels. Group 4 (7 of 113 patients) had undetected specific IgE and elevated polyclonal IgE levels. Serum IL-4 and IL-5 levels were elevated in groups 1, 2, and 4. Serum eosinophilia was present in only 10 patients with rhinitis. Specific IgE was positive for the mites *Dermatophagoides pteronyssinus* (58% of patients) and D farinae (51% of patients) and for cats (2% of patients).

Conclusions: Our data showed that 1) house dust mite is the common allergen of allergic rhinitis; 2) elevated levels of polyclonal IgE correlated with the concentration of serum-specific IgE, especially in patients with multiple causative allergens; 3) no correlation exists between peripheral eosinophilia and allergic rhinitis; and 4) serum IL-4 and IL-5 levels may be of diagnostic value in patients with allergic rhinitis.

Poster 50

IMPROVEMENT OF QUALITY OF LIFE AND DAYTIME SLEEPINESS IN PATIENTS WITH PERENNIAL ALLERGIC RHINITIS TREATED WITH IMMUNOTHERAPY

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Purpose: To perform a cross-sectional study of the effectiveness of immunotherapy (IMT) in improving the quality of life (QoL), reducing nasal symptoms (NS), and reducing daytime sleepiness (DTS) of patients with perennial allergic rhinitis (PAR).

Methods: From 1997 to 2000, 34 PAR patients (age, 11-56 y) participated in the study. Two subjects were in the preparation stage of IMT treatment, and the rest had received IMT for 6 to 36 mo using standardized allergen extract. IMT treatment was based on skin endpoint titration. Assessment included NS, QoL, and DTS.

Results: The longer the period of IMT treatment, the lower the level of DTS (Kruskal-Wallis test, $P = 0.029$) and the lower the NS ($P = 0.075$). Although the study does not show that IMT can improve the overall QoL of PAR patients ($P = 0.20$), it proves a significant correlation between QoL and DTS (Spearman rank correlation coefficient r = -0.67, $P < 0.001$), QoL and NS ($r = 0.84$, $P < 0.001$), and NS and DTS ($r = 0.70$, $P < 0.001$).

Conclusions: SET IMT effectively reduces NS and DTS. The better the NS, the better the QoL and the lower the DTS. We will conduct later a prospective cohort study to obtain a better perception concerning the correlation between IMT and NS, DTS, and QoL .

Poster 51

THE SPECIFIC IMMUNOTHERAPY EFFECT ON THE PATIENT'S SYMPTOMS

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Purpose: We observed the effect of 3 years' specific immunotherapy (SIT) with grass pollen on clinical symptoms occurring after local nasal provocation with grass pollen.

Methods: We performed local nasal provocation with grass pollen (Allergopharma) and a control challenge, in 14 patients with hay fever, before and after 3 years of preseasonal injection SIT. We assessed nasal symptoms, like sneezing, itching, nasal mucus secretion, and nose patency in the opinion of the patient (visual-analog scale [VAS]) and the doctor. The nasal patency was objectively assessed by anterior active rhinomanometry.

Results: The nasal symptoms after local nasal provocation were statistically significantly reduced ($P < 0.05$) after 3 years of SIT. SIT inhibited allergen-induced sneezing ($P < 0.01$), mucus secretion ($P < 0.05$), and the nasal blockade after challenge ($P < 0.05$) according to VAS. However, the objective measurement of nasal patency in active anterior rhinomanometry did not show statistically significant differences before and after 3 years of SIT.

Conclusions: The results suggest that 3 years of SIT significantly reduced the number and severity of nasal symptoms after specific allergen challenge, although the objective measurement of nasal patency did not show improvement. This suggests that the main benefit of SIT for the patient is relief of symptoms after the exposure to allergen, although the objective assessment of nasal patency does not show significant improvement.

Poster 52

SURGICAL APPROACHES TO THE NASAL BASE

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Purpose: At the completion of this presentation, the participants should be able to analyze the nasal base and its subunits. In addition, the participants should have a thorough understanding of surgical techniques to alter the nasal base and thus the nostril shape.

Method: The nasal base and nostril shape are important characteristics to consider during the planning and execution of aesthetic and reconstructive rhinoplasties. The first descriptions of nasal base reductions to alter the nostril shape were more than a century ago by Robert Weir. Modifications of this technique were reported by Jacques Joseph.

The nasal tip and resultant nostril shape have a complex anatomic structure consisting of a cartilaginous framework and skin and soft tissue envelope. When preparing to perform rhinoplasty operations, it is important to consider ethnic as well as individual variations in the nasal tip, the nostril shape, and internal structure. By dividing the nasal tip into its respective subunits, the rhinoplastic surgeon can then formulate a systematic and pragmatic approach to the nasal base, lateral wall, and columella. Altering or augmenting one or all of these areas results in changes to the nasal tip as well as to the shape and orientation of the nostril.

Poster 53

RECONSTRUCTION OF ALAR CARTILAGES: TECHNIQUES, RESULTS, AND PSYCHOLOGICAL ASPECTS

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Purpose: Anatomic alterations of alar cartilages cause both esthetic and functional defects. Their reconstructions require a correct diagnosis of these anatomical and functional alterations in addition to adequate surgical techniques.

Methods: We operated on 12 patients with the complaint of respiratory obstruction caused by alar insufficiency, associated with esthetic alterations. Patients were interviewed before and after surgery. These psychological interviews evaluated the personality and the expectancies of the patients through direct questions mainly aimed at their self-analysis. We used a closed technique with a gull wing graft and an alar cartilage rotation to solve these esthetic and functional problems.

Results: Ten patients had improvements in their nasal permeability and were satisfied with the new physical appearance of their noses. The 2 remaining patients had improvements in nasal appearance; however, they complained of some unilateral obstruction when they were in a supine position. The postsurgery interview revealed that all the patients acknowleged, to some extent, their improvement, especially in their level of self-esteem, therefore increasing their sociability.

Conclusions: We obtained good results functionally and esthetically along with the improvements in psychological aspects.

Poster 54

SURGICAL CLOSURE OF NASAL SEPTAL PERFORATIONS

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Purpose: Nasal septal perforation is often troublesome for patient and surgeon. The operative challenge depends mostly on the surgeon's experience. This study is to determine the condition for operation and to present our method of local inverted flaps.

Methods: Since 1989, 30 patients were operated on for a perforation of nasal septum of variable size. Three methods of covering the perforation are presented. Local transposition flaps were used in 20 cases, buccal flaps in 3 cases, and inverted flaps in 7 cases.

Results: The first method was successful in half of the operated cases. The second was unsuccessful, and the third was successful in all 7 operated patients.

Conclusions: Every nasal septal perforation that progressively enlarges and causes problems is indicated for surgical or conservative treatment. The method of bilateral inverted flaps that are drawn through a perforation on the opposite side is suitable in all perforations in which cartilage or bone around the defect is preserved.

Poster 55

M-PLASTY: A NOVEL APPROACH TO THE NASAL VALVE

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Purpose: Abnormalities of the nasal valve are a frequent source of patients' complaints of nasal airway obstruction. The M-plasty valve correction procedure was designed by Dr. Fausto Lopez-Infante. The goal of M-plasty is to reconstitute the normal 10- to 15-degree valve angle without creating a flaccid valve or changing the external appearance of the nose. The purpose of this poster is to discuss the technique of M-plasty correction of the nasal valve.

Methods: This poster provides a medically illustrated step-by-step approach to M-plasty. A video showing the procedure performed on a cadaver is available for viewing. In addition, a 3-dimensional model of the nasal valve is also a part of the multimedia presentation. Finally, a pamphlet illustrating the technique is available for otolaryngologists to take with them.

Results: We have had excellent functional results with the technique of M-plasty. This technique avoids unwanted cosmetic changes and helps to avoid postoperative tip ptosis.

Conclusions: Correction of the nasal valve via M-plasty is a simple procedure associated with excellent results. The procedure uses techniques familiar to the rhinologic surgeon and thus can be easily incorporated into rhinoplasty or septal surgery.

Poster 56

EFFECTS OF PREOPERATIVE MIDAZOLAM AND KETOROLAC TROMETHAMINE TREATMENT IN SEPTOPLASTY

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Purpose: Nasal surgery under local anesthesia can prevent possible complications of general anesthesia. However, pain, anxiety, and painful postoperative memory can be troublesome for the patients. This study aims to investigate the effect of preoperative administration of midazolam and ketorolac tromethamine for postoperative pain and antegrade amnesia in septoplasty under local anesthesia.

Methods: Forty patients underwent septoplasty under local anesthesia. The patients were divided into 4 groups, each consisting of 10 patients. Each group received different medication; the first group ketorolac only, the second group ketorolac and diazepam, the third group ketorolac and midazolam, and the fourth group midazolam only. Postoperative pain was evaluated according to Verbal Rating Pain Scores and Visual Analogue Pain Scores at 2, 4, 6, 12, 24, and 48 h after the operation, and the degree of antegrade amnesia was also evaluated.

Results: Postoperative pain was decreased at 6, 12, and 24 h in the third and fourth groups. The degree of antegrade amnesia was significantly increased in the third and fourth groups ($P < 0.05$), with more antegrade amnesia in the third group.

Conclusions: Our results suggest that preoperative administration of ketorolac and midazolam is effective to reduce postoperative pain as well as to enhance the degree of antegrade amnesia in patients undergoing septoplasty under local anesthesia.

Poster 57

MEASUREMENT OF THE BONY NASAL DORSUM FOR GUIDING CARVING OF NASAL PROSTHESES

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Purpose: To guide the carving of a prosthesis correctly and to reduce the related postoperative complications.

Method: The bony dorsum nasion of 91 skull specimens and 42 normal adults was measured either by naked eye or 3-dimensional bone reconstruction by spiral computed tomography. All data were handled by statistical methods.

Result: Definite understanding was obtained about the following: origin of the bony dorsum nasion, fitness of contact surfaces between prosthesis and the bony dorsum nasion, angulation of nasofrontal angle, and width of prosthesis. We realize that the carving of prostheses should be based on the morphology of the bony dorsum nasion, or some related complications might occur.

Conclusions: 1) The width of a prosthesis should be defined according to the distance between the pyriform apertures vertices. 2) The incidence of complication will be reduced greatly when the morphology of the bony dorsum nasion is fully understood and, depending on it, the prosthesis is carved before operation.

Poster 58

THE APPLICATION OF NASAL ENDOSCOPY IN THE RESECTION OF UPPER AND POSTERIOR NASAL SEPTUM DEVIATION

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Purpose: To find a safe, reliable, and satisfying technique to treat the upper and posterior nasal septum deviation.

Method: We performed the resection of the upper and posterior nasal septum deviation under nasal endoscopy, comparing this new method with the traditional one and discussing the safety and long-term curative effect of this new method.

Result: The observation of the outcome in 169 patients at 1 to 60 mo postoperation showed that this technique can resect the upper and posterior deviation safely and completely, improve the nasal respiratory and olfactory function, and reduce the occurrence of nasal cavity adhesion and the recurrence of nasal polyp and sinusitis.

Conclusion: Resection of the upper and posterior nasal septum deviation under nasal endoscopy is a good method for the clinician to learn.

Poster 59

MANAGEMENT OF CHOANAL ATRESIA IN NEWBORNS AND INFANTS

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Purpose: To explore a simple, safe, and easily performed management of congenital choanal atresia in newborns and infants.

Method: Ten patients age 9 days to 18 mo, 4 males and 6 females, were studied. Two had bilateral and 8 had unilateral atresia. The bony or mucous membranes of the choanal atresia were punctured by probes, which were similar to the nasal cavities in arch, and we performed the perforation under endoscopic control. Further widening was performed by dilating until the same widths as the anterior part were reached. Then stents of polyethylene tubes, of which the posterior ends were cut to form posterior nasal openings, were put in place. The stents were removed 3 to 6 mo after the operations.

Result: Nine of 10 patients recovered with patent nasal airways. One of 10 patients with bony choanal atresia had reatresia 3 y after the operation.

Conclusion: This management is an improved method for relieving nasal obstruction in newborns and infants, which is safe, reliable, and easily performed.

Poster 60

SKIN DISEASES OF THE NOSE

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Purpose: The classification for the skin diseases of the nose would be useful in clinical practice.

Methods: The skin diseases of the nose can be classified on the basis of etiology and clinical importance: 1) infections and infestations, 2) inherited diseases, 3) disorders of blood and lymph vessels, 4) connective tissue diseases, 5) pilosebaceous gland diseases, 6) dermatitis, 7) syndromes, and 8) miscellaneous.

Results: Erysipelas is the most common infectious disease of the nose. It may extend to the orbit and the sinus sagittalis with sinus thrombosis. Basal cell carcinoma (BCC) is the most common type of skin cancer. Ulcerating BCC often has a predilection for the nose. The cancer can penetrate subcutaneous tissue into the bone and brain. In Sturge-Weber syndrome, capillary malformation of dermal blood vessels on the skin of the nose is associated with vascular malformations in the distribution of the trigeminal nerve and in the brain and central nervous system with glaucoma. In many cases, a persisting diffuse erythema develops on the face. A butterfly-like distribution is one of the criteria for systemic lupus erythematosus. In rosacea, chronic, deep inflammation of the nose leads to an irreversible hypertrophy called rhinophyma. Differential diagnosis is only loosely concerned with skin infiltration in lymphatic leukemia or in mycosis fungoides. Trichostasis spinulosa is the retention of several fine hairs in a bunch with one sebaceous follicle. It is seen clinically like a small dark open comedo. Bazex syndrome is a paraneoplastic condition that is most frequently associated with squamous cell carcinoma of the upper aerodigestive tract and lesions mimic psoriasis and dermatitis.

Conclusion: Predilection of some dermatoses for the skin of nose may be a clue for clinical diagnosis.

Poster 61

ENDOSCOPIC RESECTION OF PARANASAL SINUS NEOPLASMS: UNIVERSITY OF MIAMI EXPERIENCE

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Purpose: To evaluate the efficacy and safety of endoscopic resection of paranasal sinus neoplasms.

Methods: Retrospective analysis of 58 patients undergoing surgery for paranasal sinus neoplasms. Patients who underwent endoscopic resection for palliation or for diagnostic purposes or who underwent endoscopically assisted external procedures were excluded. Patients were evaluated for the incidence of complications and their oncologic results.

Results: Forty-eight patients were evaluated (16 females, 32 males; mean age, 57.9 y; range, 15 to 88 y). Nasal obstruction was the most common presenting symptom. The most common benign neoplasm was inverted papilloma; the next most common was osteoma. The most common malignant neoplasm was esthesioneuroblastoma. The follow-up ranged from 6 to 65 mo. There have been 4 local recurrences (12%) in the inverted papilloma group, which have been managed in the office setting under topical anesthesia. There have been no local recurrences in the remainder of the patients. Two patients with esthesioneuroblastoma had recurrences in the neck and orbit. All of the patients but 1 (metastatic undifferentiated carcinoma to the temporal bone and lungs) remain free of disease. There have been no major complications.

Conclusion: In experienced hands endoscopic resection of malignant and benign neoplasms of the paranasal sinuses is a viable and safe alternative to external approaches in select patients.

Poster 62

PRIMARY CLEAR CELL CARCINOMA OF THE SINONASAL TRACT

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Purpose: Clear cell neoplasms of the salivary glands have always been a diagnostic dilemma. Several different nomenclatures have been applied to this entity. Among these were clear cell carcinoma, glycogen-rich tumor, monomorphic clear cell tumor, and epithelial myoepithelial carcinoma. These tumor cells tend to accumulate compounds like glycogen and lipids and fail to stain with hematoxylin and eosin, thus appearing as clear cells under light microscopy. Clear cell carcinomas develop from different infraclavicular and supraclavicular sites. However, within the head and neck region, primary clear cell carcinomas arise mainly from both major and minor salivary glands.

Methods: We are reporting on our experience in the diagnostic work-up and management of a young girl who was found to suffer from primary clear cell carcinoma of the sinonasal tract.

Results: Our case is the second to be reported in the literature in the past 30 y. The characteristic clinical symptoms, physical findings, and radiologic work-up will be elaborated on.

Conclusions: The management protocol and various other therapeutic options will be discussed during her 4-y follow-up.

Poster 63

NASAL SEPTAL HEMANGIOPERICYTOMALIKE TUMOR—A CASE REPORT WITH AN IMMUNOHISTOCHEMICAL STUDY

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Purpose: Hemangiopericytoma in the nasal and paranasal region is rare, and it accounts for only 1% of all neoplasms of vascular origin. Nasal hemangiopericytomas differ from those occurring elsewhere in the body, especially regarding location, age, biologic behavior, and histopathologic features. Nasal hemangiopericytoma has generally been considered a distinctive entity, a hemangiopericytomalike tumor. We report on a man with a rare hemangiopericytomalike tumor involving the right nasal septum.

Methods: The tumor was identified in the right nasal meatus with anterior rhinoscopy. After evaluation of the blood supply with functional angiography, the tumor was resected totally through the right maxillary sinus. The final histopathologic diagnosis from the specimen was determined by several stains, including vimentin (+), a-SMA (+), HHF35 (+), S-100 protein (-), chromogranin (-), CD34 (-), and factor VIII-related antigen (-).

Results: At the first visit, the patient's chief complaint was a recurrent nosebleed and right nasal stuffiness. The initial histopathologic findings of the biopsy specimen from the dark-red nasal tumor were consistent with a glomus tumor. The final histopathologic diagnosis was hemangiopericytomalike tumor. The labeling index of Ki-67 (MIB-1) and toposomerase IIa revealed less than 5%.

Conclusion: This case was the third nasal septal hemangiopericytomalike tumor reported in Japan.

Poster 64

THE EFFECT OF RADIATION THERAPY ON PARANASAL SINUS OPACIFICATION IN PATIENTS WITH NASOPHARYNGEAL CANCER

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Purpose: Previous studies have reported that irradiation influences mucociliary clearance by damaging ciliary motility in respiratory mucosa. The purposes of this study were to investigate the effect of radiation therapy (RT) on opacification of paranasal sinuses in patients with nasopharyngeal carcinoma and to find out whether anatomic variations such as nasal septal deviation (NSD) or concha bullosa (CB) influence sinusitis.

Methods: Subjects were 26 patients (19 men and 7 women, aged 23 to 69 y) with early nasopharyngeal carcinoma (T1, T2) who were treated with RT between 1989 and 1999. Pre-RT and post-RT computed tomography scans and medical records were reviewed retrospectively.

Results: Mean radiation dosage was 6,965 cGy; mean follow-up, 30 mo; 18 patients had nasal septal deviation, and 9 patients had NSD with CB; 52 maxillary sinuses and 44 ethmoid sinuses were analyzed. In 15 of 26 patients (57.7%), opacification of the sinus was newly developed or was aggravated after RT. The prevalance of aggravated sinus opacification according to anatomic variations was as follows: 30.8% in sinuses with no anatomic variations, 32.1% in the concave side of NSD, 36.8% in the convex side of NSD, 42.9% in the concave side of NSD with CB, and 68.8% in the convex side of NSD with CB. Sinus opacification was significantly different between sinuses without variations and sinuses with NSD combined with CB ($P < 0.05$).

Conclusion: These data suggest that irradiation into the nasopharynx may induce or aggravate paranasal sinusitis and that anatomic variations such as NSD or CB may contribute to the pathogenesis of sinusitis.

Poster 65

METASTATIC RENAL CARCINOMA TO THE PARANASAL SINUS

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Purpose: To highlight the rare sinonasal renal carcinoma metastasis as important in differential diagnosis of nasal lumps. To review its presentation, diagnostic challenges, and prognostic factors so that treatment can be individualized.

Methods: A case report and a literature review.

Results: A 46-y-old Chinese man presented with a painless, fluctuant lump on the dorsum of the nose. Nineteen months earlier, he had nephrectomy for renal clear cell adenocarcinoma. Computed tomographic scan showed a vascular lump in the ethmoid and frontal sinus, destroying the nasal septum and abutting the cribriform plate. Intranasal biopsy caused brisk bleeding. Preoperative embolization of the sphenopalatine artery was required before definitive biopsy under general anesthesia. Severe hemorrhage of 500 mL was controlled only after diathermy, Foley catheter, and nasal pack. Frozen section was nonconclusive, and paraffin section was needed for diagnosing renal cell metastasis. Radiotherapy failed to arrest tumor growth. Six months after a craniofacial resection of tumor, he remains disease free.

Conclusion: A solitary hypernephroma metastasis to the sinonasal area is rare, but may even be the first presentation of hypernephroma and mimic benign lesions. Life-threatening hemorrhage is possible due to its high vascularity. For a patient with a solitary metastasis to the paranasal sinus, surgical excision offers the best hope for long-term survival. It also decreases pain, epistaxis, and disfigurement from the expanding tumor. If unresectable, radiotherapy, hormonal therapy, immunotherapy, and chemotherapy can be considered.

Poster 66

RECONSTRUCTION OF THE UPPER LIP FOLLOWING PARTIAL RHINECTOMY

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Purpose: To illustrate the steps in the surgical reconstruction of the upper lip after partial rhinectomy. A 72-year-old white man had a 6-mo history of an ulcerative lesion of the midface, which was diagnosed as squamous cell carcinoma. The lesion involved the columella, anterior nasal septum, inferior turbinate, and premaxilla.

Methods: Illustration of the steps in the surgical procedure, which includes partial excision of the external nose, both alar regions, and the premaxilla. Eighty percent of the upper lip was reconstructed with a cross-lip Abbe flap and bilateral perialar advancement. An Abbe flap is full-thickness flap of the lower lip pedicled on the inferior labial vessel and rotated 180 degrees to fit into the upper lip defect. We present 10 illustrations to explain the steps in the surgical procedure, including the excision margin and reconstruction of the defect. The patient required a prosthesis for the defect in the external nose.

Results: The inferior labial flap is divided 4 weeks postoperatively together with fitting of a modified dental plate. Although the size of the oral orifice is smaller, the patient can continue normal oral feeding. A nasal prosthesis has the advantage of an acceptable cosmetic result while allowing regular monitoring for recurrence.

Conclusion: We illustrate a case in which almost the full length of the upper lip was sacrificed due to tumor involvement of the premaxilla. The major defect was successfully reconstructed by a combination of an Abbe flap and bilateral perialar advancement. The cosmetic result in our opinion is acceptable.

Poster 67

ADENOID CYSTIC CARCINOMA OF THE NASOPHARYNX

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Purpose: Adenoid cystic carcinoma of the nasopharynx is rare, with few reported cases in the English literature. A rare case of adenoid cystic carcinoma of the nasopharynx successfully treated with radiotherapy is described.

Method: Evaluate a case of an adenoid cystic carcinoma of the nasopharynx successfully treated by radiotherapy.

Results: A 77-y-old Chinese man had uncontrolled epistaxis after blowing his nose. The bleeding was controlled with anterior nasal packing. Rigid endoscopy afterward revealed a growth in the nasopharynx. There was no neck lymph node enlargement. Biopsy of the lesion showed adenoid cystic carcinoma of intermediate grade malignancy. There was no cranial nerve involvement. No evidence of distant metastasis was seen in computed tomography of the brain or radiography of the chest. Radiotherapy was given and the tumor regressed.

Conclusion: There was no recurrence 5 y postradiotherapy.

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EPITHELIAL-MYOEPITHELIAL CARCINOMA OF THE NASAL SEPTUM

Tat-yuen Ng
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Purpose: To describe a rare case of epithelial-myoepithelial carcinoma in the nasal septum treated by endoscopic excision and radiotherapy.

Methods: A case report of epithelial-myoepithelial carcinoma arising in the nasal septum successfully treated with surgery and radiotherapy is described.

Results: A 72-y-old Chinese woman presented with bilateral nasal obstruction for 6 mo. Examination showed a polypoid growth arising from the posterior part of right nasal septum extending into the nasopharynx. Biopsy of the lesion revealed epithelial-myoepithelial carcinoma. Immunohistochemical staining showed positivity of luminal epithelial cells for low molecular weight cytokeratin and clear cells for S-100 protein, thus confirming presence of both epithelial and myoepithelial cells in this lesion. The lesion was surgically excised endoscopically under local anesthesia. Radiotherapy was given afterward. There was no recurrence at 5 y postoperation.

Conclusions: The occurrence of epithelial-myoepithelial carcinoma in the nasal septum is possible and can be successfully treated by surgical excision and radiotherapy.

Poster 69

ASPERGILLOSIS OF THE PARANASAL SINUSES

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Purpose: The incidence of fungal infection of the nose and paranasal sinus is increasing worldwide. Aspergillosis is an especially important cause of morbidity and mortality. Early diagnosis, resulting in appropriate and early treatment, requires awareness and histologic study.

Methods: A retrospective study of the clinical, radiologic, and pathologic features and management was performed on 12 patients who had paranasal sinus aspergillosis confirmed by histology between 1996 and 2000.

Results: Of the 12 patients, 4 men and 8 women (aged, 36-86 y), 3 were immunocompromised and 9 were immunocompetent. The maxillary sinus was frequently involved. Most patients (11 of 12) had facial pain and headache followed by chronic unilateral nasal obstruction, postnasal drip, or both. Microcalcification or a radiographic metal density was seen in 5 cases. All patients had surgical debridement to ventilate the paranasal sinus. Antifungal medication was prescribed for invasive cases. Follow-up findings included 1 death and 2 patients with vision loss.

Conclusion: Aspergillosis of the paranasal sinus frequently occurs in old age. The symptoms mimic those of bacterial sinusitis. Awareness of fungal infection with careful investigation will lead to making an early diagnosis and providing early and appropriate treatments.

Poster 70

LASER-ASSISTED TURBINECTOMY: LONG-TERM CLINICAL OUTCOMES

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Purpose: A hypertrophic inferior turbinate is the main structure contributing to chronic nasal obstruction. Laser-assisted turbinectomy (LAT) has gained acceptance for the treatment of this problem. Significant initial improvement has been reported after LAT. This study was undertaken to assess long-term results of LAT and the effect of additional treatments on the turbinate of patients with relapse of nasal obstruction.

Methods: Patients with nasal obstruction and associated turbinate hypertrophy refractory to medical therapy were included in this study. LAT was performed in 182 patients on an outpatient basis with local anesthesia. Data on patients were compared from preoperative to postoperative assessments. The patients with relapse of nasal obstruction were offered further LAT treatment. Statistical analysis was performed with the Student t test.

Results: Significant improvement was observed in nasal obstruction at 6-mo and long-term assessments. The mean follow-up was 48 mo (range, 36-60 mo). Overall, 76% of the patients reported symptomatic improvement at long-term assessments. The mean nasal obstruction scale improved from 8.1 ± 3.2 to 2.5 ± 1.5 ($P < 0.05$); 31 patients (18%) with relapse of nasal obstruction had further LAT treatment with reduction of nasal scale from 7.2 ± 1.9 to 2.4 ± 1.8 ($P < 0.05$). Postoperative pain was rated as minimal (visual analog scale < 5). No serious complications were encountered.

Conclusions: LAT produces long-term success, and relapse of nasal obstruction can be improved after re-treatment. LAT seems to be a safe, effective procedure for treatment of nasal obstruction due to hypertrophy of the inferior turbinates.

Poster 71

BRAIN TISSUE HETEROTOPIA IN THE NASOPHARYNX

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Purpose: The occurrence of extracranial brain tissue is infrequent. Most of the literature describes cases in which it is located in or near the nose and throat and is classified as a nasal glioma.

Methods and Results: Our patient was a 1-y-old boy diagnosed with heterotopic nasopharyngeal brain tissue. This malformation was found when the boy had obstruction of the rhinopharynx with respiratory distress during the first weeks of life. The diagnosis was based on histology.

Conclusions: Magnetic resonance imaging is essential to diagnostic and pretherapeutic evaluation. Total surgical excision provides cure without sequelae.

Poster 72

NASAL GLIOMA IN ADULTHOOD: A RARE DIFFERENTIAL DIAGNOSIS OF FRONTAL SINUSITIS

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Purpose: For diagnostic preparation of endonasal sinus surgery to be performed on patients suffering from sinusitis, a clinical and endoscopic examination along with a computed tomographic scan of the patients' sinuses is considered sufficient. The following case report shows, however, that even with typical preoperative findings a rare differential diagnosis may be revealed intraoperatively.

Method: A 34-year-old patient complained of pressure on both ears and a frontal headache, first on the right and later also on the left side, after a flight. Systemic antibiotic therapy and topical nasal decongestants relieved the ear symptoms, but the frontal headache improved only minimally. Findings from the endoscopic examination showed slight mucosal redness and swelling, but no signs of polyps, other space-occupying objects, or pathologic secretion. A coronal computed tomographic scan of the sinuses showed partial opacification of the ethmoid cells bilaterally and an opacification of the frontal sinus, which was more distinct on the right than on the left side. Intraoperatively, a specimen of whitish tissue was taken out of the frontal sinus, emanating from its posterior wall.

Results: Findings from the histologic examination revealed a nasal glioma. A subsequent magnetic resonance scan showed an intracerebral connection, and the glioma was removed in a combined neurorhinosurgical operation a few weeks later, with subsequent reconstruction of the dura.

Conclusion: Routine magnetic resonance scans on patients with typical symptoms of sinusitis do not solve the problem. Even during routine operations, rhinosurgeons have to be prepared for the unexpected.

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ABSTRACT AUTHOR INDEX

(First author only and A stands for the page number in the abstract section)

NASONEX®
(mometasone furoate monohydrate)
Nasal Spray, 50 mcg*
FOR INTRANASAL USE ONLY

*calculated on the anhydrous basis

BRIEF SUMMARY (For full Prescribing Information, see package insert.)
INDICATIONS AND USAGE NASONEX Nasal Spray, 50 mcg is indicated for the treatment of the nasal symptoms of seasonal allergic and perennial allergic rhinitis, in adults and pediatric patients 3 years of age and older. NASONEX Nasal Spray, 50 mcg is indicated for the prophylaxis of the nasal symptoms of seasonal allergic rhinitis in adult and adolescent patients 12 years and older. In patients with a known seasonal allergen that precipitates nasal symptoms of seasonal allergic rhinitis, initiation of prophylaxis with NASONEX Nasal Spray, 50 mcg is recommended 2 to 4 weeks prior to the anticipated start of the pollen season. Safety and effectiveness of NASONEX Nasal Spray, 50 mcg in pediatric patients less than 3 years of age have not been established.
CONTRAINDICATIONS Hypersensitivity to any of the ingredients of this preparation contraindicates its use.
WARNINGS The replacement of a systemic corticosteroid with a topical corticosteroid can be accompanied by signs of adrenal insufficiency and, in addition, some patients may experience symptoms of withdrawal; ie, joint and/or muscular pain, lassitude, and depression. Careful attention must be given when patients previously treated for prolonged periods with systemic corticosteroids are transferred to topical corticosteroids, with careful monitoring for acute adrenal insufficiency in response to stress. This is particularly important in those patients who have associated asthma or other clinical conditions where too rapid a decrease in systemic corticosteroid dosing may cause a severe exacerbation of their symptoms.

If recommended doses of intranasal corticosteroids are exceeded or if individuals are particularly sensitive or predisposed by virtue of recent systemic steroid therapy, symptoms of hypercorticism may occur, including very rare cases of menstrual irregularities, acneiform lesions, and cushingoid features. If such changes occur, topical corticosteroids should be discontinued slowly, consistent with accepted procedures for discontinuing oral steroid therapy.

Persons who are on drugs which suppress the immune system are more susceptible to infections than healthy individuals. Chickenpox and measles, for example, can have a more serious or even fatal course in nonimmune children or adults on corticosteroids. In such children or adults who have not had these diseases, particular care should be taken to avoid exposure. How the dose, route, and duration of corticosteroid administration affects the risk of developing a disseminated infection is not known. The contribution of the underlying disease and/or prior corticosteroid treatment to the risk is also not known. If exposed to chickenpox, prophylaxis with varicella zoster immune globin (VZIG) may be indicated. If exposed to measles, prophylaxis with pooled intramuscular immunoglobulin (IG) may be indicated. (See the respective package inserts for complete VZIG and IG prescribing information.) If chickenpox develops, treatment with antiviral agents may be considered.
PRECAUTIONS General: Intranasal corticosteroids may cause a reduction in growth velocity when administered to pediatric patients (see **PRECAUTIONS, Pediatric Use** section). In clinical studies with NASONEX Nasal Spray, 50 mcg, the development of localized infections of the nose and pharynx with *Candida albicans* has occurred only rarely. When such an infection develops, use of NASONEX Nasal Spray, 50 mcg should be discontinued and appropriate local or systemic therapy instituted, if needed.

Nasal corticosteroids should be used with caution, if at all, in patients with active or quiescent tuberculous infection of the respiratory tract, or in untreated fungal, bacterial, systemic viral infections, or ocular herpes simplex.

Rarely, immediate hypersensitivity reactions may occur after the intranasal administration of mometasone furoate monohydrate. Extreme rare instances of wheezing have been reported.

Rare instances of nasal septum perforation and increased intraocular pressure have also been reported following the intranasal application of aerosolized corticosteroids. As with any long-term topical treatment of the nasal cavity, patients using NASONEX Nasal Spray, 50 mcg over several months or longer should be examined periodically for possible changes in the nasal mucosa.

Because of the inhibitory effect of corticosteroids on wound healing, patients who have experienced recent nasal septum ulcers, nasal surgery, or nasal trauma should not use a nasal corticosteroid until healing has occurred.

Glaucoma and cataract formation was evaluated in one controlled study of 12 weeks' duration and one uncontrolled study of 12 months' duration in patients treated with NASONEX Nasal Spray, 50 mcg at 200 mcg/day, using intraocular pressure measurements and slit lamp examination. No significant change from baseline was noted in the mean intraocular pressure measurements for the 141 NASONEX-treated patients in the 12-week study, as compared with 141 placebo-treated patients. No individual NASONEX-treated patient was noted to have developed a significant elevation in intraocular pressure or cataracts in this 12-week study. Likewise, no significant change from baseline was noted in the mean intraocular pressure measurements for the 139 NASONEX-treated patients in the 12-month study and again, no cataracts were detected in these patients. Nonetheless, nasal and inhaled corticosteroids have been associated with the development of glaucoma and/or cataracts. Therefore, close follow-up is warranted in patients with a change in vision and with a history of glaucoma and/or cataracts.

When nasal corticosteroids are used at excessive doses, systemic corticosteroid effects such as hypercorticism and adrenal suppression may appear. If such changes occur, NASONEX Nasal Spray, 50 mcg should be discontinued slowly, consistent with accepted procedures for discontinuing oral steroid therapy.

Information for Patients: Patients being treated with NASONEX Nasal Spray, 50 mcg should be given the following information and instructions. This information is intended to aid in the safe and effective use of this medication. It is not a disclosure of all intended or possible adverse effects. Patients should use NASONEX Nasal Spray, 50 mcg at regular intervals (once daily) since its effectiveness depends on regular use. Improvement in nasal symptoms of allergic rhinitis has been shown to occur within 11 hours after the first dose based on one single-dose, parallel-group study of patients in an outdoor "park" setting (park study) and one environmental exposure unit (EEU) study and within 2 days after the first dose in two randomized, double-blind, placebo-controlled, parallel-group seasonal allergic rhinitis studies. Maximum benefit is usually achieved within 1 to 2 weeks after initiation of dosing. Patients should take the medication as directed and should not increase the prescribed dosage by using it more than once a day in an attempt to increase its effectiveness. Patients should contact their physician if symptoms do not improve, or if the condition worsens. To assure proper use of this nasal spray, and to attain maximum benefit, patients should read and follow the accompanying Patient's Instructions for Use carefully.

Patients should be cautioned not to spray NASONEX Nasal Spray, 50 mcg into the eyes or directly onto the nasal septum.

Persons who are on immunosuppressant doses of corticosteroids should be warned to avoid exposure to chickenpox or measles, and patients should also be advised that if they are exposed, medical advice should be sought without delay.

Carcinogenesis, Mutagenesis, Impairment of Fertility: In a 2-year carcinogenicity study of Sprague Dawley rats, mometasone furoate demonstrated no statistically significant increase of tumors at inhalation doses up to 67 mcg/kg (approximately 3 and 2 times the maximum recommended daily intranasal dose in adults and children, respectively, on a mcg/m^2 basis). In a 19-month carcinogenicity study of Swiss CD-1 mice, mometasone furoate demonstrated no statistically significant increase in the incidence of tumors at inhalation doses up to 160 mcg/kg (approximately 4 and 3 times the maximum recommended daily intranasal dose in adults and children, respectively, on a mcg/m^2 basis).

At cytotoxic doses, mometasone furoate produced an increase in chromosome aberrations *in vitro* in Chinese hamster ovary-cell cultures in the nonactivation phase, but not in the presence of rat liver S9 fraction. Mometasone furoate was not mutagenic in the mouse-lymphoma assay and the *Salmonella/E. coli*/mammalian microsome mutation assay, a Chinese hamster lung cell (CHL) chromosomal-aberrations assay, an *in vivo* mouse bone-marrow erythrocyte-micronucleus assay, a rat bone-marrow clastogenicity assay, and the mouse male germ-cell clastogenicity assay. Mometasone furoate also did not induce unscheduled DNA synthesis *in vivo* in rat hepatocytes.

In reproductive studies in rats, impairment of fertility was not produced by subcutaneous doses up to 15 mcg/kg (less than the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis). However, mometasone furoate caused prolonged gestation, prolonged and difficult labor, reduced offspring survival, and reduced maternal body weight gain at a dose of 15 mcg/kg.

Pregnancy: ***Teratogenic Effects: Pregnancy Category C:*** Mometasone furoate caused cleft palate in mice at subcutaneous doses of 60 mcg/kg and above (approximately 2 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis). Offspring survival was reduced in the 180-mcg/kg group (approximately 4 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis). No such effects were observed at 20 mcg/kg (less than the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis).

In rabbits, mometasone furoate caused flexed front paws at a topical dermal dose of 150 mcg/kg (approximately 14 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis).

In rats, mometasone furoate produced umbilical hernia, cleft palate, and delayed ossification at a topical dermal dose of 600 mcg/kg (approximately 30 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis). At 1200 mcg/kg (approximately 60 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis), microphthalmia, umbilical hernias, and delayed ossification were observed in rat pups.

In these developmental studies, there were also reductions in maternal body weight gain and effects on fetal growth (lower fetal body weights and/or delayed ossification) in mice (60 and 180 mcg/kg), rabbits (150 mcg/kg), and rats (600 mcg/kg).

In an oral developmental study in rabbits, at 700 mcg/kg, (approximately 70 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis), increased incidences of resorptions and malformations, including cleft palate and/or head malformations (hydrocephaly or domed head) were observed. Pregnancy failure was observed in most rabbits at 2800 mcg/kg (approximately 270 times the maximum recommended daily intranasal dose in adults on a mcg/m^2 basis).

There are no adequate and well-controlled studies in pregnant women. NASONEX Nasal Spray, 50 mcg, like other corticosteroids, should be used during pregnancy only if the potential benefits justify the potential risk to the fetus. Experience with oral corticosteroids since their introduction in pharmacologic, as opposed to physiologic, doses suggests that rodents are more prone to teratogenic effects from corticosteroids than humans. In addition, because there is a natural increase in corticosteroid production during pregnancy, most women will require a lower exogenous corticosteroid dose and many will not need corticosteroid treatment during pregnancy.

Nonteratogenic Effects: Hypoadrenalism may occur in infants born to women receiving corticosteroids during pregnancy. Such infants should be carefully monitored.

Nursing Mothers: It is not known if mometasone furoate is excreted in human milk. Because other corticosteroids are excreted in human milk, caution should be used when NASONEX Nasal Spray, 50 mcg is administered to nursing women.

Pediatric Use: Controlled clinical studies have shown intranasal corticosteroids may cause a reduction in growth velocity in pediatric patients. This effect has been observed in the absence of laboratory evidence of hypothalamic-pituitary-adrenal (HPA) axis suppression, suggesting that growth velocity is a more sensitive indicator of systemic corticosteroid exposure in pediatric patients than some commonly used tests of HPA axis function. The long-term effects of this reduction in growth velocity associated with intranasal corticosteroids, including the impact on final adult height, are unknown. The potential for "catch up" growth following discontinuation of treatment with intranasal corticosteroids has not been adequately studied. The growth of pediatric patients receiving intranasal corticosteroids, including NASONEX Nasal Spray, 50 mcg should be monitored routinely (eg, via stadiometry). The potential growth effects of prolonged treatment should be weighed against clinical benefits obtained and the availability of safe and effective noncorticosteroid treatment alternatives. To minimize the systemic effects of intranasal corticosteroids, including NASONEX Nasal Spray, 50 mcg, each patient should be titrated to his/her lowest effective dose.

Seven hundred and twenty (720) patients 3 to 11 years of age were treated with mometasone furoate nasal spray, 50 mcg (100 mcg total daily dose) in controlled clinical trials. Safety and effectiveness in children less than 3 years of age have not been established.

A clinical study has been conducted for one year in pediatric patients (ages 3 to 9 years) to assess the effect of NASONEX Nasal Spray, 50 mcg (100 mcg total daily dose) on growth velocity. No statistically significant effect on growth velocity was observed for NASONEX Nasal Spray, 50 mcg compared to placebo. No evidence of clinically relevant HPA axis suppression was observed following a 30-minute Cosyntropin infusion.

The potential of NASONEX Nasal Spray to cause growth suppression in susceptible patients or when given at higher doses cannot be ruled out.

Geriatric Use: A total of 203 patients above 64 years of age (age range 64 to 85 years) have been treated with NASONEX Nasal Spray, 50 mcg for up to 3 months. The adverse reactions reported in this population were similar in type and incidence to those reported by younger patients.
ADVERSE REACTIONS In controlled US and International clinical studies, a total of 3210 adult and adolescent patients aged 12 years and older received treatment with NASONEX Nasal Spray, 50 mcg at doses of 50 to 800 mcg/day. The majority of patients (n = 2103) were treated with 200 mcg/day. In controlled US and International studies, a total of 990 pediatric patients (ages 3 to 11 years) received treatment with NASONEX, 50 mcg, at doses of 25 to 200 mcg/day. The majority of pediatric patients (720) were treated with 100 mcg/day. A total of 513 adult, adolescent, and pediatric patients have been treated for 1 year or longer. The overall incidence of adverse events for patients treated with NASONEX Nasal Spray, 50 mcg was comparable to patients treated with the vehicle placebo. Also, adverse events did not differ significantly based on age, sex, or race. Three percent or less of patients in clinical trials discontinued treatment because of adverse events; this rate was similar for the vehicle and active comparators.

All adverse events (regardless of relationship to treatment) reported by 5% or more of adult and adolescent patients aged 12 years and older who received NASONEX Nasal Spray, 50 mcg, 200 mcg/day and by pediatric patients ages 3 to 11 years who received NASONEX Nasal Spray, 50 mcg, 100 mcg/day in clinical trials vs placebo and that were more common with NASONEX Nasal Spray, 50 mcg than placebo, are displayed in the table below.

ADVERSE EVENTS FROM CONTROLLED CLINICAL TRIALS IN SEASONAL ALLERGIC AND PERENNIAL ALLERGIC RHINITIS (PERCENT OF PATIENTS REPORTING)

	Adult and Adolescent Patients 12 years and older		Pediatric Patients Ages 3 to 11 years	
	NASONEX 200 mcg (N = 2103)	VEHICLE PLACEBO (N = 1671)	NASONEX 100 mcg (N = 374)	VEHICLE PLACEBO (N = 376)
Headache	26	22	17	18
Viral Infection	14	11	8	9
Pharyngitis	12	10	10	10
Epistaxis/Blood-Tinged Mucus	11	6	8	9
Coughing	7	6	13	15
Upper Respiratory Tract Infection	6	2	5	4
Dysmenorrhea	5	3	1	0
Musculoskeletal Pain	5	3	1	1
Sinusitis	5	3	4	4
Vomiting	1	1	5	4

Other adverse events which occurred in less than 5% but greater than or equal to 2% of mometasone furoate adult and adolescent patients (aged 12 years and older) treated with 200-mcg doses (regardless of relationship to treatment), and more frequently than in the placebo group included: arthralgia, asthma, bronchitis, chest pain, conjunctivitis, diarrhea, dyspepsia, earache, flu-like symptoms, myalgia, nausea, and rhinitis.

Other adverse events which occurred in less than 5% but greater or equal to 2% of mometasone furoate pediatric patients aged 3 to 11 years treated with 100-mcg doses vs placebo (regardless of relationship to treatment) and more frequently than in the placebo group included: diarrhea, nasal irritation, otitis media, and wheezing.

Rare cases of nasal ulcers and nasal and oral candidiasis were also reported in patients treated with NASONEX Nasal Spray, 50 mcg, primarily in patients treated for longer than 4 weeks.

In postmarketing surveillance of this product, cases of nasal burning and irritation and rare cases of nasal septal perforation have been reported.
OVERDOSAGE There are no data available on the effects of acute or chronic overdosage with NASONEX Nasal Spray, 50 mcg. Because of low systemic bioavailability, and an absence of acute drug-related systemic findings in clinical studies, overdose is unlikely to require any therapy other than observation. Intranasal administration of 1600 mcg (8 times the recommended dose of NASONEX Nasal Spray, 50 mcg) daily for 29 days, to healthy human volunteers, was well tolerated with no increased incidence of adverse events. Single intranasal doses up to 4000 mcg have been studied in human volunteers with no adverse effects reported. Single oral doses up to 8000 mcg have been studied in human volunteers with no adverse effects reported. Chronic overdosage with any corticosteroid may result in signs or symptoms of hypercorticism (see **PRECAUTIONS**). Acute overdosage with this dosage form is unlikely since one bottle of NASONEX Nasal Spray, 50 mcg contains approximately 8500 mcg of mometasone furoate.

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