7:00-7:40
Breakfast with the Masters 1

NOSE AND AGING: WHEN TO TREAT AND HOW?

David R. Edelstein
Manhattan Eye, Ear and Throat Hospital, New York, NY, USA

The nose changes significantly as one ages. Understanding these changes and the factors that influence them, such as environment, genetics, illness, trauma, emotions and other medical problems and treatments, are essential to the treatment of the aging nose. The importance of studying the aging nose is underscored by the dramatic demographic changes that are expected to occur in the population around the world over the next 25 years. Nasal complaints are significant health issue in all ages with chronic upper respiratory conditions growing in the over 65 year old age groups.

This presentation reviews the basic physiologic process of aging and the morphologic and functional changes that occur at all age groups in the nose and paranasal sinuses. The contrasts and differences in development, growth and aging are reviewed. The results of an extensive study of 111 normal subjects ranging in age from 21 to 94 years are presented using 135 variables. Data includes history, symptoms, physical exam, rhinomanometry, ciliary beat frequency, smell testing and incentive spirometry. Anatomic and cephalometric changes are presented to aid the nasal plastic surgeon. An epidemiologic study is presented analyzing the prevalence of rhinologic complaints in a review if more than 10,000 charts from surgical cases and outpatient visits.

Although little is known about the influence of aging on treatment, a clinical format is presented to help the clinician understand the nasal changes with aging. The effects of indications ans manipulation of the aging nose are reviewed. Simple modifications to our therapy paradigms and decision are discussed. Clinical examples are presented.

7:00-7:40
Breakfast with the Masters 2

OSTIOMEATAL UNIT RECONSTRUCTION, HOW I DO IT OR VARIATIONS OF THE UNCINATE PROCESS WITH SURGICAL IMPLICATIONS

Nikhil Bhatt
University of Illinois, Chicago, IL, USA

Upon completion of this presentation, attendees will learn:

*The anatomy of the ostiomeatal unit and variations of the uncinate process with surgical implications.
*Various modalities available for the management of ostiomeatal unit disease.
*How to obtain good results with the use of minimally invasive techniques and avoid complications and morbidity associated with ostiomeatal unit surgery.

The ostiomeatal unit is composed of the maxillary sinus ostium, anterior ethmoid and middle meatus. The surgical procedure in the ostiomeatal unit involves the excision of the uncinate process and an ethmoidectomy with maxillary ostial reconstruction. During this surgery, incidence of iatrogenic trauma to the orbit and frontal recess is high. The location and identification of the natural ostium of the maxillary sinus becomes difficult in the presence of inflammatory disease and anatomical variants. Trauma caused to the ethmoid complex during this surgery leads to further obstruction of the frontal recess and upper ethmoid complex which may be patent and functional in numerous cases. A modification of the standard functional endoscopic sinus surgical steps in the form of limited partial uncinectomy leads us to the natural maxillary sinus ostium. The management of this ostium varies depending upon the complexity of the disease in each case. Submucosal uncinectomy with reconstruction of the maxillary sinus ostium is quite sufficient in most situations. We describe the anatomical landmarks, methods of evaluating the infundibulum and reconstruction of the maxillary ostium in several different disease situations with the aid of live surgical case presentation.

7:00-7:40
Breakfast with the Masters 3

DEATH AND RHINOPLASTY

Michael L. Hinni
Mayo Clinic, Mayo Foundation, Scottsdale, AZ, USA

Death is an exceedingly uncommon complication of rhinologic surgery. An equally devastating consequence of rhinologic surgery is the death of the surgeon at the hands of the patient or the family member. While these events are rare, there is a reason to be concerned about a growing threat toward the surgeon and the cosmetic surgeon in particular. Specific psychologic profiles of potential problem patients will be reviewed and advice provided on ways that surgeons can protect themselves in what appears to be an ever more violent world.

8:00-8:05
Plenary 1

ALLERGIC INFLAMMATION OF THE UPPER AND LOWER RESPIRATORY TRACT

James A. Hadley
University of Rochester Medical Center, Mayo Clinic, Mayo Foundation, Rochester, MN, USA

Allergic inflammation has evolved from a limited comprehension of the role of the mast cell by Ehrlich in the late 1800's to a defined molecular study of the interactions of cytokines and induction of host defense mechanisms. Both humeral and cellular mechanisms are set into motion after antigenic assault. The role of these mechanisms are relationships of the upper and lower respiratory tract will be reviewed by the presentations.

8:05-8:20
Plenary 1

CYTOKINES IN ALLERGIC RHINITIS ANS RHINOSINUSITIS

Claus Bachert
ENT Dept., University Hospital, Ghent, Belgium

Allergic Rhinitis, sinusitis and nasal polyposis are all characterized by an underlying inflammatory reaction, which needs to be orchestrated by different inflammatory cells, cytokines, chemokines ans adhesion molecules. Although these diseases share a great part of their pathology, involving unspecific pro-inflammatory factors, they may also be differentiated on the basis of specific pro-neutrophilic, pro-eosinophilic or IgE-modulating factors. We could recently show that disease entities can not only be differentiated clinically, but more precisely in terms of cytokine patterns involved. Allergic rhinitis is typically characterized by unspecific pro-inflammatory response (IL-1, TNF) as well as a specific Th2-driven cytokine synthesis, regulating selective migration of eosinophilic nasal polyposis can clearly be differentiated from a choanal polyp in terms of cytokines, and is dominated by IL-5 and other markers for eosinophilic activation are furthermore related to tissue IgE, again being significantly higher in polyp tissue compared to allergic mucosa. However, the analysis of specific IgE in polyps revealed a so far unknown polyclonal IgE formation, clearly differing from allergic rhinitis, which points to a different pathomechanism, possibly driven by bacterial superantigens. In summary, the studies of cytokines and other mediators may help not only in understanding pathomechanisms, but also differentiating diseases and characterizing therapeutic targets.

8:20-8:35
Plenary 1

RECENT UNDERSTANDING OF THE MECHANISMS OF ALLERGIC RHINITIS

R. Pawankar, S. Yamagishi, R. Takizawa, T. Yagi.
Dept. of Otolaryngology, Nippon Medical School, Bunkyo-Ku, Tokyo, Japan

Purpose : The prevalence of allergic diseases has been increasing. The chain of events that lead to the allergic immune response includes the recognition of allergen by the antigen activation of T cells to produce cytokines like IL-4 and IL-13, the synthesis of IgE by B cells, binding of the IgE to the high affinity IgE receptor (FceRI) on the surface of mast cells, and on subsequent exposure to the allergen, the cross linking of the bound IgE-FceRI complex with multivalent allergen resulting in inflammatory mediator release. This immediate phase response (IPR) occurs within seconds followed by the late phase response (LPR) with a recurrence of symptoms that persists for 24 hours. The LPR is largely inflammatory. The T cell-derived cytokines unregulate the expression of adhesion molecules like VCAM-1 and ICAM-1 on endothelial cells, resulting in the infiltration of eosinophils and basophils which subsequently release a number of soluble products like prostaglandins, leukotrienes, PAF, ECP, and MBP leading to the LPR. Yet, recent studies have shown that mast cells cannot be simplistically assigned a role in the IPR. Here, we will discuss the novel roles of mast cells in modulating IgE-mediated allergic inflammation.

Methods : We investigated the functional characteristics of nasal mast cells (NMC) in patients with perennial allergic rhinitis (PAR) versus those from patients with chronic infective rhinitis (CIR).

Results : NMC from PAR patients expressed increased levels of Th2 type cytokines, the FcεRI, and the CD40L. NMC from PAR patients exhibited increased expression of β1 integrins and on interaction with fibronectin produced increased amounts of IL-4, IL-13 and TNF-α, and interaction of NMC with epithelial cells (EC) resulted in the enhanced production of key cytokines/chemokines from EC.

Conclusion : Thus the mast cell is involved in the allergic inflammation, and plays a pivotal role in modulating ongoing allergic inflammation.

8:35-8:50
Plenary 1

MECHANISMS OF EOSINOPHIL-ASSOCIATED TISSUE DAMAGE

G.J. Gleich
Mayo Clinic, Mayo Foundation, Rochester, MN, USA

For many years, the eosinophil was regarded as a cell needed to repair tissue damage after mast cell-mediated anaphylaxis. Results over the past two decades have indicated that eosinophil granules are composed of a series of cationic, cytotoxic and cytostimulatory proteins. In vitro, these proteins alter tissue functioning and, in particular, mimic many pathophysiological abnormalities present in bronchial asthma. Studies of patients with eosinophil-associated diseases have shown an association between release of eosinophil granule proteins and severity of disease, and eosinophil granule protein proteins have been localized on damaged tissue. Thus, a significant amount of information supports a role for the eosinophil in tissue damage. In this presentation, the properties of the principle eosinophil granule proteins and evidence supporting their role in disease will be reviewed. Finally, new in formation suggests that two eosinophil granule proteins, namely the eosinophil ribonucleases, eosinophil-derived neurotoxin and eosinophil cationic protein, may function to kill RNA viruses. One study in a guinea pig model of virus infection showed that sensitized animals treated with anti-IL-5 prevent eosinophilia were also lacking immunity. Thus, the eosinophil may not only be pro0inflammatory and may cause tissue damage, but may also limit RNA virus infections.

9:05-9:20
Plenary 1

RHINITIS ANS ASTHMA: A NASOBRONCHIAL LINK?

R. Eccles
Common Cold Centre, Cardiff University, Wales, United Kingdom

There is much information that indicates that rhinitis can have a significant influence on the lower respiratory tract and there has been some speculation about the nature of the interaction between the nose and bronchi- a so called ‘nasobronchial link’. There is evidence in the literature which reports that activation of allergic and infectious rhinitis or sinusitis causes an exacerbation of the symptoms of asthma. This presentation will review the evidence of studies in man and animals about the possible mechanisms of a nasobronchial link. The following mechanisms will be considered-

1. Progression of the inflammatory response down the airway
2. A nervous reflex from the trigeminal to vagus nerves
3. Aspiration of inflammatory mediators in nasal mucus by post nasal drip
4. Circulation of inflammatory mediators via the blood- a humoral link from nose to bronchi

10:50-11:05
Symposium 5

THE ROLE OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS) IN THE TREATMENT OF CHRONIC RHINOSINUSITIS

David W. Kennedy
University of Pennsylvania Medical Center, Philadelphia, PA, USA

The etiology of chronic rhinosinusitis is multifactorial, in which genetic, environmental, general and regional host factors all appear to play a part. For this reason, the primary therapy of chronic sinusitis is long term medical management. However, a key event in the disease process occurs when the ostiomeatal complex becomes obstructed initiating chronic infection and increasing any predisposition towards reactive mucosal disease. Additionally, over time the adjacent bony partitions become involved in the disease process and this involvement may become a factor in disease persistence. Functional endoscopic sinus surgery provides the ability to restore mucociliary clearance and ventilation to the sinuses and to completely and precisely remove involved bony partitions in the region of disease. At the same time, access for the use of topical steroids is maximized. Mucoperiosteal preservation is an critical aspect of a surgical procedure aimed at restoring mucociliary clearance. Long term medical therapy is imperative, particularly in patients with diffuse mucosal changes. Overall, functional endoscopic sinus surgery combined with careful postoperative management has been shown to result in an improvement in patients symptomatology in 98% patients at 8 years following intervention. Functional endoscopic sinus surgery is therefore an extremely effective adjunct in the overall therapy of chronic rhinosinusitis.

11:05-11:20
Symposium 5

ALLERGIC FUNGAL SINUSITIS

RICHARD L MABRY
UNIV OF TX SOUTHWESTERN MED CTR, DALLAS, TX, USA

In little more than a decade, allergic fungal sinusitis has gone from a medical curiosity to one of the more perplexing problems to challenge the otorhinolaryngologist. At the University of Texas Southwestern Medical Center, we utilize the following approach to allergic fungal sinusitis: 1) Careful pre(c)operative evaluation and medical preparation, 2) Meticulous exenterative surgery, 3) Closely supervised immunotherapy with relevant fungal and non(c)fungal antigens, 4) Medical management including topical and systemic corticosteroids as needed, 5) Irrigation and self(c)cleansing by the patient, and 6) Close clinical follow(c)up with endoscopically(c)guided debridement when necessary. This combination of thorough surgery, close follow(c)up, and appropriate immunotherapy have greatly reduced the need for steroid therapy in these patients, eliminated the need for maintenance systemic steroids, and drastically reduced the rate of revision surgery.

11:20-11:35
Symposium 5

INDIVIDUAL MONITORING OF ASPRIN DESENSITIZATION

Wolf J. Mann, J. Gosepath, D. Schafer, R.G. Amedee
Dept. of Otolaryngology-HNS, University of Mainz, Mainz, Germany
Dept. of Otolaryngology-HNS, Tulane-University, New Orleans, USA

Background: Patients suffering from aspirin sensitive rhinosinusitis, which is frequently associated with intrinsic bronchial asthma, can be desensitizing by a long-term treatment with oral aspirin. The exact mechanisms of this desensitization remain obscure, but modulations of the eicosanoid pathway occur and can be monitored by an in vitro assay on mixed leukocyte cultures. **Methods**: Thirty patients with Aspirin Intolerance, who were treated following a desensitization protocol with only 100mg of oral aspirin per day, were followed over one year and reassessed every three months. **Results**: Twenty-five patients showed a normalization of in vitro eicosanoid levels during this period, four showed some improvement and one individual showed no therapeutic effect on eicosanoid release. Clinical follow up revealed a very low recurrence rate of nasal polyposis with recurrent disease only in four individuals without normalization of eicosanoid release levels. Furthermore a reduction of the average incidence of purulent episodes of sinusitis was seen after one year. None of twelve patients with asthma experienced marked improvement in pulmonary function. Fourteen of sixteen individuals with marked impairment of nasal breathing felt an increase of nasal patency and seven of eleven patients with pretreatment hyposmia had improved sense of smell after one year. **Conclusions**: These results indicate that desensitization therapy in patients with aspirin sensitive rhinosinusitis can be successfully performed with low oral doses of aspirin and that the individual course throughout the desensitization can be monitored with the help of an in vitro analysis of eicosanoid release from mixed leukocyte cultures.

10:50-11:05
Symposium 6

EPICUTANEOUS/FIXED INTRADERMAL TESTING

Jacquelynne P. Corey, Jay S. Rechteweg
The University of Chicago, Chicago, IL, USA

Purpose: The purpose of this review is to describe prick intradermal methods of epicutaneous /fixed intradermal testing and their common use, with a comparison of its advantages, disadvantages, and comparison to other methods of testing.

Methods: The practice parameters and clinical guidelines of major allergy societies, major textbooks, and a Medline search of the literature for the last 10 years, as well as reviews of cited literature from the above sources was utilized to summarize the current literature and prick/intradermal testing.

Results: Epicutaneous tests for allergies have been used since 1873. Older tests included “scratch” methods, which have been generally abandoned due to poor reproducibility. “Prick” epicutaneous testing is the standard of testing used in the U.S. by many physicians, including allergy specialists. Common methods in use include the Morrow Brown needle, multitest device, and others. Testing is quick and reproducible. Intradermal testing was introduced to check for higher level sensitivity. Several types of intradermal tests exist; however, most U.S. allergists use 1:10 dilutions. Variations, using 1:5 and 1:3 dilutions also exist. One to five dilution testing is commonly used for SET and 1:3 is used to standardize extracts by the U.S. FDA. Controversy exists, however, about the assumption that intradermal tests should follow prick tests. Some newer studies suggest that prick tests alone may be sufficiently sensitive, making intradermal testing unnecessary. Other controversies concern the exact type of device preferred and reproducibility between test sites. Standardization of technique and of allergen extracts is beginning to reduce this variability. Advantages include rapid results and an easy-to-learn technique. This type of testing is recognized as valid by national and international professional societies, including the American College of Allergy, Asthma, and Immunology, The American Academy of Allergy, Asthma, and Immunology and the American Academy of Otolaryngic Allergy.

Conclusions: Epicutaneous/fixed intradermal testing is a rapid method of assessing inhalant allergies in common use.

11:05-11:20
Symposium 6

SERIAL ENDPOINT TITRATION

Edwyn L. Boyd

Although not the first to use the term serial endpoint titration (SET), I, Chandler Walker, in 1917, was one of the first to utilize a crude titration technique to quantitate sensitivity for the safe initiation and escalation of allergenic extract injection immunotherapy for the pre-seasonal treatment of hay fever. As more allergens became available for testing and treatment it became apparent that different degrees of skin reactivity to the different allergens could exist simultaneously within the same patient and the technique was refined. SET, as we know it today, was born of the need for a safe method of co-seasonal testing and treatment. The current method, as employed by many practitioners, utilizes five-fold serially diluted extract as reported by Rinkel in 1949.l The technique of SET is not only qualitative, but also quantitative, allowing for the specific treatment of multiple allergens that demonstrate different degrees of sensitivity within the same patient. As with all other testing techniques, selection of allergens for testing and treatment utilizing SET requires that the physician obtain an accurate history that implicates allergic disease as the principle cause for the patient's symptoms.

11:20-11:35
Symposium 6

SUBLIMINAL IMMUNOTHERAPY

David L. Morris
Allergy Associated of La Crosse, Ltd., La Crosse, WI, USA

There was over 40 recent studies proving the value of oral (sublingual/swallow) immunotherapy. Many papers are from Italy and a substantial number come from France and Spain. Studies have included the use of sublingual antigens for pollens, dust mites, molds and nickel. A selection of these papers will be presented and some comparison studies with sublingual and injection therapy of molds will be presented.

There have been very few studies coming from the United States, and there was nearly a 30 year gap in studies published in American allergy journals. The use of oral immunotherapy has been expanding rapidly in Europe. In Italy nearly 50% of the immunotherapy in some areas is by the oral (sublingual/swallow) route.

Sublingual treatment has been particularly valuable in mold, yeast, and chemical problems.

10:35-10:50
Symposium 7

SURGERY OF THE VALVE

ANATOMY AND PHYSIOLOGY OF THE VALVE

A.F. van Olphen
University Medical Centre, Utrecht, The Netherlands

Al functions of the nose depend on the interaction between the air and the mucous membranes. The valve is a part of a complex system that distributes the air over the nose and creates a turbulent flow that facilitates this interaction. The distribution of air over the nose requires a dynamic system that is regulated by the autonomous nervous system, although there exists a muscular system around the valve that can open it. From a functional point of view it has little importance other than perhaps to prevent collapse of the ala during inspiration. This is different from the situation in marine animals. In these animals the normal state of the nose is closed, whereas it opens during inspiration. Regulation of the airflow in the human nose is achieved by changing the congestion of the inferior turbinate and the septal intumescence. Consequently the valve is only a part of the functional unit that regulates the airflow. The unit as a whole is designated as the valve area. Most disturbances in nasal function are described as nose blocking. This is true even in conditions where the nose is too wide. Therefore the objective of functional nasal surgery is to reconstruct normality in terms of the anatomy of the valve area and the airflow of the nose rather than lowering the resistance of the nasal airflow.

10:30-10:35
Symposium 7

SURGERY OF THE VALVE – WHAT WORKS? WHAT DOES NOT?

Richard L. Goode
Stanford University, Stanford, CA, USA

A number of surgical procedures have been described over the years to correct internal nasal valve collapse at normal inspiratory negative pressures. The procedures can be divided broadly into four areas:
1) Stiffening of the internal nasal valve area with battens of cartilage or alloplastic materials. 2) Moving the upper lateral cartilage outward by means of spreader grafts or out-fracturing of the nasal bones. 3) Direct surgery on the limen vestibularis using a z-plasty or rotation flaps. 4) Suture techniques which outwardly buckle the upper lateral cartilages or pull the valve outward. All of these procedures have been advocated as effective in the hands of the reporting surgeon(s); there is very little long-term data available. It is also possible that a combination of procedures would be more effective than a single procedure.

In my experience over the past 30 years performing and evaluating a variety of procedures, I believe stiffening the valve with an implant is the best approach, and makes the most sense. The paper will describe the technique used with a comparison to other techniques, including complications.

11:05-11:20
Symposium 7

"M" PLASTY OF THE NASAL VALVE

Fausto López Infante
Cirugia Reconstructiva Funcional de la Nariz, Mexico

We present a modification of the Joseph's approach, which consists of a muco-cutaneous medial incision exactly at the junction of the intercartilaginous incision and the hemi transfixion in each side.

We demonstrate the advantages with a seven minute video.

11:05-11:15
Symposium 8

CAS UTILIZING BRAINLAB VECTORVISION

L. Klimek
German Center for Diagnostics, Wiesbaden, Germany

Purpose To develop new components for the optical computer-aided surgery (CAS) device VectorVision and to evaluate its accuracy and usability under laboratory and intraoperative conditions.

Study design Prospective study utilizing laboratory experiments and intraoperative data collection.
Methods New components for the passive optical CAS system VectorVision were developed. Laboratory accuracy measurements were obtained on a plexiglas model with known coordinates of fiducial markers, before and after predefined table movements. Intraoperative accuracy measurements were recorded from 42 patients undergoing endonasal surgery of the paranasal sinuses.

Results The system demonstrated laboratory accuracy to within 0.86mm (SD 0.94mm). Intraoperative accuracy was within 1,14mm (SD 0.57mm) (old) and 1.04mm (SD 0.41mm) (new registration technology) ($p<0.05$). One of the main advantages system was the possibility of using any common instrument or endoscope by adapting a marker array. The new registration technology highly improves handling comfort and usability in daily practice.

Conclusions Passive-marker technology has been demonstrated to be useful for optical position determination in computer-aided surgery.

11:25-11:35
Symposium 8

TOWARDS THE LIMITS OF ENDOSCOPIC SURGERY: TRANSNASAL RESECTION OF A LARGE TUMOR OF THE ANTERIOR SKULL BASE OF UNCERTAIN HISTOLOGY

Wolfgang Köle, Heinz Stammberger
University ENT-Department, Graz, Austria

This video demonstrates our endoscopic approach to a large expansile lesion of the anterior skull base, filing both anterior and posterior ethmoid, all of the sphenoid sinus and apparently infiltrating the right orbit. On the initial CT-scan, the lesion appeared to infiltrate the dura of the anterior skull base as well as the superior parts of the septum up to the orbit of the other side. MRI demonstrated no clear signs of infiltration but of significant displacement or vital structures. Despite repetitive biopsies, histology could not be established at first. Under the working diagnosis of neurogenic lesion of the anterior skull base, endoscopic resection under VTI-InstaTrak navigation was attempted. Sodium fluorescein was used erethically.

The lesion presented as a fibrous very dense and almost immotile lesion which originated from the dura and/or the perineurium of olfactory fibers on the right. Complete resection was achieved including an 8 x 6 mm dural area, which was patched with fascia lata.

Postoperative course was uneventful, the final histology revealed a solitary, fibromatous benign tumor.
This is one of the most unusual benign lesions we ever resected endoscopically at our department.

11:25-11:35
Symposium 8

VTI-IMAGE NAVIGATION IN BORDERLINE CASES

Wolfgang Köle, Heinz Stammberger
University ENT-Department, Graz, Austria

Image guided navigation has developed into a helpful and reliable tool in endoscopic sinus and anterior skull base surgery. The VTI-InstaTrak-System has been extremely helpful in endoscopic approaches in complex situations. Based on the precise anatomical orientation provided by the system, the limits of endoscopic surgery have been pushed further and, now include approaches to and through the clivus, to the apex of the pyramid, early type-III nasopharyngeal angiofibromas and in selected cases, malignant lesions of the region as well.

By reassuring the surgeon and enhancing the degree of confidence – it has become possible to bypass the internal carotid artery or to circumnavigate it when dealing with processes of the clivus or the apex of the pyramid.

As of June 2000, we have treated 48 patients with invasive/destructive tumors of the paranasal sinuses and the anterior skull base strictly endoscopically.

We will demonstrate the use of a VTI-InstaTrak in “borderline” cases which we believe may not have been accessible with the same degree of safety without navigation. The examples include:

Endoscopic approach to the apex of the pyramid
Endoscopic resection of the clivus chordoma
Endoscopic transnasal removal of a large juvenile angiofibroma
Endoscopic transnasal removal of a 3-T-carcinoma

It is our impression, that part of their use in teaching, complex and revision cases, it is with extended applications where image-guided navigation systems may offer significant help in the future.

10:30-11:50
Mini-Course 11

TREATMENT OF ALLERGIC RHINITIS WITH IMMUNOTHERAPY: THE IMPORTANCE OF QUANTIFICATION

Richard J. Trevino, Maria C. Veling
From the Department of Otolaryngology (R.J.T.), Louisiana State University, San Jose, CA, USA

Allergic rhinitis affects an estimated 36 million Americans making this the fifth most prevalent chronic condition in the United States. Medical therapeutic options in the treatment of allergic rhinitis include environmental modifications to decrease allergen exposure, pharmacotherapy, as well as immunotherapy for those patients who fail to obtain satisfactory relief of their symptoms with medical management.

Skin testing is the best established and most sensitive indicator of allergic disease. Several techniques are currently in use to identify pertinent antigens in the treatment of inhalant allergies. These techniques are described.

In an effort to evaluate the efficacy and safety of serial dilution quantitative intradermal testing, a retrospective medical chart review was performed and the records of 1000 immunotherapy patients were evaluated. These patients had undergone evaluation and treatment of their allergic rhinitis by this technique. After 3 months of immunotherapy, 86% of patients had complete relief of symptoms, 14% had partial improvement and continued to use pharmacotherapy for breakthrough symptoms. There was one systemic reaction during testing, which responded to subcutaneous epinephrine.

We conclude that quantification of skin reactivity to formulate a successful antigen vial for effective immunotherapy is necessary in the management of allergic disease.

10:30-11:50
Mini-Course 12

LATEX SENSITIVITY

Kim E. Pershall
Lubbock, TX, USA

Latex sensitivity was a consistent problem in the 1990s. Anaphylaxis to latex became a major concern at about the same time as universal precautions with mandatory glove use took prominence in the field of medicine. The search for a suitable standardized extract has yet to produce material approved by the Food and Drug Administration that the clinician can utilize in testing patients. In vitro testing is available and is useful as a diagnostic study. The clinical history is still the most important part of diagnosing latex sensitivity. Type and location of reaction, exposure history, and dietary history are all important in suggesting the diagnosis.

At-risk populations can be determined by their frequency of exposure to latex. Occupation exposure is one of the main risk factors, with anyone involved in a latex product industry being at risk. This sensitivity will continue to be a major issue, as the incidence of atopy in certain populations appears to be increasing, and exposure to latex will continue.

The lack of an approved extract after over a decade continues to handicap the allergist seeking to make a diagnosis and consider desensitization. These issues must be addressed and resolved. Exposure concerns in the workplace will continue to be debated in the insurance and legal arenas.

In most cases of sensitive patients, exposure to latex is frequent and difficult to avoid. It is likely that latex sensitivity will continue to be a problem confronting the clinician treating allergic patients.

10:30-11:50
Mini-Course 13

BASIC IMMUNOLOGY FOR THE SURGEON

Scott E. Strome
Mayo Clinic, Mayo Foundation, Rochester, MN, USA

Recently advances in immunology are likely to have significant bearing on the practice of Otolaryngology-Head and Neck Surgery, particularly with regard to treatment of the head and neck malignancies, autoimmunity, and inflammatory/allergic conditions of the nose and paranasal sinuses. The objective of this course is to define specific topics in the field of immunology, which are likely to impact clinical practice. The course will primarily focus on cellular immunity and antigen presentation, with in depth analysis of a specialized class of professional antigen presenting cells termed dendritic cells. The role of a novel group of surface proteins, coned costimulatory molecules, in mediating T cell function post activation, will also be reviewed. Finally, the potential role of dendritic cells and select costimulatory molecules will be evaluated in relation to the pathogenesis and potential treatment of both autoimmunity and solid malignancies of the head and neck.

10:30-11:50
Mini-Course 14

ENDOSCOPIC ENDONASAL DACRYOCYSTORHINOSTOMY: INDICATION-TECHNIQUES-RESULTS

Gerald Wolf, T. Hoffmann, A. Lackner, K. Muellner
ENT University Hospital, Graz, Austria

The endoscopic endonasal technique is an excellent diagnostic and surgical approach to the nasolacrimal system.

The most common indication for an endoscopic endonasal dacryocystorhinostomy (DCR) is obstructions of the nasolacrimal sack and duct following inflammatory processes, trauma and tumors.

In the fist step anatomical studies are presented to demonstrate the best surgical access to the nasolacrimal system.

The surgical technique and the use of instruments included in the KTP-laser are described.

We give recommendations for the postoperative treatment.

Our results indicate, that the endoscopic endonasal DCR is an effective and minimally invasive method to treat obstructions of the nasolacrimal system.

12:55-13:20
Luncheon 1

THE ALLERGIC REPORT: COMMENTS ON GUIDELINES FOR PRACTICE

James A. Hadley
University of Rochester Medical Center, Mayo Clinic, Mayo Foundation, Rochester, MN, USA

Allergies are the sixth leading cause of chronic health disorders in the United States. The results of allergy: rhinitis, sinusitis, asthma, and other allergic problems negatively impact on the quality of life and contribute to the escalation of health care costs. Knowledge of the triggers of allergy and how to treat the disorders that result can improve the patient's illness and lead to a healthy lifestyle. The purpose of the Allergy report is to improve the health and well being of allergy sufferers. Partnering with the National Institute of Allergy and infectious Disease (NIAID), medical professional associations including the AAO-HNS, the AAOA and the AAAAI began a program to educate health care providers and to implement best practice information to manage patients with allergic diseases. This seminar will discuss the results of the task force and address the clinical approach to treatment.

14:05-14:20
Symposium 10

CAUSES OF SYMPTOMS IN RHINITIS

R. Eccles
Common Cold Centre, Cardiff University, Wales, United Kingdom

For many of the most common nasal diseases such as allergic or infectious rhinitis the symptoms are the major component of the disease as the disease processes are not normally a threat to life. It is therefore surprising that most current research has lost sight of the importance of symptoms in nasal disease and has tended to fucus on the molecular and cellular pathophysiology to the symptomatology. This presentation will attempt to bridge the gap in our knowledge by demonstrating that the nasal sensory nerves and humoral factors are a crucial link in the pathophysiology of nasal symptoms.

The following aspects of symptoms will be discussed; cellular changes as a starting point of symptomatology; chemical and physical changes associated with the nasal pathophysiology; trigeminal nerves; and symptoms and psychology.

14:20-14:35
Symposium 10

ANTIHISTAMINES: TOPICAL AND ORAL

Helen Fox Krause
Pittsburgh, PA, USA

One of the major chemical mediators of allergies is histamine. Antihistamines were developed to antagonize this chemical. The newer antihistamines have been found to also antagonize other chemical mediators of both the early and late allergic reactions. The first antihistamines developed relieved the reactions of sneezing, rhinorrhea, and itching but are contraindicated ina number of disease conditions, have some drug interactions, and produce drowsiness and mucosal drying as well as other side effects in susceptible patients.

Second generation antihistamines have special properties as well as relieving the early allergic symptoms. sometimes new antihistamines which are metabolites of earlier drugs are listed as third generation drugs. These seem to have even other additional actions which will be discussed. It appears that some of these newer drugs may also benefit the late allergic reaction. There are oral and topical – nasal and ophthalmic agents.

The drugs available in different parts of the world may vary considerably. I will discuss the drugs now available in the United States, some available in other countries and some still in the research stage. Development of exciting new antiallergic drugs is on the horizon. As more learned about the pathophysiology of allergy, research in designer drugs will be possible.

14:01-14:08
Free Paper
Session 7

POSTOPERATIVE HISTOPATHOLOGIC STUDY OF RABBIT MAXILLARY SINUS

M. C. Khalifa, R. Kamel, A. Khorshid, A. Salama, M. Emam
Cairo University, Cairo, Egypt

Purpose: Endoscopic sinus surgery has been widely adopted by many surgeons. Meanwhile, others still perform conventional surgery. This work aimed at studying the gross and histopathologic changes at the site of the natural ostium and the nasoantral windows as well as within the antral cavity after nasoantral window, middle meatal antrostomy, and radical antrostomy operations in rabbits.

Methods: Twenty-four healthy rabbits were divided into 3 groups: nasoantral window, middle meatal antrostomy, and radical antrostomy. One sinus was operated on and the other side was a control. Exploration was performed after 6 weeks to record changes in the size, contents, and mucosa of the sinus as well as the state of the natural or artificial window. The animals were sacrificed and their heads were processed for histopathologic evaluation for the presence of metaplastic, ciliary, and glandular changes as well as any ulceration or fibrosis.

Results: The artificial nasoantral window was associated with high rates of fibrosis and window closure and it did not improve the rate of postoperative infection. Middle meatal antrostomy was followed by the lowest rate of contraction and suppuration. However, it resulted in noticeable changes at the ostium. Radical antrostomy was associated with a high incidence of mucosal and submucosal abnormalities as well as a high infection rate.

Conclusions: Nasoantral window and radical antrostomy carry a high incidence of postsurgical sequelae and recurrence and are not advised in chronic maxillary sinusitis. Moreover, middle meatal antrostomy should not be performed except when highly indicated owing to histopathologic changes at the natural ostium.

14:08-14:16
Free Paper
Session 7

DOES SMOKING AFFECT THE RESULTS OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY?

Hisham Saleh Khalil
Alexandria University, Alexandria, Egypt

Purpose: Several factors may affect the outcome of functional endoscopic sinus surgery (FESS), including systemic illness, the nature and severity of pathologic changes, and previous surgical procedures. The aim of this study was to determine whether long-term smokers who had FESS had poorer outcomes than nonsmokers.

Methods: This prospective study included 62 patients with infective chronic rhinosinusitis who had FESS: the study group was 32 smokers (each smoked more than 10 cigarettes per day for at least 10 y), and the control group was 30 nonsmokers who had no significant history of exposure to passive smoke. Patients with diffuse polypoid rhinopathy, nasal allergy, systemic illness, immune suppression, or a history of previous nasal surgery were excluded. The Lund and Mackay staging system for rhinosinusitis was used to score symptoms (nasal obstruction, nasal discharge, hyposmia, headache, and facial pain), computed tomography findings, endoscopic appearance (edema, polyps, discharge, and scarring), and the operation performed. The saccharin clearance test (SCT) was performed. All patients had FESS using the Messerklinger technique. Grading of symptoms and endoscopic appearance was repeated at 3 and 6 mo postoperatively. The SCT was repeated at 6 mo.

Results: Multiple t tests and multivariate analysis of variance showed that improvement of nasal obstruction, nasal discharge, and hyposmia after FESS was significantly less among smokers. Smokers also had a significantly higher endoscopic score and a slower saccharin clearance than nonsmokers.

Conclusion: It is important to emphasize to patients who are long-term smokers the possibility of poorer outcomes after FESS.

14:20-14:28
Free Paper
Session 7

MUCOPYOCELES IN ENDONASAL SINUS SURGERY

Barbara Kratzsch, Bernhard Schick, Wolfgang Draf
Klinikum Fulda Pacelliallee, Fulda, Germany

Purpose: Mucopyoceles develop most frequently after operations of the paranasal sinuses. Trauma, tumors, or spontaneous manifestations are infrequent causes. Since the renaissance of endonasal sinus surgery, only case reports and studies including small numbers of patients have been published.

Methods: A retrospective analysis of 197 patients with mucopyoceles (from January 1983 through June 1999) was performed to evaluate the treatment of mucopyoceles.

Results: The evaluation included the main symptoms, the cause of the mucopyoceles (after surgery, 67%; after trauma, 15.7%; spontaneous, 15.2%; due to tumor, 2%), the frequency of occurrence by location (frontal sinus, 43.1%; maxillary sinus, 24.4%; sphenoid sinus, 9.1%; ethmoid 6.6%; multiple locations, 16.8%), the therapy dependent on the location, and the recurrence rate (7 of 197). External approaches (eg, Caldwell-Luc and Jansen-Ritter) frequently caused mucopyoceles of the frontal or maxillary sinus.

Conclusions: Microendoscopic endonasal surgery is, whenever possible, the method of choice to prevent and treat mucopyoceles of the ethmoid, sphenoid, and frontal sinuses. Operations on frontal sinus mucopyoceles medial to the lamina papyracea should be through an endonasal approach, and those almost completely lateral to the lamina papyracea, through an osteoplastic procedure using a coronary incision. We have abandoned completely the external approaches to the frontal sinus (eg, Jansen-Ritter and Lynch-Howarth) because the frequent occurrence of mucopyoceles seems due to the two-thirds resection of the bony margins of the frontonasal drainage.

14:28-14:36
Free Paper
Session 7

DEVELOPMENT OF THE LATERAL NASAL WALL--EVOLUTION OF CONCEPTS

Antoni Krzeski
The Medical University of Warsaw, Warsaw, Poland

Purpose: My purpose is to present the evolution of fundamental notions and concepts concerning the development of the lateral nasal wall. For clarity, the author distinguishes, within several theories, 4 main groups, in accordance with chronology and their basic concepts. I. Concepts based on topographic relationships, from antiquity through Middle Ages until XVIII century. For years, scientists distinguished only 1 ethmoidal concha within the ethmoidal labyrinth in man, which corresponds, according to the present nomenclature, to the middle nasal concha. Morgani (1716) introduced the notion of the second ethmoidal concha, and Santorini described the third concha, corresponding to the supreme nasal concha. II. XIX century. Zuckerkandl (1893) described the human ethmoidal labyrinth as a system of 4 conchae, whereas Killian (1896) introduced the notion of the cardinal ethmoidal concha in man. He also defined the standard human ethmoidal labyrinth, with the medial nasal concha being its most constant and characteristic element. III. XX century. The combination of rigid endoscopy and computed tomographic scanning, allowing the application of new surgical techniques in the management of sinus diseases, greatly enhanced the knowledge of the anatomy of that region. As the evolution remains the "clue" to define anatomic relationships, the development of the lateral nasal wall has appeared as a subject of practical significance. However, concepts of Messerklinger, Stammberger, and others are largely based on the XIX century notions. IV. Latest studies do not entirely support actual statements concerning the development of the lateral nasal wall.

14:40-14:48
Free Paper
Session 7

ENDONASAL SINUS SURGERY: EXTENDED VERSUS LIMITED APPROACH

M. Kühnemund, A. Lopatin, A. Pilipenko, W. J. Mann
Mainz Medical School, Mainz, Germany

Purpose: Endonasal sinus surgery can be performed in a limited fashion, providing for ventilation drainage, or in a more extended form, removing all diseased mucosa. This study compares results of both methods.

Methods: We assessed 65 patients with chronic rhinosinusitis who underwent endonasal sinus surgery using both strategies. Patients were randomized and evaluated 3 and 6 mo postoperatively. The results were graded in a system of symptom score, endoscopic score, functional nasal clearance test, and a computed tomography score.

Results: According to these results, the extended approach tends to improve the symptomatology, whereas the endoscopic findings were similar.

14:48-14:56
Free Paper
Session 7

APPROACH TO THE HOSPITALIZED PATIENT WITH SPHENOID SINUS DISEASE

Zan Mra and Jeffrey Roach
Montefiore Medical Center, Bronx, NY, USA

Purpose: Headache is the most frequent manifestation of acute sphenoid sinusitis and may prompt the clinician to order a computer tomographic scan of the paranasal sinuses for diagnosis. Sphenoid opacifications may also be discovered incidentally during the radiologic work-up of patients with fever of unknown origin or neurologic changes. In the latter instance, an otolaryngology consultation is usually requested to aid in diagnosis and treatment. This inevitably leads to some form of surgical intervention in most cases.

Methods: Ten patients who underwent sphenoidotomy for drainage or biopsy at Montefiore Medical Center from September 1995 through January 2000 are presented. In addition, similar cases reported in the literature are reviewed to compare the presentations and the pathologic findings.

Results: All but 2 patients had predisposing factors such as AIDS, diabetes, leukemia, and end-stage renal disease. The most common presentation was altered mental status. One patient rapidly developed cavernous sinus thrombosis. Microbiology of sphenoid cultures included various fungi, *Mycobacterium avium-intracellulare*, coagulase-negative *Staphylococci*, and *Corynebacterium*. Neoplastic processes included non-Hodgkin lymphoma and sinonasal undifferentiated carcinoma.

Conclusions: When evaluating hospitalized patients with sphenoid sinus disease, a thorough history and a bedside nasal endoscopy should be performed. Conservative management in the form of intravenous antibiotics and topical decongestion should always be the first line of treatment. Patients with clinical or radiologic evidence of disease extending beyond the confines of the sphenoid sinus require immediate surgical intervention.

15:00-15:08
Free Paper
Session 7

THE FUTURE APPLICATION OF THE ROBOTIC ARM (AUTOMATIC ENDOSCOPIC SYSTEM FOR OPTIMAL POSITIONING OR AESOP) WITH VOICE RECOGNITION (VR) IN SINUS ENDOSCOPIC SURGERY: PRELIMINARY REPORT

Marcelo A. Obando and John Payne
Kaiser Permanente, Honolulu, Hawaii

During some cases of endoscopic sinus surgery, we had the opportunity to apply the robotic arm (AESOP) with voice recognition (VR). The AESOP replaces the surgical assistant by holding and focusing the endoscopic lenses under the direction of the surgeon by VR, thus allowing the surgeon use of both hands. The lenses are kept clean via a closed circuit system. Presently, we are suggesting some modifications in the AESOP for a better adaptation of the endoscopic lenses. The application of the AESOP with VR in sinus endoscopic surgery requires some training by the surgeon.

15:08-15:16
Free Paper
Session 7

LONG-TERM EFFICACY OF ENDOSCOPIC SINUS SURGERY IN PATIENTS WITH ASTHMA AND CHRONIC SINUSITIS

James N. Palmer, David B. Conley, Rakesh Chandra, Robert C. Kern
Northwestern University and Searle, Chicago, IL, USA

Purpose: No study has closely objectively monitored long-term improvement in asthmatic complaints more than 1 y after endoscopic sinus surgery (ESS). We recently reported 1-y follow-up of 15 patients with asthma and chronic sinusitis who underwent ESS between 1994 and 1996. The current study analyzes 4-y follow-up data on these patients.

Methods: Study criteria include the following: chronic sinusitis, 1-y preoperative and multiple-y postoperative follow-up from ESS, and asthma requiring inhaled steroids and oral prednisone for control. Number of days and total dose of oral prednisone were used as objective measures of asthma control. Number of weeks of antibiotics was used as a relative measure of sinusitis.

Results: In the first postoperative year, a decrease in prednisone requirement was noted. In the second postoperative year, all 15 patients decreased their prednisone requirement in days and in total dose of prednisone compared with preoperative use (days, 84 vs. 63, $P < 0.0003$; dosage, 4,201 mg vs. 2,939 mg, $P < 0.04$). For the 11 patients with 3-y postoperative data, again a statistically significant decrease in prednisone requirement was noted, in days and in dosage ($P < 0.05$). This relationship held consistent for 5 of the 6 patients with 4-y follow-up. Although number of weeks of antibiotics decreased in the first postoperative year, in subsequent years the decrease was not statistically significant.

Conclusion: This study provides objective evidence for the long-term efficacy of ESS in the management of patients with chronic sinusitis and asthma.

14:01-14:08
Free Paper
Session 8

OUTCOMES ASSESSMENT OF REVISION ENDOSCOPIC SINUS SURGERY

Liana Puscas, Uttam Sinha, Rick Rosen, Omid Shaye, Dale Rice
University of Southern California, Los Angeles, CA, USA

Purpose: To assess improvement of symptoms in patients undergoing revision endoscopic sinus surgery (rESS) and to correlate this improvement with clinician perceptual assessment.

Methods: Retrospective study using a postoperative questionnaire to obtain quantitative subjective measurements of improvement after rESS. Of 638 patients receiving rESS between 6/92 and 9/97, 205 responded. Patients were asked to rate the severity of 17 symptoms, medication use, number of infections, and overall satisfaction with surgery. Mean follow-up was 32 mo.

Results: Moderate to substantial improvement in overall symptoms was reported by 78.7% of patients. Facial pain/pressure, headache, and nasal obstruction were the most common presenting complaints. Of patients presenting with 1 or more of these 4 complaints, 78% reported a moderate to substantial improvement. Improvement in hyposmia/anosmia was reported by 44% of patients. Overall, 85.2% would recommend ESS to a friend or a family member. Endoscopic findings of patent sinus ostia or ostia clear of any drainage at 1-mo follow-up each correlated significantly with symptom improvement ($P = 0.001$ and $P = 0.010$, respectively). Eight percent of the study patients required another ESS during the follow-up.

Conclusion: rESS is a safe and effective procedure for chronic sinusitis. Patient satisfaction is high, and the need for repeat operations is low. Patients whose ostia remain patent or free of drainage after healing from surgery are more likely to report a subjective improvement in their symptoms.

14:08-14:16
Free Paper
Session 8

OUR EXPERIENCE WITH FESS IN CHILDREN

Ranko Risavi, Ivica Klapan, Sasa Janjanin
ENT Dept. Medical Faculty, Zagreb, Croatia, Europe

Purpose of the study: Between 1993 and 2000 we performed FESSS on 65 children with complications of acute rhinosinusitis, foreign bodies, antrochoanal polyps, conchae bullosa and nasal polyps. We wanted to evaluate which were the most frequent complications among the operated children in the postoperative evaluation.

Methods: CT axial and coronary tomograms were done before FESS procedures. In preoperative # weeks we treated patients with polyposis by cortisone till 12 mg per os, and Fluticasone Propionate nasal spray 100 ng once a day. Patients with rhinosinusitis were treated with antibiotics. Other patients were without preoperative pharmaceutical therapy.

Results: We operated 28 children with a complication of acute rhinosinusitis and the propagation of the process toward the orbit (periorbits), 6 with an ethmoid and sphenoid foreign body, 26 with antrochoanal polyp and within them 8 with conha bullosa, and 5 with nasal polyposis associated with cystic fibrosis. The children's age was between 8 and 26 years. In 5 out of 28 (17.8%) operated because of complications of acute rhinosinusitis, there were synechiae in OMC. In 4 out of 26 (23.5%) with antrochoanal polyp there was a relapse, and in 3 out of 5 (60%) with nasal polyposis associated with cystic fibrosis relapse was noticed to.

Conclusions: We believe that FESS is very appropriate method for the treatment of complications of rhinosinusitis and polyposis in children, and it is more functional, precise and acceptable than other procedures recommended in the past years. The most common complications during postoperative care were synechiae and relapse.

14:20-14:28
Free Paper
Session 8

ISOLATED SPHENOID SINUS LESIONS

Michael R. Shohet, Ozcan Cakmak, E. B. Kern
Mayo Clinic and Mayo Foundation, Rochester, MN, USA

Purpose: Pathologic conditions involving the sphenoid sinus alone are rare.

Methods: A retrospective chart review was performed of 182 cases of isolated sphenoid sinus lesions seen at our institution between 1935 and 1998.

Results: There were 53 cases of sinusitis and the rest were divided among numerous other pathologic entities. Symptoms, differential diagnosis, and various therapeutic modalities are discussed.

Conclusions: We believe that these data will be useful to clinicians considering multiple pathologic possibilities when faced with a lesion involving the sphenoid sinus alone.

14:28-14:36
Free Paper
Session 8

THE USE OF STENTS IN FRONTAL SINUS SURGERY

Michael J. Sillers and Christy A. Richter
The University of Alabama-Birmingham, South Birmingham, AL, USA

Functional endoscopic sinus surgery has become the standard of care for medically refractory chronic rhinosinusitis since its introduction in the United States in 1985. With improvements in instrumentation, the frontal recess and frontal sinus have been successfully treated with a decreased need for traditional open, obliterative procedures. However, achieving long-term patency in the frontal recess is one of the most difficult challenges in surgery of the paranasal sinuses. Measures ranging from meticulous postoperative debridement to frontal sinus stenting have been described to help ensure success in this area. The purpose of this paper is to retrospectively evaluate 20 patients in whom frontal sinus stents were used. The indications for frontal sinus stent placement, duration of stenting, complications of stenting, and frontal sinus patency rates will be discussed.

14:40-14:48
Free Paper
Session 8

PROSPECTIVE STUDY--ENDONASAL SURGERY OF THE PARANASAL SINUSES

D. Simmen, Th. U. Kaufmann, B. Heinz
University Hospital, Zurich, Switzerland

Purpose: Although chronic rhinosinusitis (RS) is a common disease, the optimal therapy is still controversial. In a prospective study we analyzed the outcome of 69 patients treated according to a protocol at the University Hospital, Zurich, between 1998 and 1999. The follow-up was 1 year.

Methods: The patients were classified and staged according to their medical history, clinical findings, and computed tomograms in chronic infectious RS (group 1) and chronic hyperplastic RS (group 2). All patients underwent first a conservative therapy with topical steroids and saline irrigation. If their complaints persisted, we started with a systemic therapy with antibiotics and steroids. If the patients still suffered from the disease (eg, nasal blocking, facial pain, posterior rhinorrhea, loss of sense of smell) under an optimal conservative therapy, we proposed endoscopic endonasal surgery. The patient's complaints and clinical and computed tomographic findings are marked in a protocol preoperatively. The same procedure is done 6 wk, 3 mo, 6 mo, and 1 y after the operation.

Results: Sixty-nine patients have been investigated (group 1, 30; group 2, 39). Preoperatively, the average score was 14.9 (group 1, 13.2; group 2, 16.5), the median score was 14 (group 1, 12.5; group 2, 16), and the standard deviation was 5.7 (group 1, 4.9; group 2, 6.1). One year after the operation, the average score was 2.7 (group 1, 3; group 2, 2.4), the median score was 2 (group 1, 1; group 2, 2), and the standard deviation was 2.6 (group 1, 2.8; group 2, 2.6).

Conclusions: We demonstrated the benefit of endoscopic endonasal microsurgery for patients with chronic RS who still suffered from the disease despite an optimal conservative therapy.

14:48-14:56
Free Paper
Session 8

LONG-TERM RESULTS AFTER FRONTAL SINUS DRAINAGE ("DRILL OUT") PROCEDURE

D. Simmen and D. Holzmann
University Hospital, Zurich, Switzerland

Purpose: Most cases of frontal sinus disease can be treated by standard endonasal endoscopic approaches. For refractory cases or those with severe pathologic features, the endonasal frontal sinus drainage procedure (FSDP) has at times been successful and spared the patient the morbidity of an external approach. Although this technique is not new, we present our long-term results after FSDP.

Methods: Prospective analysis was performed on the efficacy of FSDP in patients for whom endoscopic sinus surgery had failed or in primary cases with severe pathologic features. The technique uses a diamond burr to remove solid bone (frontal spine) obstructing the sinus drainage and allows a wide opening to the frontal recess while causing minimal mucosal damage. Unilateral drainage (extended FSDP) and bilateral drainage (median FSDP) are used. Outcome measures were obtained regularly with a subjective symptom score, endoscopic findings, and follow-up computed tomography.

Results: With an average of 35 mo of follow-up, over 90% of patients were either free of symptoms or substantially improved after the FSDP. Six patients required revision surgery (extended the opening into a median drainage procedure) for adequate relief of symptoms. In 1 case we had to obliterate the frontal sinus with abdominal fat through an external approach.

Conclusions: The FSDP is highly successful in the treatment of frontal recess disease, particularly in those cases of severe abnormality or difficult anatomy. It may be used in those cases refractory to standard endoscopic sinus surgery in which an external approach and frontal sinus obliteration are contemplated.

15:00-15:08
Free Paper
Session 8

ENDONASAL ENDOSCOPIC MANAGEMENT OF RHINORRHEA

J. Svárovsk´y
Central Military Hospital, Prague, Czech Republic

Purpose: The most frequent mechanism of origin of cerebrospinal fluid (CSF) leaks by functional endoscopic surgery (FES) is inadequate radicalism of surgery in critical areas of the operation field, often with help of factors which increase the risk of an injury (postoperation states, inadequate operation technique, insufficient visualization, damage of bony wall). We diagnose rhinorrhea from basic biochemical evidence and mainly cisternography, especially high-resolution computed tomography, which not only qualitatively manifests rhinorrhea but simultaneously determines localization and extent of rhinobase defect.

Method: We present our endonasal method with the use of myofascial flap from fascia lata and fibrin glue taken preoperatively.

Results: The authors closed endonasally endoscopically 19 cranial-nasal communications with rhinorrhea: 1 was a meningoencephalocele and 1 was a meningocele. Localization of the defect of rhinobases was 11 sphenoid sinus, 4 roof of ethmoids, 4 lamina cribrosa. Etiology of liquorrhea: 7 spontaneous (4 posttraumatic), 5 after FES, 5 after transseptal hypophysectomy, 2 craniotomy.

Conclusion: Endoscopic endonasal management enables a minimally invasive aimed intervention which is linked with lower morbidity than other surgical approaches.

15:08-15:16
Free Paper
Session 8

THE CONTRIBUTION OF FUNCTIONAL ENDONASAL SURGERY FOR TREATMENT OF DISEASE OF THE LOWER AIRWAYS

J. Svárovsk´y, P. Rákosník, O. Veselá, P. Krejeí
Central Military Hospital, Prague, Czech Republic

Purpose: Between November 1992 and June 1999 the authors performed 1,615 operations on 912 patients: 301 (33% of patients) were affected also in lower airways.

Methods: One hundred sixty-seven patients (56%) were evaluated (59% male and 41% female). Ninety-three percent of patients have been operated on bilaterally; 82% of the operations were done in the range of pansinus operation. The average age of the patients is 46 y (15-74 y); average length of postoperative follow-up is 38 mo (10-74 mo). Subjective marking was by a questionnaire (general postoperative state, free nasal breathing, cold, headache, state of lower airways, medicament use). Objective marking was done after judging the functional state of the lower airways (spirometry, BODY test) and endoscopic and allergo-immunologic examinations.

Results: Eighty-eight percent of patients described their general postoperative state as improved, although the results of objective examination are not so impressive.

Conclusion: The authors believe that with adequate indication, functional endonasal surgery has a place within complex treatment of patients with lower airway involvement after conservative treatment has failed.

15:20-15:28
Free Paper
Session 8

TRANSNASAL ENDOSCOPIC MEDIAL ORBITOTOMY

P. Thulasi Das
Chennai Kaliappa Hospital 43, Chennai, Tamilnadu, India

Purpose: Deliberate entry into the orbit under endoscopic vision to deal with purely orbital lesions is a slowly but steadily evolving approach. Transnasal endoscopic medial orbitotomy (TEMO) offers excellent visualization of the lacrimal sac and duct, medial orbit, and orbital apex. The external approaches described earlier to the orbital apex have not been satisfactory, owing to the difficult anatomic location.

Methods: A technique to retract the medial rectus, which is the major obstacle in visualizing the orbital apex through a medial orbitotomy, has been developed and routinely used.

Results: TEMO is used in 30 cases, including orbital neoplasm, orbital cysts, orbital foreign bodies, orbital osteoma, orbital abscesses, and dysthyroid orbitopathy.

Conclusion: TEMO appears to offer a simple, less morbid, repeatable alternative to the various external approaches, apart from obviating a scar on the face.

14:08-14:16
Free Paper
Session 9

THE INCIDENCE AND TOPOGRAPHIC ANATOMY OF THE HUMAN NASOPALATINE RECESS AND VOMERONASAL ORGAN

Welby Winstead, Kunwar P. Bhatnagar, Timothy D. Smith
University of Louisville School of Medicine, Louisville, KY, USA

Purpose: Physiologic studies suggesting that humans can communicate by pheromones have renewed interest in the vomeronasal organ (VNO). We undertook this study to precisely describe the topographic anatomy of the human VNO and its opening.

Methods: Nasal endoscopy was performed in 160 subjects and any discernible landmarks on the septum were documented. We also performed macroscopic (26) and serial section (19) examinations of cadaveric nasal septa.

Results: The most conspicuous structures on endoscopic examination of the nasal septum are the nasopalatine recess (NPR) and nasopalatine fossa. We found significant individual variability in their incidence and configuration. The VNO, in contrast, was found in all serially sectioned septa. The septal VNO opening is distinct from the NPR and usually microscopic. Its putative identification was made rarely on endoscopy. When mucosal pits thought to represent the VNO opening were identified in cadavers, they frequently (~50%) failed to correlate with the VNO location found on subsequent serial histologic sections.

Conclusions: Our findings suggest that the VNO opening is usually microscopic and may be confused with openings of mucosal glands on endoscopic examination. Because the NPR and fossa are apparent on macroscopic and endoscopic examination, we suggest that these structures have often been mistaken for the VNO, leading to discrepancies in the literature regarding VNO incidence and location.

14:20-14:28
Free Paper
Session 9

RETHINKING THE ANATOMY AND DEVELOPMENT OF THE BULLA ETHMOIDALIS

Erin D. Wright and William E. Bolger
University of Western Ontario, London, Ontario, Canada

Purpose: The bulla ethmoidalis is the most significant and constant anterior ethmoid cell, and it is thought to play a key role in the pathogenesis of chronic rhinosinusitis. Surgical experience and review of the anatomy and embryology of the anterior ethmoidal region have led to our questioning of the true nature of the ethmoidal bulla as an ethmoid cell or bleb. We currently lack a clear explanation of the mechanism of pneumatization of the ethmoid bulla. It was therefore our aim to further analyze the pneumatization of the ethmoidal bulla and to gain insight into the mechanism of pneumatization of the bulla lamella.

Methods: Fresh human cadaver heads (n = 13, 21 sides) were sectioned in the midline sagittal plane and dissected from the lateral approach with reflection of the middle turbinate. The ethmoidal bulla was classified into 4 categories with respect to the degree of its pneumatization. Analysis of the pneumatization patterns was used to develop a proposal for the mechanism of ethmoid pneumatization.

Results: In all cases the ethmoidal bulla was found to drain posteriorly within the middle meatus. There was variable pneumatization of the bulla, ranging from a rudimentary torus to extensive pneumatization of the bulla lamella with septations. This led to the development of a hypothesis that the ethmoid bulla is not a true air cell but rather an air space behind a variably developed lamella.

Conclusion: Perhaps bulla is not the best term for this structure. It is proposed that pneumatization behind a bulla lamella develops as a result of enlargement of the rudimentary torus and that, like other paranasal sinus pneumatization, it can be variable in its extent.

14:28-14:36
Free Paper
Session 9

MICRODEBRIDER-ASSISTED SEPTOPLASTY ON AN OUTPATIENT BASIS

Chairat Neruntarat
Srinakharinwirot University Vajira Hospital, Bangkok, Thailand

Purpose: Significant improvement has been reported in the measures of nasal obstruction after laser-assisted septoplasty under local anesthesia. The use of microdebriders has become a popular method of performing endoscopic sinus procedures. The purpose of this study was to evaluate the safety and efficacy of microdebrider-assisted septoplasty (MAS) on an outpatient basis for nasal obstruction due to anterior septal deviation.

Methods: Thirty-two patients with nasal obstruction from anterior nasal septal deviation were included. Shaving of the nasal septum was done with a microdebrider on an outpatient basis under local anesthesia. No nasal packing was required. Data on patients were compared from preoperative to postoperative assessment points. Analysis was performed using the Student t test.

Results: All patients tolerated the procedure well, and it was performed in an average of 15 min. The mean follow-up was 6 mo (range, 4-12 mo). Significant improvement was observed in the nasal obstruction scale (6.8 ± 2.1 vs. 2.2 ± 1.8, $P < 0.01$). Rhinomanometry revealed a significant decrease in the mean nasal airway resistance ($P < 0.05$). Epithelialization occurred, and healing was complete in 2 to 3 wk. No significant complications were encountered. There were 3 cases of minor bleeding, which were easily treated. Postoperative pain was rated as minimal (visual analog scale < 4). The overall success rate was 80%.

Conclusion: Nasal obstruction, as reported by subjective and objective results, decreased after MAS. It is a safe and effective procedure, which can be performed under local anesthesia on an outpatient basis in carefully selected patients.

14:40-14:48
Free Paper
Session 9

AURICULOTEMPORAL NEUROPATHY ASSOCIATED WITH HEADSET USE IN IMAGE-GUIDED SINUS SURGERY

M. S. Schapp, J. Lindgren, P. Hwang
Oregon Health Sciences University, Portland, OR, USA

Purpose: We present 3 cases of auriculotemporal hypoesthesia associated with the use of a headset-based image guidance system for functional endoscopic sinus surgery.

Methods: Retrospective chart review was performed for 3 patients who presented with auriculotemporal hypoesthesia after image-guided sinus surgery.

Results: All patients underwent a standard imaging protocol for image-guided surgery with the Instatrak system (Visualization Technology Incorporated). All patients were fitted intraoperatively with the Instatrak fiducial headset that by design anchors tightly over the nasal dorsum and in the external auditory meatus bilaterally. Patients were placed in standard supine position for surgery, with the right arm tucked and the head turned to the right. Operative times for each patient ranged from 90 to 150 min, and each surgery proceeded uneventfully. In each case, the patient presented with right temporal hypoesthesia in the immediate postoperative period. The sensory deficit in each case was consistent with the right auriculotemporal nerve dermatome. All sensory deficits resolved within 3 weeks of conservative postoperative observation.

Conclusions: Auriculotemporal neuropathy is a potential complication associated with headset-based image guidance surgical systems. The hypoesthesia appears to be related to a pressure neuropathy from tight-fitting headset earmolds and may be exacerbated by head positioning. This heretofore unreported complication may be considered in discussions of potential complications of image-guided surgery with prospective patients.

15:00-15:08
Free Paper
Session 9

COMPARISON OF CONVENTIONAL INSTRUMENTS AND MECHANICAL DEBRIDERS FOR SURGERY OF CHRONIC SINUSITIS

Oxana Selivanova, Mathias Kühnemund, Wolf J. Mann
Mainz Medical School, Mainz, Germany

Purpose: Commonly, endonasal surgery for chronic polypous sinusitis is based on avulsion techniques to remove diseased mucosa. Recently the use of mechanical debriders has been advocated to reduce trauma and improve healing.

Methods: In a prospective study 24 patients with chronic sinusitis, classified for their computed tomography and endoscopy findings and their symptomatology in a scoring system according to Lund/Kennedy (1995), were randomized into 2 treatment groups using both techniques. Longitudinal observations were done over 3 and 6 mo and postoperative findings were correlated with the respective techniques.

Results: There was no significant difference in symptomatology, synechia formation, or secondary closure of antrostomies in the treatment groups.

Conclusion: The use of mechanical debriders, even providing for less intraoperative trauma, did not yield better outcome on a long-term basis.

THURSDAY

15:08-15:16
Free Paper
Session 9

CLINICAL RESULTS USING COMPUTER-ASSISTED IMAGE-GUIDED TECHNOLOGY IN ENDOSCOPIC SINUS SURGERY

Vijay K. Anand and Clark Huang
Weill Cornell Medical Center of The New York Presbyterian Hospital, New York, NY, USA

Purpose: The recent introduction of computer-assisted image-guided technology has greatly enhanced the surgical precision in endoscopic sinus surgery. Many proponents have attested to its accuracy and the potential benefits. The purpose of this study was to discover indications for the use of this technology and whether its accuracy translated into clinical benefits.

Methods: A 2 1/2-year review, from May 1996 to December 1998, was performed examining the surgical cases of an otolaryngologist using computer-assisted image-guided technology during endoscopic sinus surgery.

Results: One hundred operations were performed on 89 patients. Of these 100 procedures, 88 were revision cases: 85 for chronic sinusitis and 3 for closure of cerebrospinal fluid leaks in the anterior cranial fossa. There were 12 nonrevision cases (for decompression of mucoceles, extensive nasal polyposis, and optic nerve decompression). Of all 100 cases, 12 patients subsequently needed 1 further revision surgery and 1 required a third procedure. There were no major complications but 9 minor complications: 8 synechia and 1 minor postoperative hemorrhage.

Conclusions: This clinical study confirms the enormous benefits of intraoperative stereotactic localization in endoscopic sinus surgery. The technology is especially pertinent in difficult cases where anatomic landmarks have been distorted or where exact precision and localization are required.

15:20-15:28
Free Paper
Session 9

THE CHEMOTACTIC BEHAVIOR OF EOSPINOPHILS AND IDENTIFICATION OF CHEMOKINES IN PATIENTS WITH EOSINOPHILIC FUNGAL RHINOSINUSITIS (EFRS)

Julie L. Wei, Hirohito Kita, David A. Sherris, Jens U. Ponikau
Mayo Clinic and Mayo Foundation, Rochester, MN, USA

Purpose: Chronic rhinosinusitis (CRS) is characterized by persistent eosinophilic inflammation of sinus and nasal cavities. However, the mechanisms leading to eosinophil infiltration from peripheral blood into sinus mucosa are poorly understood. We hypothesize that chemotactic factors generated in the sinus mucosa or lumen attract and induce migration of eosinophils.

Methods: Extracts of sinus polyp tissue and mucin were obtained from 10 CRS patients undergoing functional endoscopic sinus surgery. Eosinophils were isolated from peripheral blood of the sample patients and 10 healthy subjects without history of CRS or allergic diseases. Eosinophilic migration was examined by using the modified Boyden chamber method.

Results: Eosinophils from CRS patients demonstrated migration toward mucin and polyp extracts in a concentration-dependent manner. Migration of patient eosinophils to medium alone, 50% mucin extract, and 50% polyp extract was 4%, 24%, and 25% of total cells, respectively (mean of 10 experiments). Eosinophils from normal individuals also migrated in response to mucin or polyp extract, albeit much less. Eosinophil migration responses to polyp and mucin extracts were inhibited by antibodies to RANTES, eotaxin, and CCR3, suggesting involvement of these chemokines and receptor on eosinophils. Furthermore, by immunoassay, RANTES and small amounts of eotaxin were detected in the extracts.

Conclusion: These findings suggest that RANTES and maybe eotaxin produced in sinus mucosa and mucin of CRS patients induce migration of eosinophils from blood into the inflammation sites.

14:01-14:08
Free Paper
Session 9

PREVENTION OF SYNECHIA FORMATION FROM ENDOSCOPIC SINUS SURGERY

Nobuhiro Tokita
Dokkyo University Koshigaya Hospital, Kawagoe, Saitama, Japan

Purpose: A new method for reduction of the middle turbinate by submucous resection was done in an attempt to prevent synechia formation.

Methods: This procedure was applied to patients with chronic sinusitis who had an enlarged or lateralized middle turbinate interfering with surgical exposure of the middle meatus. Submucous resection of the middle turbinate was similar to that described for the inferior turbinate. A curved incision was made on the anterior-inferior edge of the middle turbinate and carried down to the bone. The mucosa was elevated off the bone, and the bone removed with biting forceps. The anterior 1/3 of the bone with vertical height of a few millimeters was removed, while preserving the turbinate mucosa. The mucosa was folded over to cover the bare turbinate bone.

Results: Forty-one patients (51 cases) underwent submucous resection of the middle turbinate. Four of the 51 cases (7.8%) developed synechiae. Seventy-eight patients with chronic sinusitis underwent the endoscopic sinus surgery with scrupulous preservation of the middle turbinates. Of these, 21% developed synechiae. Crusting of the middle turbinate was minimal after the submucous resection. Furthermore, healing was rapid and postoperative bleeding was rare.

Conclusions: Submucous resection of the middle turbinate is a reliable technique to prevent formation of synechiae after endoscopic sinus surgery. Reduced bulk of the middle turbinate with this technique allows for enhanced visualization of the osteomeatal complex.

14:01-14:08
Free Paper
Session 10

INTRACRANIAL COMPLICATIONS OF SINUSITIS: 15-YEAR REVIEW

Ramzi T. Younis and Vinod K. Anand
University of Mississippi Medical Center, Jackson, MS, USA

Purpose: To familiarize rhinologists and otolaryngologists in training with these potentially fatal complications of sinusitis and to highlight the evolving role of new therapeutic and diagnostic tools in the management of sinusitis with complications.

Methods: The charts of 82 patients who were admitted to the University of Mississippi Medical Center with the diagnosis of sinusitis with complication between January 1, 1985, and December 31, 1999, were reviewed. Thirty-nine patients had intracranial complications and 43 had intraorbital complications.

Results: The most common complications were meningitis in 21 patients, 7 with epidural abscess, 5 with subdural abscess, 4 with intracranial abscess, 1 with superior sagittal sinus thrombosis, 2 with Pott's puffy tumor, and 4 had more than 1 complication simultaneously. In the past 5 y, more patients were diagnosed with magnetic resonance imaging (MRI) and treated with an endoscopic approach compared with the first 5 y of the study.

Conclusions: Endoscopic surgery, computer-assisted surgery, and MRI along with new antibiotics have changed and improved our current management. Intracranial complications are associated with high morbidity.

14:08-14:16
Free Paper
Session 10

ORBITAL COMPLICATIONS OF SINUSITIS: IS THE TREND CHANGING?

Ramzi T. Younis and Vinod K. Anand
University of Mississippi Medical Center, Jackson, MS, USA

Purpose: Orbital infections are the most common complications of sinusitis. The purpose of this study was to review diagnostic and therapeutic trends over the past 2 decades.

Methods: The charts were retrospectively reviewed of all patients admitted to the University of Mississippi Medical Center between January 1, 1985, and December 30, 1999, with a diagnosis of sinusitis and associated orbital complication. Forty-three patients were identified.

Results: The age range was 8 mo to 41 y with a 33:10 male-to-female ratio. Twenty-one patients had periorbital cellulitis, 6 had orbital cellulitis, 10 had a subperiosteal periorbital abscess, 5 had orbital abscess, and 1 had eyelid and supraorbital abscess. Three of 39 patients had other associated complications. All patients with abscesses were treated surgically. Patients requiring surgery between 1985 and 1990 had an open external approach for treatment; since 1990, the majority had an endoscopic approach.

Conclusions: 1. Orbital complications of sinusitis are easily recognized by using computed tomography and magnetic resonance imaging. At times, these complications remain subclinical and can be identified only on imaging studies. 2. Current surgical treatment of sinusitis with orbital complications includes endoscopic drainage. The patency of the osteomeatal complex is enhanced with such drainage techniques. 3. Orbital infections of sinusitis may be associated with serious sequelae.

14:20-14:28
Free Paper
Session 10

CHRONIC SINUSITIS: A CLINICAL-BACTERIOLOGIC PERSPECTIVE

George M. Zaytoun and Soha N. Ghossaini
American University of Beirut, New York, NY, USA

Purpose: To study the bacteriologic findings in patients with chronic sinusitis and to try to look for correlation between the organisms retrieved and the clinical findings in the patients.

Methods: Eighty-six patients with the clinical and radiologic diagnosis of chronic sinusitis who have failed adequate medical therapy underwent endoscopic sinus surgery. Specimens obtained during surgery were cultured for aerobes, anaerobes, and fungi. A statistical correlative analysis was made between bacteriologic findings and age; sex; duration of symptoms; previous intake of antibiotics or steroids; history of allergy, smoking, or prior surgery; endoscopic and computed tomographic scan findings; and histopathologic findings.

Results: Sixty-four patients (73%) had a positive culture result. *Staphylococcus* coagulase-negative species were the most frequently retrieved organism. A total of 18 organisms were retrieved. A remarkably low incidence of fungi and anaerobes was found. Seventy percent of the organisms isolated were sensitive to amoxicillin/clavulanic acid combination. Among the criteria studied, only the sex of the patient and the duration of symptoms before operation seem to be associated with the most commonly cultured organism. The sinus origin of the culture and its nature (fluid versus mucosa) were not significant. *Pseudomonas* species were found in patients with the longest history of antibiotic intake before surgery.

Conclusion: In our series, *Staphylococcus* coagulase-negative species were the most commonly cultured organism. Fungi as well as anaerobes were rare.

14:28-14:36
Free Paper
Session 10

COMPUTERIZED ASSESSMENT OF THE THRESHOLD LEVEL OF VANILLIN

H. R. Briner, T. Scholer, D. Simmen
University Hospital, Zurich, Switzerland

Purpose: The measurement of threshold levels of defined odorants is essential for the assessment of patients with impaired sense of olfaction. In a prospective study, we evaluated the suitability of a computerized application device for odorants to measure the threshold level of vanillin in a clinical setting.

Methods: A computerized application device, developed by the perfume industry (Givaudan-Roure Research LTD, CH-8600 Dübendorf, Switzerland), was used to apply different concentrations of vanillin. With a switch, the patients had to choose among the position where vanillin was presented and 2 positions without any odorant. The lowest concentration that was correct 3 times was defined as threshold. Volunteers (109) with normal sense of smell and 51 patients with subjective hyposomia or anosmia were assessed.

Results: Thirty-six male and 73 female volunteers (age, 18-71 y; average, 36 y) with a normal sense of smell were evaluated. Their threshold level of vanillin was between 0.0047 and 15.04 ng/L. Among the patients with subjective hyposmia and anosmia there were 31 males and 20 females (age, 16-76 y; average, 47 y). Eleven did not detect vanillin at a maximal concentration of 30.08 ng/L, what can be considered as anosmia, and 40 had a threshold between 30.08 and 0.038 ng/L. None of the patients had difficulties in handling the application device. The time needed for the procedure was 20 to 60 min (average, 35 min).

Conclusions: The computerized application device evaluated in this study is suitable for measuring the threshold level of vanillin in a clinical setting. The machine is easy to handle for investigator and patient and assesses the degree of hyposmia in a reasonable time.

14:40-14:48
Free Paper
Session 10

INFLUENCE OF REPEATED TESTING ON PHENETHYL ALCOHOL ODOR DETECTION THRESHOLD TEST

Rong-San Jiang and Chen-Yi Hsu
Taichung Veterans General Hospital, Taichung, Taiwan, R.O.C.

Purpose: The influence of repeated testing on the results of the phenethyl alcohol (PEA) odor detection threshold test was evaluated in this study.

Methods: The PEA odor detection threshold test was used to test the olfactory thresholds of 25 normal Chinese young people. To evaluate the influence of repeated testing on the results, the testing orders were counterbalanced. Every person was tested in 6 different testing orders (ie, right [R] nostril followed by left [L] nostril, and by bilateral [B] nostrils; R, B, L; L, R, B; L, B, R; B, R, L; B, L, R).

Results: The mean threshold values were -8.172, -8.355, -8.12, -8.35, -8.33, and -8.25 for the right nostril in the aforementioned 6 testing orders. There was no difference among these 6 values. For the left nostril, the mean threshold values were -7.574, -8.595, -8.145, -8.555, -8.555, and -8.432. The values in the (R, L, B) testing order were significantly higher than those in other testing orders ($P < 0.05$). For the bilateral nostrils, the mean threshold values were -8.395, -8.83, -8.555, -8.64, -8.729, and -8.755. There was no difference among these 6 values.

Conclusions: Except that a different result was produced in a testing order for the left nostril, the results of PEA odor detection threshold test were not influenced by different testing orders.

14:48-14:56
Free Paper
Session 10

DECREASED OLFACTORY FUNCTION IN HOG CONFINEMENT WORKERS

Donald Leopold, Susanna Von Essen, Mary Snyder, Joseph Sisson
University of Nebraska Medical Center, Omaha, NE, USA

Purpose: Survey data and published reports suggest that workers in hog confinement buildings have an increased prevalence of rhinosinusitis symptoms and decreased olfactory ability. Increased levels of inflammatory mediators induced by chemicals in the environment may be the mechanism. We measured nasal and olfactory function in 19 hog confinement workers and in 16 nonfarm worker controls.

Methods: The workers were in the hog environment more than 8 h per workday. Seven of the workers had a history of fever, aches, and chills after previous exposure to organic (grain) dusts. The tests administered were the saccharin nasal transit time and the 12-item scratch-and-sniff “Cross-Cultural” Smell Identification Test (Sensonics, Inc, Hadden Heights, NJ, USA).

Results: The saccharin transit times were not significantly different between workers and controls. Five of the 19 hog farmers had an absolute olfactory loss compared with none of the controls. The percentile olfactory score for the workers was 36.8 ± 7.1; for the controls, 53.8 ± 9.7. Seven of the workers and 3 of the controls complained of chronic nasal or sinus problems.

Conclusions: The olfactory losses could be conductive (eg, blocked airflow to the olfactory receptors caused by upper nasal mucosal thickening) or neural (eg, abnormal function or death of olfactory neurons in the nasal mucosa). Studies are under way to further assess possible causes.

15:00-15:08
Free Paper
Session 10

USE OF ELECTRICAL TESTING IN CHEMOSENSORY DISORDERS

Michael H. Stevens and Louis Monti
University of Utah, Sandy, Utah, USA

Purpose: Because considerable compensation can be awarded to patients who lose their sense of smell, it is imperative that accurate objective information be obtained from olfactory testing. It is also important in other conditions when repeat testing has failed to delineate whether anosmia or microsmia exists. Although the Smell Identification Test is an easily administered test for office use, it is a subjective test in which considerable overlap exists between anosmic patients and malingerers.

Methods: We programmed a portable computerized electrical testing system that we used to observe an action potential from electrodes on the olfactory membrane, on the vomeronasal organ, and on trigeminal nerve endings as well as a chemosensory event-related potential from bitemporal electrodes.

Results: This allows a determination of gross responses in these systems which can provide valuable information regarding the functional status of the olfactory system. In patients who have head trauma, it can also determine the site of the lesion.

15:08-15:16
Free Paper
Session 10

OLFACTORY-EVOKED RESPONSE

Masashi Wada
National Center of Neurology, Ichikawa-Shi, Chiba, Japan

Purpose: A new device was developed that introduces brief pulses of odorized air synchronized with a subject's inspiration.

Methods: There was no detectable response in the absence of the odor. When the odorous stimulation was introduced at the end of inspiration or during expiration, the positive evoked response was undetectable.

Results: The positive response to odorant in normal subjects was distinguishable as an evoked response by the superimposition technique before the averaging. And a positive response became obvious after the averaging.

14:01-14:08
Free Paper
Session 11

A COMPARATIVE STUDY OF CRYOSURGERY AND SUBMUCOUS DIATHERMY IN VASOMOTOR RHINITIS

S. R. Agrawal, A. K. Jain, Abhay Gupta
G. R. Medical College 1, Gwalior, Madhya Pradesh, India

Purpose: Vasomotor rhinitis (VMR) is a common disease thought to be a nonallergic rhinitis. The disease process is due to disturbance in the sympathetic and parasympathetic systems. Various types of treatments have been tried to manage this condition. However, the relief is temporary. With the progressive attempt to provide curative procedures and the concept of parasympathetic predominance in causing vasomotor rhinitis, attention has been diverted from the techniques like submucous diathermy and cryosurgery. The aim of this study was to find out the efficacy of the cryosurgery and submucous diathermy in treatment of VMR and compare the effect of these techniques.

Methods: Forty cases of VMR were studied; submucous diathermy and cryosurgery were done in 20 cases each.

Results: In 54% of cases of cryosurgery, patients showed good response, 15% showed no response, and 5% worsened. Similarly, in 52% of cases of diathermy response was good, in 15% no response was seen, and in 9% it worsened. Hemorrhage was the main complication associated with diathermy along with cicatrization and infection. Neither hemorrhage nor infection and cicatrization were seen in cryosurgery cases during the postoperative period.

Conclusion: Cryosurgery is a better technique, which does not require general anesthesia and is a nonhemorrhagic procedure with minimal postoperative inconvenience and complication. It seems that cryosurgery is a better, safer, and faster procedure.

14:08-14:16
Free Paper
Session 11

CHEMICAL CAUTERIZATION FOR VASOMOTOR RHINITIS AND SINUSITIS

Robert Bumsted and Roland Gerencer
Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL, USA

Purpose: Although numerous anecdotal references to acid cautery for the treatment of chronic vasomotor rhinitis or sinusitis appear in the literature, limited data are presented. This study consists of 100 consecutive patients who presented with chronic rhinitis or sinusitis or both who had failed conventional medical therapy and were treated with chemical cauterizations.

Methods: Chemical cauterization consisted of the topical application of 4 different solutions (the primary cauterizing agent was a 0.5% phenol solution) to the nasal mucosa under topical anesthesia. The cauterizations were repeated monthly for 3 months (with progressively increasing intervals after this) along with concomitant continued medical therapy of topical intranasal steroid sprays and antibiotics if sinusitis was present.

The patients all completed questionnaires assessing rhinitis or sinusitis quality of life indicators before and after commencing cautery (minimum of 3) treatments. The symptoms were quantified on a 6-point scale and included nasal stuffiness or obstruction, postnasal drainage, smell or taste, sleep pattern, and headaches.

Results: The results demonstrated a highly statistically significant ($P < 0.00001$) improvement in all of the symptoms studied. The cauterizations were well tolerated, with only minor epistaxsis occurring in a few patients (< 5%).

Conclusions: This study demonstrates the significant improvement in patient symptoms by the use of chemical cautery as an adjunct to current medical therapy for chronic vasomotor rhinitis or chronic sinusitis or both.

14:20-14:28
Free Paper
Session 11

THE ROLE OF SINUSCOPY IN RHINOSPORIDIOSIS

Sandra Desa Souza and Dillon D'Souza
Seth A J B Municipal Hospital and
Topiwalla Medical College, Bombay, Maharashtra, India

Purpose: There is a high incidence of recurrence of rhinosporidiosis after surgical excision. This study was done to see if the use of the sinuscope during excision reduces the recurrence.

Methods: Fifty cases were investigated, surgically treated, and followed up for a minimum of 2 y between 1988 and 1998. Twenty-five of these patients underwent a routine per nasal excision with laser cautery, and in 25 other patients a sinuscope was used during the procedure. The sinuscope was 0∞ in anterior and posterior lesions, 30∞ in lesions arising from the maxillary sinus, and 70∞ for lesions in the nasopharynx.

Result: There was no difference in the recurrence rates of lesions that were small and arose in the vestibule from the septum. However, with all other lesions, the recurrence rate decreased from 70% to 5% with the use of the sinuscope.

Conclusion: The use of the sinuscope enabled diagnosis of posterior lesions and accurate laserization of the pedicle with no trauma to normal nasal mucosa, which predisposes to recurrence.

14:28-14:36
Free Paper
Session 11

EFFECT OF AMOXICILLIN IN PATIENTS WITH SUSPECTED RHINOSINUSITIS: RANDOMIZED DOUBLE-BLIND PLACEBO-CONTROLLED TRIAL IN GENERAL PRACTICE

An De Sutter, Marc De Meyere, Wim Peersman, Jan De Maeseneer
University of Ghent, Ghent, Belgium

Purpose: To compare the effectiveness of amoxicillin with placebo in patients with rhinosinusitis-like complaints.

Methods: Randomized, double-blind, placebo-controlled trial in 50 general practices in Belgium included 415 patients, 12 y or older, with rhinosinusitis-like complaints. After randomization, 207 patients received 500 mg amoxicillin 3 times a day for 10 days and 208 received identical capsules containing placebo. All patients received symptomatic treatment. We compared treatment groups for prevalence of 31 clinical signs and symptoms after 10 d of treatment.

Results: At day 10, fewer patients in the antibiotic group complained of purulent rhinorrhea (31.4% with antibiotics and 43.7% with placebo; $P = 0.025$, number needed to treat = 8). None of the other signs or symptoms, including fever, pain, fatigue, sleep disturbance, reduced energy or concentration, were significantly less prevalent in the treatment group compared with placebo.

Conclusion: Although there is some effect, antibiotic treatment was not able to influence the more troublesome symptoms such as pain or feeling ill. Therefore, we conclude that for patients consulting their general practitioner with suspicion of uncomplicated rhinosinusitis, antibiotics are not indicated.

14:40-14:48
Free Paper
Session 11

ENDOSCOPIC APPROACH TO SPHENOID AND SELLAR LESIONS

P. Castelnuovo, D. Locatelli, F. De Bernardi, S. Mauri, E. Emanuelli, M. Bignami
University of Pavia, Pavia, Italy

Purpose: Advances in endoscopic surgical access to the skull base have enabled surgeons to safely operate on sellar and parasellar regions. Extent of disease and individual nasal anatomy are first evaluated with computed tomography and magnetic resonance imaging.

Methods: From 1996 to 1999 37 patients with sphenoid and sellar lesions were operated on by endonasal endoscopic technique. Twenty-six patients had adenomas, 4 craniopharyngiomas, and 1 a dermoid cyst. The endoscopic approach was planned on the basis of patients' nasal anatomy, and all patients were operated on under general anesthesia. When possible, the sellar region was approached by the direct endonasal transsphenoidal route (56%); in the second group (44%) the sellar region was approached by the transethmoidal, transsphenoidal route, owing to narrow nasal chambers.

Results: At a minimum 12-mo follow-up (average, 2.5 y), no patients required additional surgery. All microadenomas had a complete removal, without additional hormonal suppressing therapy. Macroadenomas had a subtotal removal in 3 cases and subsequent suppressing therapy, and we obtained total removal in the remaining cases. Endoscopic sinus approach was also used to manage 6 patients with sphenoid invasive mycosis admitted to the emergency department. These patients presented cavernous sinus thrombophlebitis with sudden vision loss. CT and MRI scans showed sphenoidal mycosis eroding the lateral sinus wall. The mycotic material was removed with complete resolution of symptoms. Only 1 patient who was admitted at our hospital 48 h after the onset of ocular symptoms showed no improvement of vision after the resolution of the inflammatory disease.

14:48-14:58
Free Paper
Session 11

IMMUNOTHERAPY IN ALLERGIC RHINITIS

C. Cingi, H. Cakli, K. Gurbuz, E. Ozudogru, C. Kecik, E. Cingi
Osmangazi University, Eskisehir, Turkey

Purpose: This study was to evaluate the efficacy and safety of immunotherapy that has been used in the treatment of allergic rhinitis in our clinic.

Methods: One hundred fifty-four patients were diagnosed as having allergic rhinitis and were treated with immunotherapy (Hal Allergenen Laboratorium) for 3 y. The diagnosis of allergic rhinitis was made by clinical history, positive skin tests, and the presence of specific IgE. Subjective symptoms (nasal obstruction, sneezing, nasal discharge, and itching of the nose) were evaluated. After assessment with anterior rhinoscopy, rhinomanometric measurements were performed. The data obtained in control examination after the end of treatment were compared with the initial findings.

Results: Immunotherapy prevented or reduced the symptoms of allergic rhinitis in 147 patients (95%). According to the skin prick tests, sensitivity of the patients decreased significantly after the treatment period in 120 patients (78%). Specific IgE levels were lowered. Rhinomanometric evaluations revealed that nasal resistance also was reduced with this treatment. No systemic reactions were observed during the treatment period.

Conclusions: Symptoms are the most important indicator of a treatment method. Symptoms of the allergic rhinitis were prevented or reduced by specific immunotherapy. It is an effective treatment of allergic rhinitis for a selected group of patients. It should be done by trained clinicians. Introduction earlier in the course of allergic rhinitis and continuity for 3 y are important factors.

15:00-15:08
Free Paper
Session 11

ENDONASAL DETOXIFICATION FOR INFLAMMATORY CONDITIONS OF THE NOSE AND PARANASAL SINUSES

Valery P. Sitnikov and Vladimir P. Voronovitch
Vitebsk State Medical University ul. Mira, Vitebsk, Belarus

Purpose: The aim of the investigation was to assess the efficacy of conservative treatment of rhinosinusitis by using endonasal peristaltic perfusion of a liquid therapeutic mixture.

Methods: Two hundred thirty patients, aged 16-60 y, with various forms of acute and chronic purulent rhinosinusitis were observed. Various degrees of the syndrome of endogenic intoxication were noted in 85% of patients. All patients underwent a full otorhinolaryngologic examination along with radiography and computed tomography of the paranasal sinuses. The main functional parameters of the nasal cavity were dynamically studied along with cytologic investigation of the nasal secretion and determination of basic immunologic parameters. All patients were treated by traditional methods (antibiotics, puncture and lavage of sinuses, sinus catheters, physical methods). Additionally, in 120 patients the nasal cavity and paranasal sinuses were perfused with an activated liquid therapeutic mixture (0.035 sodium hypochlorite + charcoal adsorbent [Belasorb-II]), with the help of a specially constructed peristaltic roller pump. The treatment consisted of 5 to 7 sessions, each lasting 2 to 3 min, in which 100 mL of mixture was perfused with a frequency of 30 to 40 pulsations/min.

Results: The method facilitated the elimination of pathogenic microorganisms and the normalization of the functional parameters of the nasal cavity and cytology of the nasal secretions. The hospital stay of the patients was reduced by 3 to 4 d.

Conclusions: Endonasal detoxification by using the activated therapeutic mixture can be included in the conservative treatment of rhinosinusitis.

15:08-15:16
Free Paper
Session 11

ONODI CELL IN ADULT THAI CADAVERS

Sanguansak Thanaviratananich, Suthee Kraitrakul, Watcharachai Tangsawas
Khon Kaen University, Khon Kaen, Thailand

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.

14:00-15:20
Mini-Course 15

CHEMICAL SENSITIVITY: DIAGNOSIS AND TREATMENT

David L. Morris
Allergy Associates of La Crosse, Ltd., La Crosse, WI, USA

Chemical sensitivity has become a very controversial subject. In the lay literature the "sick building syndrome" has become part of common medical thought. Allergists tend to deny that chemicals can cause symptoms. The theory of Dr. Claudia Miller that it is a "Toxicant Induced Loss of Tolerance" (TILT) makes sense and allows the possibility of improving a patient's tolerance using allergy techniques.

Specifics of using sublingual challenge for hydrocarbons, phenol, formaldehyde, sodium benzoate, citric acid, Sodium metabisulfite, mixed dyes, chlorine, monosodium glutamate, aspartame and saccharin will be given. These chemicals can also be used to treat patients in an effort to help them develop tolerance.

Specific guidelines will be given to be able to effectively test common chemical exposures.

14:00-15:20
Mini-Course 16

HIV, IMMUNE DEFICIENCY, AIDS, AND ALLERGY

Bruce R. Gordon
Harvard Medical School, Boston, MA, USA

Purpose: Review and update clinicians on aspects of continuing HIV epidemic that are important for their personal safety and for the safety of their patients.

Content: Characteristics of the HIV virus, epidemiology of the pandemic, risk factors for infection, HIV concerns in allergy care, vaccine progress, advances in treatment, and what to do if you are HIV exposed.

14:00-14:05
Mini-Course 17

OPTIC NERVE DECOMPRESSION

David W. Kennedy
University of Pennsylvania Medical Center, Philadelphia, PA, USA

Although the indications for optic nerve decompression in the presence of blunt trauma requires significant additional study, decompression of the optic nerve is indicated in certain situations and can have a dramatic effect on return of vision. An endoscopic approach to the nerve provides excellent visualization and, in the presence of favorable anatomy, the potential for an excellent decompression. The bone over the nerve is thinned with a diamond burr and the resulting eggshell-thin bone is removed with otologic elevators. Significant caution is required during drilling to ensure adequate irrigation and cooling of the burr and to avoid the adjacent carotid canal. This presentation will review the anatomy of the optic nerve and the technique of transethmoidal endoscopic optic nerve decompression. A videotape will be presented illustrating the potential hazards when fractures impinge on the region of the optic chiasm.

14:50-15:15
Mini-Course 17

OPTIC NERVE DECOMPRESSION IN TRAUMA AND TUMOR PATIENTS

Wolf J. Mann, J. Maurer, M. Hinni, N. Pfeiffer
Ophthalmic Dept., Mainz, Germany

Purpose: Optic nerve decompression is a procedure that is now receiving increasing clinical attention. However, there are currently no standardized treatment protocols in the therapy of traumatic or pressure insults to the nerve. **Methods**: The present retrospective study was designed to report our experience with microscopic endonasal transethmoid-sphenoid optic nerve decompression in 24 unilateral trauma cases and 11unilateral skull base tumor patients. **Results**: In general preoperative visual acuities in the trauma patients were worse than the tumor patients. Following surgery, 9 of 11 tumor patients (82%) had at least some improvement of their vision, including 5 complete recoveries. In the group with traumatic visual impairment, 16 of the patients had no light perception preoperatively. Postoperatively, 13 patients (54%) had at least some improvement, with 4 patients regaining normal or near normal vision. **Conclusions**: Compared to other techniques and approaches, our technique is a minimally invasive procedure for optic nerve decompression, reducing unnecessary operative trauma to nasal structures, skin incisions or even craniotomy and frontal lobe reaction.

16:05-16:20
Symposium 11

ANTIHISTAMINES IN THE MANAGEMENT OF ALLERGIC RHINITIS FIRST AND SECOND GENERATION ANTIHISTAMINES

James A. Hadley
University of Rochester Medical Center, Mayo Clinic, Mayo Foundation, Rochester, MN, USA

The symptoms of seasonal and perennial allergic rhinitis affect patient's quality of life such that pharmacomanagement of the disorder is justified. Traditional H1 antihistamines may reduce the symptoms of sneezing, itching, rhinorrhea and ocular congestion, but do not relieve the nasal congestion induced by allergic reaction. The ability of the first generation antihistamines to cross the blood-brain barrier leads to their adverse side-effect profile. The second generation antihistamines are at least as clinically effective as the first generation agents but are more lipophobic and do not readily cross the blood-brain barrier. These products have less potential to cause somnolence, affect performance or induce anticholinergic affects. Metabolites of the latter generation have been described as "third" generation antihistamines. The impact of these newer products will be reviewed.

16:20-16:35
Symposium 11

SIDE EFFECTS OF ANTIHISTAMINES: CARDIAC AND SEDATIVE

John H. Krouse
University of Florida, Ormond Beach, FL, USA

Antihistamines have been a mainstay for inhalant allergies since their introduction over 50 years ago. Early antihistamines, while quite efficacious in the relief if allergic symptoms, suffered from significant sedation and anticholinergic effects dur to their ability to cross the blood-brain barrier freely. As a consequence of this significant limitation, researchers and pharmaceutical companies developed newer antihistamines that were relatively free of these side effects. The introduction of agents such as terfenadine and astemizole in the 1980's initially seemed to provide the efficacy of the older medications without their significant limitations. It became clear, however, that these agents were associated with a significant risk of malignant cardiac arrhythmias and death. Newer agents such as loratadine, cetirizine and fexofenadine have therefore been developed and introduced to the market, and do not appear to have the same significant risk of cardiac symptoms as do the previous agents. Another major risk of antihistamine usage is sedation and performance impairment. Recent studies have shown an increase in job-related injuries, traffic fatalities, learning dysfunction and other significant problems related to the subjective drowsiness. The presentation will review both the cardiac and performance effects of sedating and non-sedating antihistamines. At the conclusion of the presentation, the physician will have an improved appreciation of various effects of both older and newer generations of antihistamines.

16:35-16:50
Symposium 11

ANTIHISTAMINES: ANTI-CHOLININERGIC EFFECTS AND ASTHMA

Bruce R. Gordon
Harvard Medical School, Boston, MA, USA

Purpose: Brief Review and update clinicians on systemic and local respiratory tract effects of anticholingeric drugs.

Content: Anticholingeric drug clinical effects, both useful and adverse, advantages of topical therapy, and possible uses in treatment of rhinitis and asthma.

17:05-17:20
Symposium 11

WHAT ARE THE THIRD GENERATION ANTIHISTAMINES AND WHAT WILL THEY DO?

William W. Storms
Asthma & Allergy Associates, P.C.,Colorado Springs, CO, USA

The third generation antihistamines were developed in order to provide effective control of allergy symptoms without side effects. Previous antihistamines have had a variety of side effects, from sedation to excessive dryness to cognitive dysfunction, and such things as reduced reaction time. The third generation antihistamines give effective relief without these side effects. The other characteristic which differentiates most third generation antihistamines is the fact that they can be given once daily.

The primary third generation antihistamines are loratadine (Claritin) and fexofenadine (Allegra). Cetirizine (Zyrtec) and azelastine (Astelin nose spray) are sometimes considered in the third generation category although they do have a slight amount of drowsiness.

Third generation antihistamines are indicated primarily for seasonal allergic rhinitis for adults and children, although they also have been shown to have some efficacy in chronic urticaria.

16:05-16:20
Symposium 12

NASAL SEROPROTEINS, THEIR PHYSIOLOGY AND PATHOLOGY

R.I. Henkin, B.M.Martin
Taste & Smell Clinic, Washington, DC, USA

Proteins secreted from serous glands in nasal mucosa play a critical role in maintaining integrity of the nose, structures within it, the lungs and the body as a whole. These proteins form a protective shield which enables humans to be guarded from the hostile external environment. In this sense, nasal seroproteins act as guardians of the nose and lungs by protecting this major entry port from external bacteria, fungi and xenobiotics. Nasal seroproteins isolated from nasal mucus in normal volunteers and in patients with various diseases, identified by HPLC and sequenced, in order of quantitation, are: albumin (~15% of total), lysozyme (~10%), lactoferrin (~10%), IgG (~5%), a-trypsin proteinase inhibitor (~5%), Clara cell phospholipid binding protein (~3%) and many others including b2 microglobulin, carbonic anhydrase (CA)VI (a zinc metalloprotein), lumicarmine, statherin, histones, cytokines and chemokines. Some proteins act as antimicrobials (lysozyme, lactoferrin), some protect the mucosal surface from toxic breakdown products of neutrophils and microbial agents (a-trypsin proteinase inhibitor), some bind xenobiotics to inhibit their toxic effects (Clara cell phospholipid binding protein), some are involved in immune responses (b2 microglobulin, Zn a-2 glycoprotein, cytokines, chemokines) and some are involved in stem cell growth and maturation of olfactory epithelial cells to preserve normal smell function (CAVI). Various disease states alter seroprotein synthesis and/or secretion and are directly involved with nasal pathology; Treatment with antibiotics inhibits microbial growth decreasing albumin secretion; treatment with zinc initiates resynthesis of CAVI, stimulation of stem cell turnover, return of normal olfactory epithelial cell growth and return of normal smell function through this paracrine effect. Other pathology affects other proteins in an anologous manner. Many drugs alter seroprotein seretion.

16:35-16:50
Symposium 12

OLFACTOMETRY: IT IS USEFUL?

G.C. Passali, L. Bellussi,
E.N.T. Clinic, University of Siena, Siena, Italy

Tests for the assessment of olfactory function are numerous. In the otorhinolaryngological and in the neurological practice few of them are actually used.

A critical orientation among the different possibilities, needs as a premise, a classification: for clinical use and screening procedures, subjective olfactometry (which needs the total patient's participation) can be used; whereas objective olfactometry is used in forensic medicine. The involvement in smell sensation together with the olfactory nerve of additional nerves (trigeminal, glossopharyngeal and vagal nerves) different kind of stimuli must be used. At the same time, as the assessment of the auditory sensation, also for the olfactory function, a detection threshold and an identification threshold can be determined.

These consideration are the premise to a short review of all the olfactory tests which have found a wider spread in the clinical practice together with the more sophisticated methods used for research.

Finally the Authors discuss their own method in which a great importance is given to all the nasal functionality tests reporting the data from their rhinological lab where more than 150 patients complaining for olfactory disturbances are visited every year.

Most nasal dilators at present on the market and introduced in agonistic practice, consist of a small self-adhesive strip of inert material with inside it a sort of scaffolding giving rigidity to the whole device. In its application the plaster mechanically lifts up the wing of the nose, achieving in this way an increase in valvular section and consequently in air capacity.

16:01-16:08
Free Paper
Session 12

REPORT OF A NEW, PASSIVE OPTICAL SURGICAL NAVIGATION SYSTEM FOR ENDOSCOPIC SINUS SURGERY

Martin J. Citardi
Saint Louis University, St. Louis, MO, USA

Purpose: Since the early 1990s, computer-aided surgery (CAS) technology has been applied to endoscopic sinus surgery, and numerous reports have described the use of these systems in sinus surgery. Recently, the Food and Drug Administration (FDA) provided marketing clearance for a new CAS system that is being developed for sinus surgery, neurosurgery, and spine surgery. This system incorporates passive optical tracking technology as well as other software enhancements.

Methods: The SAVANT (Cbyon, Palo Alto, CA) uses a registration protocol that incorporates a customized headset for semiautomatic point registration. This headset has been designed so that it can be removed and replaced in the same position reproducibly. Patients wore this headset during preoperative computed tomography and during surgery. Various curved suctions with passive tracking were used for localization.

Results: Seventeen patients were enrolled in this Phase I FDA protocol. One patient was withdrawn when her surgery was postponed due to an uncontrolled asthma exacerbation. Failure to achieve acceptable registration occurred in 1 instance. In the remaining 15 patients, acceptable registration accuracy was achieved. In all instances, the SAVANT system was felt to provide clinically useful information. The passive (ie, wireless) tracking of instruments facilitated their use during surgical dissection. Issues that restrict registration accuracy in the current headset design were identified.

Conclusions: The SAVANT CAS system offers unique advantages for endoscopic sinus surgery. It is anticipated that further development of this CAS platform will extend its applications in otolaryngology.

16:08-16:16
Free Paper
Session 12

NASAL SURGERY IN THE TREATMENT OF PATIENTS WITH OBSTRUCTIVE SLEEP APNEA SYNDROME—PRELIMINARY REPORT

Balcerzak Jarosaw, Przybyowski Tadeusz, Samoliński Bolesaw
Medical Academy, Warsaw, Poland

Purpose: The aim of this study was to evaluate the effects of nasal surgery on the intensity of obstructive sleep apnea syndrome (OSAS) assessed on the basis of basic polysomnographic values.

Methods: The study included 27 patients with OSAS confirmed by polysomnography. Patients had impairment of nasal patency due to various deformities of the nasal skeleton confirmed by acoustic rhinometry and rhinomanometry. All patients had nasal surgery for the irregularities.

Results: During the 2-mo postoperative follow-up, 25 patients reported marked improvement in their subjective feelings, and their families reported that the intensity of snoring and the frequency and duration of episodes of apnea greatly diminished. Two patients did not observe any significant changes. In contrast to the improvement expressed by the patients and their families, the results of control polysomnographic investigations were not unequivocal: No statistically significant changes were observed in the basic values. Eleven patients who did not tolerate nasal continuous positive pressure (nCPAP) therapy preoperatively because of discomfort tolerated nCPAP well.

Conclusions: Nasal obstruction caused by deformation of the nasal framework and OSAS are not directly correlated. Nevertheless, correction of nasal abnormalities should be considered for all patients with OSAS because it may decrease the intensity of apnea or at least improve patients' quality of life and their tolerance for nCPAP in the majority of cases.

16:28-16:36
Free Paper
Session 12

INCIDENCE OF GERD IN YOUNG CHILDREN UNDERGOING ADENOIDECTOMY

M. M. Carr, C. P. Poje, L. S. Brodsky
Children's Hospital of Buffalo, Buffalo, NY, USA

Purpose: To compare the incidence of gastroesophageal reflux disease (GERD) in children younger than age 2 y who have symptomatic adenoid hypertrophy requiring surgical removal or who have otitis media with effusion requiring ventilation tube insertion without adenoidectomy.

Methods: A retrospective chart review was done. All children younger than age 2 y undergoing adenoidectomy (Ad Group) in 1998-2000 were compared with children of the same age having ventilation tube insertion without adenoidectomy (VT Group).

Results: There were 95 children in the Ad Group (age, 1.46 y) and 99 in the VT Group (age, 1.19 y). GERD incidence was 38% in the Ad Group and 7% in the VT Group ($P < 0.001$). In the Ad Group, 86% of children age 1 y or younger had GERD, and 31% of those older than 1 y had GERD. In the VT Group, 14% of patients age 1 y or younger and 2% of those older than 1 y had GERD. Of the 43 children in both groups who had GERD, 16 of 32 had an abnormal scintiscan, 8 of 31 had abnormal gastric emptying time, 11 had reflux laryngitis on direct laryngoscopy, 10 had reflux laryngitis seen with flexible fiberoptic laryngoscopy, 5 had esophagitis by biopsy, 3 had abnormal pH probes, and 1 had an abnormal upper gastrointestinal series. GERD was treated with diet and positioning in 15%, fundoplication in 3%, and the rest had medical therapy. Complete resolution of symptoms occurred in 50% of the Ad Group and 73% of the VT Group.

Conclusions: Children younger than age 2 y requiring adenoidectomy have a significantly higher incidence of GERD than children presenting with otitis media requiring ventilation tube insertion.

16:20-16:28
Free Paper
Session 12

A UNIVERSAL SINUSCOPE FOR USE IN THE ENT OFFICE

DUC M. BUI AND TOM M. BUI
Westminster ENT Clinic, Westminster, CA, USA

Purpose: With the development of modern endoscopy, telescopes became the instrument of choice for diagnosis in the practice of Otorhinolaryngology. A telescope with multiple uses in the Ear Nose Throat office is much preferred because of its cost-effectiveness.

Methods: Using the telescope 30°-angle, 2.7-mm-diameter, 12-cm-long designed for sinuscopy, we performed rhinoscopy, nasopharyngoscopy, otoscopy, and otoendoscopy on more than 300 patients in our office. The telescope was connected to a video camera, and the procedures were performed with video monitoring.

Results: The 30°-angle, 2.7-mm-diameter telescope proved to be a good diagnostic instrument for multiple use in the Ear Nose Throat office. It provided better results than the traditional diagnostic instruments. There were no serious iatrogenic problems in our patients. However, it is proper to exercise some caution with its use in otoendoscopy.

Conclusion: The 30°-angle, 2.7-mm-diameter, 12-cm-long sinuscope is a practical and cost-effective diagnostic instrument for use in the Ear Nose Throat office.

17:20-17:28
Free Paper
Session 12

NASAL POLYPOSIS IS NOT A HOMOGENEOUS PATHOLOGY

Magdalena Arcimowicz and Boleslaw Samolinski
The Medical University of Warsaw, Warsaw, Poland

Purpose: To describe and compare the history and eosinophilic inflammation in patients with nasal polyps.

Methods: Sixty-seven patients with confirmed nasal polyposis were divided into 3 groups: primary nasal polyps (PP) (*n* = 33); polyps and bronchial asthma without aspirin intolerance (A) (*n* = 19); polyps and aspirin-sensitive asthma (ASA) (*n* = 15). The blood and nasal eosinophilia and serum eosinophilic cationic protein (ECP) concentrations were measured.

Results: Average age of all patients was 55 ± 1 y. The ratio of males:females was 1.48:1 (PP, 2.67:1; A, 1.11:1; ASA, 0.67:1; the difference between PP and ASA was statistically significant, *P* = 0.001). Females with nasal polyps have asthma more often than males (*P* = 0.036). Age when polyps were first seen was 45.12 y (similar in all groups). The duration of nasal polyps was 10 ± 10 y (range, 0.5-30 y): PP, 10 ± 9; A, 14 ± 11; ASA, 7 ± 7 (A/ASA, P = 0.045). Rhinitis preceded the diagnosis of nasal polyposis (6.64 y). Age when asthma developed (A + ASA groups) was 45.5 y; the duration of asthma was 11 ± 9 y. Fifty-two percent of patients had polypectomies (1.1 per patient). The polypectomies were done most often in the ASA group (PP/ASA, P = 0.01 and A/ASA, P = 0.045). The mean interval between polypectomies in all patients was 9.1 y. The blood eosinophilia was 5.58 ± 0.4% (PP, 4.6 ± 0.5; A, 6.2 ± 0.9; ASA, 7.2 ± 0.9; and PP/ASA, P = 0.019; PP/A + ASA, P = 0.03). Nasal eosinophilia was 18.5 ± 3% (PP, 15.0 ± 4; A, 15.5 ± 6; ASA, 30.0 ± 8; and PP/ASA, P = 0.01; A/ASA, P = 0.02). Serum ECP was 24 ± 2 µg/L.

Conclusions: The history and the intensity of eosinophilic inflammation are not similar in nasal polyposis.

16:40-16:48
Free Paper
Session 12

URBAN MEDICINE: A 20-YEAR PERSPECTIVE

Jack L. Clark
Comprehensive ENT Institute, Southfield, MI, USA

Medicine is, in my view, still the most noble of all professions. However, it has had better days in its past. Today, with the invention of all the Healthcare Management ideas, patients are often left out of the healthcare equation. When physicians step aside and permit nonphysicians to design healthcare programs, to cut cost, and to attempt to better control cost, it seems to always negatively impact physician-patient rapport.

In the American urban setting, an infrastructure of patient education and physician team building was never addressed. Additionally, urban medicine did not interface with politics, finance, or the Church. These issues must be similar to those of Third-World countries. In America, these avenues must be traveled now and quickly. As a result, these pathways may be useful in solving healthcare problems in urban America as well as in Third-World countries.

16:48-16:56
Free Paper
Session 12

SURGICAL MANAGEMENT OF INVASIVE FRONTAL MUCOCELES

Jannis Constantinidis, Holger G. Gassner, Helmut Steinhart, Heinrich Iro
Friedrich-Alexander University Erlangen, Erlangen, Germany

Purpose: Invasive frontal mucoceles that extend intracranially or intraorbitally are a relatively rare, challenging to manage, and potentially lethal condition.

Methods: An algorithm for choosing the surgical approach and technique was developed and used in 12 cases that were treated between 1995 and 1998. Seven mucoceles were located medially and 5 laterally. Five were complicated by intracranial and 5 by orbital extension. The remaining 2 invaded intracranially and intraorbitally. Nine patients had undergone previous sinus surgery (5 endonasal and 4 external approaches), and 3 patients had an untreated frontal sinus fracture in the past.

Results: Endoscopic or microscopic endonasal marsupialization was performed in 7 cases. The remainder were treated by osteoplastic flap with fat obliteration (2), osteoplastic flap with median drainage (2), or cranialization after complete removal of the posterior table (1). Factors determining the choice of surgical approach and technique included the location and the size of the process, compromise of the posterior table, and underlying disease. No orbital or intracranial complications occurred.

Conclusions: The algorithm aids in selecting the surgical approach and technique. Factors necessitating an external approach include lateral location, degree of intraorbital or intracranial extension, and underlying disease. In such cases, the versatile osteoplastic flap procedure has proven to be an excellent alternative.

17:00-17:08
Free Paper
Session 12

STEROID INJECTION IN THE TREATMENT OF NASOFRONTAL RECESS OBSTRUCTION

Jay M. Dutton and Robert M. Bumsted
Rush Medical College, Chicago, IL, USA

Purpose: To determine whether steroid injection is a safe, efficacious intervention for nasofrontal recess obstruction.

Methods: A retrospective review of medical records was performed for 74 patients who had endoscopic sinus surgery and subsequently developed nasofrontal obstruction secondary to polyps or fibrosis. All patients were treated with triamcinolone (Kenalog), 20 mg/cc, injected directly into the polyps or scar. The patients' records were reviewed to determine sex, age, number of injections, indications for injection, length of follow-up, complications, and whether the patient required other procedures to remove polyps, open the nasofrontal recess, or obliterate the frontal sinus.

Results: From June 1991 through March 2000, 74 patients were identified who received nasofrontal steroid injections (38 male and 36 female; average age, 45.4 y). These 74 patients had 687 nasofrontal steroid injections (average, 9.3 injections per patient). The cause of nasofrontal obstruction was polyposis in 70 patients and fibrosis in 17 patients, with both causing obstruction in 13 patients. These patients also required 112 office procedures to maintain nasofrontal recess patency, including polypectomy, nasofrontal curettage, or both (average, 1.5 procedures per patient). Three patients required frontal sinus obliteration with an osteoplastic flap. No complications occurred due to the steroid injections. Mean follow-up from the initial injection was 50.1 mo.

Conclusions: Nasofrontal steroid injection appears to be a safe, effective intervention for nasofrontal recess obstruction; it may help prevent chronic frontal sinusitis and the need for frontal sinus obliteration.

17:20-17:28
Free Paper
Session 12

A RARE LOCATION OF BILATERAL INVERTED PAPILLOMA OF THE NOSE AND THE PARANASAL SINUSES

John Yiotakis, Anastassios G. Hantzakos, Eleftherios Ferekidis, George Adamopoulos
Hippocrateion General Hospital, Athens, Greece

Purpose: To present an unusual case of bilateral inverted papilloma arising from the sphenoid septum and extending toward both the sphenoid and posterior ethmoid sinuses and the posterior section of both nasal cavities, while it compresses the sella turcica and elevates the pituitary gland.

Methods: Inverted papilloma is an infrequent benign sinonasal tumor that is potentially invasive. The lateral nasal wall is the most common site of origin, whereas paranasal sinuses are involved by extension frequently. In contrast, primary sinus inverted papillomas have been reported infrequently. Although the midfacial degloving approach has historically been the procedure of choice, recent technological advances have rendered endoscopic sinus surgery safe with equivalent success rates and low probability of papilloma recurrence.

Results: The bilateral inverted papilloma was successfully removed with a transnasal endoscopic procedure. There was no evidence of recurrence during a postoperative follow-up period of 1.5 y.

Conclusions: Bilateral inverted papilloma of the sphenoid sinus is an unusual entity that can be treated successfully with endoscopic sinus surgery performed by an experienced otorhinolaryngologist.

16:01-16:08
Free Paper
Session 13

ENDOSCOPIC LASER-ASSISTED LACRIMAL SURGERY

T. Hofmann, G. Wolf, K. Muellner
University of Graz, Graz, Austria

Purpose: Endoscopic dacryocystorhinostomy (DCR) is a method to create an anastomosis between the lacrimal sac and the nasal mucosa in patients with stenosis of the lacrimal sac or duct after recurrent dacryocystitis.

Method: A KTP laser was used for dacryocystorhinostomy with endolacrimal visualization by the ophthalmologist, while the ENT surgeon assisted with the procedure via nasal endoscopy. Endolacrimal laser-assisted DCR was performed on 26 patients. All patients suffered from lacrimal sac or duct obstructions. Bicanalicular silicone intubation was placed in all patients for at least 3 months.

Results: Twenty-one patients remained free of symptoms after 3 to 6 months' follow-up, 3 patients tear intermittently in extremely cold weather, and 2 patients required conventional DCR because of tearing and blurred vision.

Conclusion: The KTP laser generates enough power to open the bony window in DCR surgery. Precise endolacrimal visualization with mini-endoscopes and collaboration between ophthalmologists and ENT surgeons guarantees a minimally invasive and time-saving procedure.

16:08-16:16
Free Paper
Session 13

ENDOSCOPIC TREATMENT FOR SINONASAL INVERTED PAPILLOMA: EXPERIENCE ON 38 PATIENTS

D. Tomenzoli, M. Berlucchi, M. Trimarchi, F. Pagella, M. Cerniglia, P. Castelnuovo, P. Nicolai
University of Brescia and Pavia, Italy

Purpose: To retrospectively review patients with inverted papilloma (IP) treated by an endoscopic approach.

Methods: From January 1992 to November 1999, 38 patients with IP had endoscopic surgery. Thirty-one were males, and mean age was 55 y. Preoperative work-up included computed tomography or magnetic resonance imaging. Exclusion criteria were massive skull base erosion, intradural or intraorbital invasion, extensive involvement of the frontal sinus, abundant scar tissue, and association with squamous cell carcinoma. Three types of resection were adopted: ethmoidectomy with wide antrostomy and sphenoidotomy (Type 1) for lesions confined to the middle meatus; medial maxillectomy with ethmoidectomy and sphenoidotomy (Type 2) for IPs partially invading the maxillary sinus; Sturmann-Canfield approach (Type 3) for IPs extending into the anteromedial portion of the maxillary sinus. Postoperative endoscopic evaluations were scheduled every 3 mo.

Results: The anatomic sites involved by the lesion were the anterior ethmoid in 26 patients (68%), the middle turbinate in 22 (58%), the maxillary sinus in 18 (47%), the superior turbinate and the sphenoid sinus in 3 each (8%), and the inferior turbinate in 2 (5%). Types 1, 2, and 3 resections were performed respectively in 20 (52%), 16 (42%), and 2 (5%) patients. The patient with IP recurrent in the frontal recess required a Draf type II frontal drainage. No recurrence has been observed as of May 2000, with a mean follow-up of 30 mo (range, 6-102 mo).

Conclusion: Endoscopic surgery is an effective treatment for selected IP. Strict application of selection criteria and frequent follow-up evaluations are key elements.

16:20-16:28
Free Paper
Session 13

SINUSITIC STRABISMUS AND ESOTROPIA

Joe F. Smith, Irene Ludwig, F. Kent Nunnally
Dothan Sinus, Allergy, & Asthma Health Center, Dothan, AL, USA

Purpose: To evaluate the hypothesis that maxillary and ethmoid sinusitis is involved in acquired strabismus and esotropia.

Methods: Currently, 34 patients with acquired vertical strabismus or esotropia or both have been evaluated and subsequently treated for sinusitis for 1 year. The diagnosis and treatment were performed by the referring ophthalmologist. The sinusitis evaluation consisted of history, including using the Academy's Rhinosinusitis Clinical Factors, rhinologic examination, and coronal computed tomography (CT).

Results: Ninety-four percent of these patients were found to have sinusitis on CT examination by using the Lund-McKay staging system. Thirty percent of these patients had minimal or no clinical history of sinusitis by the Academy's Rhinosinusitis Clinical Factors.

All patients experienced stabilization of the extraocular muscle dysfunction with medical or surgical resolution of their sinonasal disease, and 14% experienced dramatic improvement in extraocular muscle dysfunction, with medical resolution of the sinonasal disease.

Conclusion: Ethmoid and maxillary sinusitis may cause medial or inferior rectus fibrosis resulting in acquired esotropia or vertical strabismus in children and adults. This is shown by the high incidence of sinusitis on coronal CT scan in these patients. Stabilization, or dramatic improvement, of these extraocular muscle problems occurred with treatment and resolution of their sinusitis.

16:28-16:36
Free Paper
Session 13

SURGICAL MANAGEMENT OF OPTIC NEUROPATHY

W. Stoll and U. Grenzebach
ENT and Eye Clinics, Muenster, Germany

Purpose: Injuries, infections, tumors, and thyroid disease are supposed to produce orbital complications, including decrease of visual ability. With special regard to ophthalmologic findings and histories, the surgery of orbital and optic nerve decompression is indicated. From our point of view, it means removal of the lamina papyracea and medial wall of optic nerve canal, with or without cutting their periorbital shell.

Methods: During the last 20 years, 558 patients underwent this surgical treatment.

Results: The best improvement in vision was seen after treatment of inflammatory processes in about 80% and after posttraumatic nerve decompression in about 55%. The prognosis of tumor surgery is closely related to the histologic findings.

Conclusion: An intact interdisciplinary cooperation is the basis of the preoperative strategy. Often a fast decision is postulated. The microsurgical or endoscopical controlled surgery can be recommended as a sufficient technique.

16:48-16:56
Free Paper
Session 13

DIAPHANOSCOPIC LOCALIZATION OF LACRIMAL DRAINAGE SYSTEM IN ENDOSCOPIC ENDONASAL DACRYOCYSTORHINOSTOMY

Ahmed M. Youssef
Minia University, Minia University Hospital, Minia, Egypt

Purpose: The advent of the rigid endonasal endoscope and the development of functional endoscopic sinus surgery (FESS) technique have awakened interest in an endonasal endoscopic dacryocystorhinostomy (EN-DCR) in treating nasolacrimal obstruction. Intraoperative endonasal localization of pathologically changed ducts may prove difficult and time consuming owing to the considerable anatomic variation of patients. The aim of this work is to shed light on the value of using a special optical probe for diaphanoscopic localization of the nasolacrimal duct intraoperatively during EN-DCR.

Methods: Forty-eight EN-DCRs were done for 40 patients who were subdivided into 2 equal groups. EN-DCRs were done for group A without diaphanoscopy and for group B with diaphanoscopy.

Results: The average duration of surgery was 78 min (SD ± 13; range, 60-115 min) for group A and 38 min (SD ± 13; range, 19-79 min) for group B. The total success rate was 83.3% (82.6% and 91.3% for group A and B, respectively).

Conclusions: In this study, it appears that EN-DCR with diaphanoscopy is a simple, practical, and useful complementary imaging for EN-DCR, permitting rapid surgery without undue damage to the tissue. Moreover, it showed high success rate more than EN-DCR without diaphanoscopy, which may be due to precise localization of the rhinostomy site without undue damage to adjacent structures. Use of recently developed lacrimal duct endoscope in preoperative evaluation procedures has been emphasized.

17:00-17:08
Free Paper
Session 13

MEASUREMENT OF THE ACCURACY OF ACOUSTIC RHINOMETRY

Ozcan Cakmak, Huseyin Celik, Tan Ergin, Levent Sennaroglu
Baskent University, Ankara, Turkey

Purpose: Acoustic rhinometry is a method, based on acoustic reflection, developed to measure the dimensions of the nasal cavity. Factors that influence the accuracy of measurements made with a commercial acoustic rhinometer were examined.

Methods: A simple model was used consisting of a metal pipe with cylindrical apertures of various dimensions comparable to the human nasal valve. The measured cross-sectional areas of the apertures were compared with their actual values.

Results: As the inner diameter of the aperture is decreased, the possibility of making errors is increased. Furthermore, as the length of the aperture is increased, the measured cross-sectional area is decreased progressively and approaches the actual area of the aperture.

Conclusions: Acoustic rhinometry is quite sensitive in determining the locations of the apertures when placed at different distances. Both the inner diameter and the length of the cylindrical apertures affect the precision of acoustic rhinometry measurements.

THURSDAY

17:08-17:16
Free Paper
Session 13

RHINOMANOMETRY FOR SELECTING PATIENTS FOR SEPTOPLASTY

L. Malm, S. Freccero, M. Jannert
University Hospital, Malmö, Sweden

Purpose: Can rhinomanometry be instrumental in selecting patients who can be expected to be satisfied with the outcome of functional septoplasty?

Methods: Since 1976 almost all septoplasty patients operated on at our department have been controlled with preoperative and postoperative active anterior rhinomanometry and have filled out the same preoperative and postoperative questionnaires. The postoperative control has taken place about 1 year after the surgery. Since 1986, the rhinomanometric results and the answers to the questionnaire have been stored in a database.

Results: In the years 1986-1995, functional septoplasty without simultaneous surgery on the lower turbinate was performed on 202 patients. The patients were operated on by 15 more or less experienced ear, nose, and throat surgeons, and 2 of them, both experienced, performed the operation on about half of the patients. One of those 2 operated on many patients with a preoperative nasal airway resistance (NAR) on the narrower side after decongestion, which can be considered as a normal NAR. Only 73% of his patients were subjectively improved, whereas the other surgeon, who operated on fewer patients with a normal NAR, had more than 90% subjectively improved patients 1 year after the surgery.

Conclusion: Preoperative rhinomanometry after proper decongestion is of value as a means of selecting patients suitable for functional septoplasty.

17:20-17:28
Free Paper
Session 13

EXPERIMENTAL STUDY ON OLFACTORY EVOKED POTENTIALS IN RABBITS

Yongxiang Wei and Demin Han
Beijing Tongren Hospital, Beijing, China

Purpose: To explore an objective measurement that can be used to assess the status of olfactory functions.

Methods: 1) Thirty adult healthy rabbits weighing 2.5 to 3.5 kg were used. A bipolar stimulating electrode was placed on the olfactory region of the nasal mucosa via an anterior naris to observe the character of olfactory evoked potentials (OEPs) by electrically stimulating olfactory mucosa. 2) A model of olfactory bulb (unilateral or bilateral) injury in the rabbit was made by means of stereotactic electrolytic lesions. A series of changes of OEPs was observed in the models by physiologic methods.

Results: 1) Evoked potentials were recorded from the surface of the frontal head close to olfactory bulb. They were composed of triphasic negative-positive-negative peak complexes with constant waveforms, N1, P1, and N2, respectively. When the respiratory mucosa of the nasal cavity was stimulated or olfactory bulbs were resected, no OEPs could be observed. 2) When unilateral olfactory bulb was damaged, N2 was absent and the latencies of N1 and P1 were delayed. When bilateral olfactory bulbs were damaged, we could only record P1 with N1 and N2 absent. 3) Histopathology and ultrastructure showed that the edema areas were extended and elicited a serious inflammation response. There were many infiltrating inflammatory cells and scattered hemorrhagia 24 to 48 h after injury.

Conclusion: 1) A waveform—unchanged OEPs produced by the electrical stimulation of olfactory mucosa—can be recorded. It originates from olfactory system rather than trigeminal neuroelectrical response. 2) Our laboratory developed a reliable animal lesion model of olfactory bulb by means of stereotactic electrolytic lesions.

16:01-16:08
Free Paper
Session 14

NASAL BLOCKAGE AFTER APPLICATION OF A VASOCONSTRICTOR

Masato Miwa, Richard M. McCarron, Mayumi Matsunaga, Maria Spatz
Naval Medical Research Center, Silver Spring, MD, USA

Purpose: Arachidonic acid metabolite such as prostaglandin (PG) D2 is a potent vasodilator and causes nasal obstruction. Thromboxane (Tx) A2 is thought to be a vasoconstrictor. It has been demonstrated clinically that TxA2 receptor antagonist is effective in alleviating nasal blockage. To evaluate the role of vasoconstrictors and vasodilators in nasal blockage, we examined nasal blood flow, total nasal volume (NV), and nasal airway resistance (NAR) of 10 adult volunteers with (6) and without (4) allergic rhinitis.

Methods: The effect of test solutions (PGD2, TxA2 analogue U46619) was studied by nontraumatic application with a micropipette on the mucosal surface of the inferior turbinate. Blood flow in the nasal mucosa was measured by Laser-Doppler-Flowmeter (ALF21, Advance, Japan). NV was measured by acoustic rhinometer (RHIN2000, Rhinometrics, Denmark). NAR was measured by rhinomanometer (MPR2100, Nihon Kohden, Japan).

Results: PGD2 (20 µM) induced a significant increase in nasal blood flow (50%) and NAR (300%) and a decrease in NV (-40%) in both groups with and without allergy. In contrast, TxA2 analog (200 µM) induced a dose response-related decrease in nasal blood flow (-20% to -30%) and an increase in NV (10% to 50%) in both groups after 15 min. Interestingly, only in patients with allergy, the increase in NAR and blood flow recurred 2 h after treatment with TxA2.

Conclusions: The reduction of nasal blood flow in patients with allergic rhinitis may be due to ischemic formation of edema and blockage.

16:08-16:16
Free Paper
Session 14

ENDONASAL STIMULATION OF THE TRIGEMINAL SYSTEM

B. K. Moll, B. Hinz, W. J. Wolf
University of Mainz, Mainz, Germany

Purpose: The trigeminal nerve innervates large portions of the head and is responsible for the sensitivity in this region. The diagnosis of dysfunctions of the nerve is mostly based on information given by the patient. Examinations which allow an exact stimulation and objective results are rare. Endonasal stimulation, which leads mainly to a response of the second branch, is a new method to investigate the trigeminal function.

Method: By a constant endonasal flow of humidified and temperature-controlled air produced by an olfactometer, it is possible to introduce different odors into the nasal cavity without producing artifacts. In more than 100 cases of olfactory disorder, we used the olfactometer to stimulate the olfactory and trigeminal systems.

Results: The event-related potentials (ERPs) of the trigeminal system showed shorter latencies and larger amplitudes. The unchanged ERPs in anosmic patients were used as a control. In a study of 25 patients with paralysis of the facial nerve, we compared the ERPs of the paralyzed side with those of the contralateral side. Some patients showed differences, so that an involvement of the trigeminal nerve in patients with Bell palsy is demonstrated.

Conclusions: Endonasal stimulation is a good method to get objective information on the trigeminal system. It is useful in the investigation of olfactory disorders and dysfunction of the trigeminal nerve.

THURSDAY

16:20-16:28
Free Paper
Session 14

SLUDER SPHENOPALATINE GANGLION NEURALGIA-- LOCAL TREATMENT WITH 88% PHENOL: TWO CASE REPORTS

A. Olszewska-Ziaber, P. Zalewski
Military Medical Academy, Lód´z, Poland

Purpose: Patients who complain of chronic recurring head and face pain can have in some rare cases Sluder sphenopalatine ganglion neuralgia. It is a form of cluster headache. In our department there were 2 patients with Sluder neuralgia among 12 patients with recurring head and face pain.

Case reports: Patient 1, 46-y-old woman was treated by a neurologist because of strong, recurrent unilateral face pain localized in the region of the nose, orbit, and maxilla, accompanied by nasal obstruction, rhinorrhea, and ipsilateral lacrimation. The pains lasted for hours; medications did not relieve pain. Patient 2, 65-y-old man admitted to the department of neurology because of the attacks of unilateral face pain, accompanied by nasal obstruction and ipsilateral lacrimation. Neither stomatological treatment nor medications relieved pain.

Methods: Lidocaine 4% was applied intranasally into the region of sphenopalatine ganglion behind the posterior tip of the middle turbinate. The diagnosis of Sluder neuralgia was confirmed only when local anesthetic block of the sphenopalatine ganglion was successful. In both cases the patients were pain-free for several hours so they were qualified for phenolization, but first a saline solution was applied to avoid a placebo effect. Then 88% phenol was applied on the cotton carriers, only once in the first case and twice in the second.

Results: The total relief of pain was obtained, lasting 9 mo in the first case and 6 mo in the second.

Conclusions: The intranasal phenolization of sphenopalatine ganglion seems to be an effective method of treatment of Sluder neuralgia.

16:28-16:36
Free Paper
Session 14

THE EFFECT OF THE EXTERNAL NASAL DILATOR IN HEALTH AND DISEASE

Renato Roithmann, Jerry Chapnik, Philip Cole
Universidade Luterana do Brasil, Porto Alegre, Brazil

Purpose: To evaluate the effects of the external nasal dilator on nasal sensation, structure, and function in healthy and in obstructed nasal cavities.

Methods: Healthy volunteers and patients with nasal obstruction secondary to 1) mucosal congestion, 2) septal deviation, and 3) nasal valve collapse.

Results: Healthy volunteers: Both external nasal dilator and decongestant produced an increase in nasal airflow that was followed by an improvement in the sensation of nasal patency. The external nasal dilator increased the minimal cross-sectional area (CA) at the first and second valleys of the rhinogram. The decongestant increased the CA of the second valley but not the first valley. Nasal valve collapse: Only a single and deep valley was demonstrated by acoustic rhinometry. External dilatation produced a marked increase in CA that was followed by a significant decrease in nasal resistance and a marked relief of nasal obstruction. Septal deviation: Effects were similar to those in nasal valve collapse. The decongestant also improved nasal patency. Mucosal congestion: The external nasal dilator increased the minimal CA and decreased the nasal resistance. There was no improvement in the sensation of nasal obstruction. The decongestant induced an increase in both minimum area and airflow, and also improved the subjective sensation of nasal blockage.

Conclusions: The external nasal dilator improves the nasal patency in normals and obstructed patients. The effect is more pronounced in patients with valve collapse and patients with septal deviation. The device does not seem useful to alleviate obstruction associated with mucosal congestion.

16:40-16:48
Free Paper
Session 14

HISTOPATHOLOGIC AND MICROBIOLOGIC STUDIES ON ATROPHIC RHINITIS

Retno S. Wardani, Sona, Damayanti Soetjipto, Endang Mangunkusumo
Cipto Mangunkusumo National Jl., Jakarta, Indonesia

Purpose: Atrophic rhinitis is a clinical entity characterized by a dry, crusted appearance and the emission of fetid odor. We conducted a preliminary study of histopathologic and microbiologic studies to prove infection is the etiologic factor in atrophic rhinitis and to show infection has a poor result after conservative therapy.

Methods: Twenty patients with a histologic diagnosis of atrophic rhinitis were selected. From the clinical manifestations, 6 patients (30%) were classified as first stage and 14 patients (70%) were stage 2. The age of patients ranged from 15 to 53 y. Sixteen (80%) were females. Nasal biopsy specimens were taken from the middle turbinate under local anesthesia. Statistical analysis was used to show a correlation between histopathologic findings and clinical manifestation.

Results: Squamous cell metaplasia, atrophic submucous glands, lymphocyte infiltration, and vascular dilatation were consistently found. The number of submucosal glands, goblet cells, and eosinophil infiltration is decreased in the second stage of atrophic rhinitis, but basal membrane and tunica intima of blood vessels are thicker. The microbiologic examinations show that *Klebsiella* sp, Pseudomonas aeruginosa, and *Staphylococcus aureus* are the big 3 bacteria findings. None of the nasal cavity is free of bacteria.

Conclusion: The histopathologic findings tend to correlate with clinical manifestations. Osteomyelitis and diffuse fibrosis may play a role as focal infections and are difficult to be penetrated by antibiotic therapy only. Functional endoscopic sinus surgery may be needed.

16:48-16:56
Free Paper
Session 14

PARTIAL CLOSURE OF THE NOSTRIL IN ATROPHIC RHINITIS

Ben-Chih Yuan
Military Kaohsiung General Hospital No. 2, Kaohsiung City, Taiwan, China

Purpose: Atrophic rhinitis is a progressive chronic nasal disease characterized by mucosal atrophy, thick crusts, and a distinct fetid odor. Many therapeutic measures have been tried for atrophic rhinitis, but none has proved to be wholly successful. We tried to narrow the nasal cavity, which might benefit from vasodilator effect of partial closure of the nostril, hoping to cure atrophic rhinitis.

Methods: Patients who had failed medical treatment for atrophic rhinitis were included in this study. All of them underwent partial closure of the nostril with a 3- to 5-mm hole made below the suture line and never reopened after operation. They were followed up at least 1 y after operation, with examination and questionnaires about symptoms and signs.

Results: From January 1987 to June 1997, 14 women having atrophic rhinitis were selected for this study. Ages ranged from 19 to 45 y (average, 35.2 y). At the end of follow-up, many of the patients' symptoms improved (80%); no or little crusting was found after operation, and all patients had satisfactory results.

Conclusions: Chronic atrophic rhinitis is one of the noncurable diseases. As the main underlying mechanism of its occurrence is the wide nasal cavity, no conservative treatment can cure the disease, so long as the nasal cavity remains uncorrected. Partial closure of the nostril without reopening it can significantly improve the symptoms and signs of atrophic rhinitis.

17:00-17:08
Free Paper
Session 14

ARE IMAGING STUDIES NECESSARY IN THE WORK-UP OF ANOSMIA?

Nicolas Y. Busaba
Massachusetts Eye and Ear Infirmary and Harvard Medical School, Boston, MA, USA

Purpose: Assess the value of imaging studies in diagnosing the etiology of anosmia in patients with unremarkable endoscopic intranasal examination.

Methods: This is a retrospective review of patients who presented with the isolated complaint of anosmia. We excluded patients with sinusitis or a history of sinus or anterior cranial fossa surgery and those previously diagnosed with neurologic disorder. The results of the imaging studies were reviewed.

Results: The study group comprised 28 patients (20 females and 8 males). The mean age was 48 y, and the median duration of anosmia was 3 mo (range, 1 mo-2 y). Twenty-one patients reported upper respiratory tract infection before onset of symptoms. All patients denied epistaxis, headaches, or other neurologic symptoms. Three patients had a history of environmental allergies. Endoscopic nasal examination was performed on all patients. Septal deviation was noted in 5 and inferior turbinate hypertrophy in 4 patients. Twenty patients underwent enhanced magnetic resonance imaging and 8 had enhanced computed tomographic (CT) scan of the paranasal sinuses and brain. The imaging studies revealed maxillary sinus retention cysts in 4, mucosal thickening in the paranasal sinuses in 3, deep lobe parotid tumor in 1, and nasopalatine cyst in 1 patient. The remainder of the scans were unremarkable. None had intranasal mass, central nervous system (CNS) tumor, or relevant CNS abnormality.

Conclusion: Imaging studies did not add to the clinical history and endoscopic nasal examination in determining the cause of anosmia for the work-up of patients who present with the isolated complaint of anosmia.

17:20-17:28
Free Paper
Session 14

RELATIONSHIP BETWEEN THE C-MYC AMPLIFICATION AND SQUAMOUS CELL CARCINOMA AND INVERTED PAPILLOMA IN NASAL CAVITY AND NASAL SINUS

Ji-Qun Wang, Fa-Qi Zhang, Sheng-Zhi Chen, Li-Hua Wang, Tao Zhang
Jinan University Medical College, Qinyuan City Hospital, and Zhangjiang City Central Hospital China

Purpose: To study the relationship between the c-myc amplification and squamous cell carcinoma and inverted papilloma in nasal cavity and nasal sinus.

Methods: Forty-four samples (24 cases of squamous cell carcinoma in nasal cavity and nasal sinus; 15 cases of benign tumors, of which 8 are cases of inverted papilloma in nasal cavity, 5 cases of angioma in nasal cavity, 2 cases of maxillary cyst, and 5 cases of normal tissue in nose) were studied by molecular biologic technique.

Results: Amplification of c-myc in all of the cases was as follows: 10 to 40 times in malignant tumors, 5 to 10 times in inverted papilloma, and 5 times below in benign tumors and normal tissues.

Conclusion: Amplification level of c-myc as a molecular parameter might be used to detect whether inverted papilloma in nasal cavity was changing into malignancy early. The amplification of c-myc is responsible for the squamous cell carcinoma in nasal cavity and nasal sinus.

16:01-16:08
Free Paper
Session 15

RELATIONSHIP BETWEEN CILIARY BEAT FREQUENCY AND MAXILLARY SINUS MUCOSAL HYPERTROPHY ON COMPUTED TOMOGRAPHY IN PATIENTS WITH CHRONIC SINUSITIS

Weon-Jin Seong, Sang-Jun Jeon, Seok-Won Park, Yang-Gi Min
Seoul National University, Seoul, Korea

Purpose: This study aimed to investigate the relationship between the sinus mucosal hypertrophy and ciliary beat frequency (CBF) in patients with chronic sinusitis in vitro.

Methods: In 14 patients with chronic sinusitis, mucosal samples were obtained from the superior, inferior, and lateral walls of the maxillary sinus. Using a video-computerized analysis technique, we measured 2 parameters for ciliary activity at 5 different sites selected randomly from each sample: the ciliated area (%) showing CBF equal to or higher than 10 Hz ($A_{\geq 10}$) and the weighted frequency (W_f). Mucosal hypertrophy of the maxillary sinus was calculated using a computer program on computed tomography (CT).

Results: $A_{\geq 10}$ and Wf were 95% and 11.3 Hz in the congrol group, respectively, whereas they were 47% and 9.1 Hz in the chronic sinusitis group, respectively ($P = 0.03$). There was a significant inverse correlation between $A_{\geq 10}$ or Wf and mucosal hypertrophy of the maxillary sinus ($P = 0.001$).

Conclusions: The results of this study suggest that the severity of mucosal hypertrophy on CT scans may correlate with the ciliary activity.

16:08-16:16
Free Paper
Session 15

ANATOMIC AND COMPUTED TOMOGRAPHIC ANALYSIS OF THE NASOFRONTAL DUCT

Kyung Su Kim, Sung Shik Kim, Hyun Ung Kim, In Hyuk Chung, Jeung Gweon Lee, In Yong Park, Joo-Heon Yoon
Yonsei University College of Medicine, Seoul, Korea

Purpose: Although a complete anatomic knowledge of the nasofrontal duct is of great importance, little is known about it. The aim of this study is to examine the drainage site of the nasofrontal duct and to investigate the anatomic boundaries of the nasofrontal duct according to the drainage site.

Methods: Computed tomograms of 50 adult cadaver heads were taken sagittally with 1-mm intervals and coronally with 3-mm intervals to find the nasofrontal duct. One hundred specimens, made up of sagittally divided adult cadaver heads, were dissected under the microsope to study the structure of the nasofrontal duct.

Results: We identified the anterior, posterior, medial, and lateral boundaries of the nasofrontal duct. In the most common type, the superior portion of the uncinate process formed the anterior border and the superior portion of the bulla ethmoidalis, the posterior border of the nasofrontal duct. The conchal plate formed the medial border and the suprainfundibular plate, the lateral border of the nasofrontal duct. Other variations are described in detail.

Conclusion: To widen the nasofrontal communication, removing the upper portion of the ground lamella of the ethmoid bulla, which is the posterior boundary of the nasofrontal duct, with a cutting forceps seems to be a safe and easy method.

16:28-16:36
Free Paper
Session 15

RHINOSCLEROMA: A REPORT OF AN UNUSUAL PRESENTATION

Devyani Lal, Achal Gulati, A. K. Agarwal
Maulana Azad Medical College and Lok Nayak Hospital, New Delhi, India

Purpose: To present an unusual case of rhinoscleroma involving the nose, lips, and facial soft tissues.

Methods: Case review.

Results: A 45-y-old man presented with a 4-mo history of nasal obstruction with associated nasal bleeds. A mass occupied both sides of the nasal cavity, filling the inferior and middle meatuses, with sclerosis in the region of the nasal vestibules, confirmed on nasal endoscopy. Systemic examinations (hemogram, erythrocyte sedimentation rate, and chest radiograph) were normal. Biopsy results suggested a granulomatous lesion. Subsequent tests for tuberculosis, sarcoidosis, and Wegener granulomatosis were negative. Complement fixation tests for rhinoscleroma were unavailable. Culture studies were unhelpful. On clinical grounds, a diagnosis of rhinoscleroma was made. Tetracycline treatment was unsuccessful. A repeat biopsy was inconclusive. The swelling rapidly progressed to involve the soft tissues overlying the external nasal skeleton. Despite treatment with rifampicin and local acriflavin packs, swelling increased over 15 d to involve the lips. A repeat biopsy specimen taken from the nose and lips indicated rhinoscleroma. Treatment with a combination of rifampicin and ciprofloxacin and nasal acriflavin packs resulted in regression of the swelling of the mass, but was associated with sclerosis of the nasal vestibules.

Conclusion: Involvement of the external nasal soft tissues or lips is uncommon in rhinoscleroma. Russell bodies and foam cells may be absent (perhaps because the organism is developing drug resistance), leading to difficulty in diagnosis, confusion with malignancies, and difficulty in treatment.

16:40-16:48
Free Paper
Session 15

EVALUATION OF HEARING DISORDERS IN PATIENTS WITH CYSTIC FIBROSIS ADMINISTERED AMINOGLYCOSIDES: PRELIMINARY RESULTS

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The Medical University of Warsaw, Warsaw, Poland

Purpose: The aim of this study was to evaluate hearing disorders in the group of patients with cystic fibrosis (CF) treated with aminoglycoside antibiotics owing to an exacerbation of chronic rhinosinusitis.

Methods: The study group consisted of the 30 patients with CF administered aminoglycoside antibiotics, both systemic and topical. The control group consisted of 30 patients with chronic rhinosinusitis. In both groups of patients an otoscopy, pure tone audiometry, immittance audiometry, and distortion product otoacoustic emissions (DPOAEs) recordings were performed.

Results: In the control group in 2 cases a conductive hearing loss was observed, whereas in CF patients hearing tests did not reveal any conductive disorders. In the CF group in 2 cases and in 1 case in the control group, DPOAEs were abnormal even though the pure tone hearing threshold was within normal limits. In the CF group in 2 patients and in the control group in 1 patient with high-frequency hearing loss, DPOAE amplitude for 4 and 6 kHz was decreased, revealing cochlear function impairment. The difference in prevalence of cochlear disorders between the groups of patients was not statistically significant.

Conclusion: The prevalence of hearing disorders in CF patients is not higher than in the patients with chronic rhinosinusitis. DPOAEs are a useful tool in monitoring the ototoxicity of aminoglycosides in CF patients. Cochlear hearing loss was observed only in those patients who were treated with a systemic aminoglycoside antibiotic. No ototoxic effect of topical aminoglycoside treatment was observed.

16:48-16:56
Free Paper
Session 15

A CLINICAL STUDY OF LOCAL ACRIFLAVINE IN TREATMENT OF RHINOSCLEROMA

S. R. Agrawal and Abhay Gupta
G. R. Medical College 1, Gwalior, Madhya Pradesh, India

Purpose: Rhinoscleroma is a chronic granulomatous disease, which mainly involves upper respiratory tract. Patients present with bluish granulomatous nodules, which in later stages turn into cicatrix tissue imparting deformity and hardness. Disease runs a long course and thus requires prolonged therapy. Rhinoscleroma is caused by *Klebsiella rhinoscleromatis*. This study was done to find out the antibacterial effect of local acriflavine on *K rhinoscleromatis* as well as on the disease process.

Method: Antibiotic effect of acriflavine was studied on 1 of the isolates of *K rhinoscleromatis* using Whatman's #1 filter paper disc soaked in 2% or 5% acriflavine solution. It was found sensitive. A total of 26 cases, diagnosed clinically and histopathologically, were studied. These patients were treated using 1%, 2%, or 5% acriflavine ointment.

Results: The cure rate was 33%, 67%, and 100%, respectively. Details of response to acriflavine and its adverse effects are discussed.

Conclusion: It is concluded that acriflavine can be used as a good alternative to systemic therapy for rhinoscleroma. Acriflavine solution can be prepared easily and is not a financial burden.

17:00-17:08
Free Paper
Session 15

CYSTIC FIBROSIS IN RHINOLARYNGOLOGIC PRACTICE

A. Krzeski, D. Kapiszewska, N. P. Gorski
The Medical University of Warsaw, Warsaw, Poland

Purpose: Mutation of the cystic fibrosis transmembrane regulator (CFTR) gene causes alterations in the composition of mucus, which becomes thicker and decreases mucociliary clearance. The alterations in the mucociliary clearance in the ostiomeatal complex (OMC) promote inflammatory changes in the sinuses. This study was based on examination and follow-up of 30 patients admitted to the ENT Department. The age of the patients was from 6 to 26 y. The control group was equal to the target group. The aim of the study was to find out how common and severe are the changes in nasal cavities and sinuses among patients with CF.

Methods: We examined: what is specific among patients with CF during sinusitis, what are the changes in the clinical tests, and what should be the diagnostic process and treatment for chronic rhinosinusitis (CRS) among those patients. We checked the age at CF diagnosis, type of the CFTR gene mutation, duration and severity of CRS, and treatment.

Results: We found that CF promotes sinusitis, severity of the sinusitis depends on the type of the gene mutation, and patients with CF present more severe symptoms than controls.

Conclusions: The consequences of the severity of this process among this group are enlargement of the base of the nose, disorders in the development of the sinuses, destruction of the nasal skeleton, medial displacement of the lateral nose wall, and alterations of the mucociliary clearance. A combination of those symptoms is characteristic for patients with CF.

17:08-17:16
Free Paper
Session 15

MORPHOLOGIC CHANGES OF NASAL MUCOSA IN PATIENTS WITH CYSTIC FIBROSIS

S. T. Knipping, H. J. Holzhausen, A. Berghaus
Martin Luther University Halle Wittenberg, Halle/Saale, Germany

Purpose: Cystic fibrosis (CF) is an inherited multisystemic disorder that results in generalized dysfunction of exocrine glands. Cystic fibrosis is mainly a problem of the upper and lower respiratory tract. Chronic obstructive pulmonary disease, chronic sinusitis, nasal polyposis, and hypertrophy of inferior turbinates with nasal airway obstruction are typical symptoms. To understand pathophysiologic mechanisms in CF and to correlate morphologic findings with clinical symptoms, investigations of nasal mucosa are important.

Methods: Tissue samples of inferior turbinates were taken during nasal surgery in 6 children (3-11 y) between 9/98 and 10/99. Histologic sections were examined by light and electron microscopy (EM 902 A Zeiss).

Results: Compared with sections of normal nasal mucosa, the lamina propria mucosae shows different morphologic changes. Under a thick layer of respiratory epithelium with a high proportion of goblet cells and particularly vacuoles, there is an edematous subepithelial area. The capillary layer is reduced, and the seromucous glands show an atypical morphologic construction with widely spaced mucous cells and cystic dilatation. On the ultrastructural level, the glandular cells show in the supranuclear cell portion atypical and inhomogeneous glandular droplets. A viscous secretion was detectable at the glandular lumen. The nucleus contains dispersed chromatin as a sign of increased activity, and the structures of Golgi apparatus were obviously detectable.

Conclusions: This histologic study demonstrated various morphologic changes of nasal mucosa and showed a correlation between the glandular dysfunction and the typical symptoms in CF. Additionally, a comparison with ultrastructural findings of CF enteropathies is proposed.

17:20-17:28
Free Paper
Session 15

HIGH-RESOLUTION RHINOMANOMETRY: BASICS AND CLINICAL IMPACT

Klaus Vogt, Wolfgang Hasse, Helmuth Hoffrichter
Rendsburg/Kiel/Schwerin, Germany

Purpose: High-resolution rhinomanometry (HRR) is an advanced method of computerized rhinomanometry as given by the International Standardization Committee On The Objective Assessment of the Nasal Airway (ISOANA). HRR was developed as a result of comprehensive analyses of the errors of "classic" computerized rhinomanometry and the general progress of data processing by personal computer. HRR separates graphically and numerically 4 phases of the nasal breathing cycle: an ascending and descending part during inspiration and expiration. The curves of HRR follow the general form of an asymmetric double loop instead of a simple s-shaped line. The theoretical background is given by Hoffrichter's 1994 equation. Recent physical experiments with the "Dynamic Artificial Nose" show that HRR measures rigid resistors within the full range of frequency alterations in human breathing. The parameters of airflow through rigid resistors are calcuable.

Methods: We performed a comprehensive analysis of 2,000 measurements in 1,000 patients.

Results: HRR produces different curves if the geometric form of the nasal channel corresponds to a tube or a diaphragm; it shows the great influence of elastic compartments of the nose on the airflow. The differences between the ascending and descending parts of the loop explain some of the problems connected with the bad reproducibility of the results of the "classic" rhinomanometry.

Conclusion: The "hysteresis" of the rhinomanometric curves should no longer be considered as "error due to the apparatus." It is important information about the influence of elastic compartments on the nasal airflow.

16:01-16:08
Free Paper
Session 16

SURGERY OF NASAL TIP

C. Cingi
Osmangazi Üniversity, Eskisehir, Turkey

Purpose: The aim of this paper is to evaluate the applied surgical methods and the outcomes obtained in nasal tip surgery.

Methods: Rhinoplasty patients who were operated on during the last 5 y took part in this study. The follow-up was between 5 y and 4 mo. Different surgical methods were chosen according to the deformity of the nose. Secondary procedures were not included. Satisfaction of the patient and the surgeon were reviewed.

Results: Of 327 rhinoplasties, 193 patients were females (59%). The median age of the female patients was 27 y (range, 17 to 54 y). The median age of the male patients was 29 y (range, 17 to 51 y). Delivery technique with dome binding suture was the most preferred method. It was applied to 217 patients (66%). Intercartilaginous incision and retrograde strip excision were performed in 68 patients (21%) who had straight and symmetric noses but had slight bulbosity or needed minimal rotation. External rhinoplasty was performed in 42 patients (13%) who had extremely difficult noses or for educational purposes.

Conclusions: Although the majority of the patients were female, the number of male patients was more than expected. The ratio of satisfaction of the patients is fortunately higher than that of the surgeon. Delivery technique with dome binding suture was used in most of the cases. This method has the advantage of re-forming the tip. I found test tie of the dome binding suture before completely tying the knot useful. External rhinoplasty is the proper method for extreme cases of asymmetry and for lack of tissue that necessitates replacement, grafting, and fixation under direct vision.

16:08-16:16
Free Paper
Session 16

TIP RHINOPLASTY FOR THE EGYPTIAN NOSE

Hossam M. T. Foda
Alexandria Medica, Sidi Gaber, Egypt

Purpose: Successful surgical control of the nasal tip is considered the most difficult step in any nasal plastic procedure. Various techniques have been described to modify the degree of nasal-tip projection, rotation, and definition.

Methods and Results: A personal series of 750 consecutive rhinoplasties was reviewed, including different tip-modifying techniques and their long-term results. Computer-assisted nasal analysis was performed preoperatively to evaluate the presenting nasal-tip deformity as well as postoperatively to assess the effects that each tip-modifying technique had on the final position of the nasal tip.

Conclusion: An understanding of the effects that each technique has on the dynamics of the nasal tip will allow surgeons to select the most appropriate surgical technique to adopt for each patient.

THURSDAY

16:20-16:28
Free Paper
Session 16

THE TRUE STORY OF THE ORIGIN OF RECONSTRUCTIVE RHINOPLASTY IN THE ITALIAN RENAISSANCE

R. La Rosa, P. Castelnuovo, P. Palma
Bologna, Pavia, and Milano, Italy

Gaspare Tagliacozzi (1545-1599), professor of Anatomy and Surgery at Bologna, is considered the father of reconstructive rhinoplasty in Italy. He published the technique in his book De Curtorum Chirurgia per Insitionem in 1597, and since then the "Italian method" is known as the "Tagliacozzi method." It is known that Gaspare Tagliacozzi learned the technique from other surgeons (Branca in Catania, Vianeo in Calabria). Branca's and Vianeo's techniques of reconstructing noses, ears, and lips were extraordinary for their time, when surgical techniques were jealously kept in the family circle like a holy secret.

We try to document the role these pioneers played in the art of reconstructing noses as well as the connections among them. Research has involved several Italian towns: Bologna, Naples (National Library), Tropea, Catania, and Palermo.

After a short historical scenario, the authors will comment on their research that gives a more detailed insight into the life and activity of the family Vianeo from Tropea and will highlight the role played by Leonardo Fioravanti from Bologna, who was the trait-d'union between the family Vianeo and the young Tagliacozzi. We will also shed light on the relationship between Tagliacozzi and his teacher Giulio Cesare Aranzio. The latter was the first surgeon to be officially appointed as a Chairman of Anatomy, and he practiced rhinoplastic surgery even before Tagliacozzi did.

16:28-16:36
Free Paper
Session 16

LONG-TERM RESULTS OF NASAL VAULT-PRESERVING SURGERY

Pietro Palma and Giorgio Sulsenti
Milano and Bologna, Italy

Purpose: A nose with an undesirable projection or a deflection from the mid-sagittal plane of the face can be corrected by means of a "let-down" procedure, ie, a double (high and low) lateral osteotomy and a bony wedge resection. The 30-year experience is presented. Indications, surgical techniques, practical hints, and critical remarks are thoroughly discussed, and long-term functional and aesthetic results are presented.

Method: The level and the side of the osteotomies as well as the size of the bony wedge(s) to be removed should correspond to the desired lowering or medianization of the nasal pyramid. Undermining the soft tissue covering of the nasal pyramid allows redistribution of the excess of skin. Before the performance of the "let-down" procedure, a strip of septum has to be resected to make room in the septal space.

Results: The authors have found that the "let-down" procedure permits correction of overprojecting or laterally deviated noses with a great degree of accuracy and predictability. Furthermore, the dislocated bones do not impinge on the concha or affect nasal valve physiology. Because healing occurs more slowly than in "classic" rhinoplasty, a careful postoperative adjustment of the splinting is required to avoid re-formation of the deformity.

Conclusion: Longer follow-up confirms initial results, suggesting improved functional and cosmetic results.

16:40-16:48
Free Paper
Session 16

A PRACTICAL GUIDE TO AVOID RHINOPLASTY MALPRACTICE

P. Palma, P. Castelnuovo, A. Staffieri
Milano, Pavia, and Padova, Italy

Purpose: Rhinoplastic surgery is not recommended for every patient who requests it. Even the presence of an obvious deformity is not in itself an indication for surgery: if the desire is unrealistic or if the surgeon leads the patient to desire the procedure, there is a marked probability that the patient will not be happy. This can lead to a disaster despite an objectively satisfactory result.

Method: The authors set up a systematic method to approach the rhinoplastic patient, involving all the phases of the patient-surgeon relationship: the goal is to try to avoid being sued for malpractice. Defensive rules concerning first consultation work-up, planning of the operation, informed consent, surgical conduct, record keeping, procedures for discharging patients, and postoperative care behavior will be highlighted. However, the psychological makeup of the rhinosurgeon represents a significant variable in the outcome of surgery: a successful surgeon is able to realize his personal limitations and respect them.

Results: The majority of malpractice suits are due to a lack of communication between the surgeon and patient. The basis of such dissatisfaction, whether temporary or permanent, is predominantly the result of unfavorable interpersonal relationships during the preoperative, operative, and postoperative phases.

Conclusion: We urge rhinosurgeons to develop a systematic method to optimize the doctor-patient relationship and improve the sense of mutual trust and respect.

17:00-17:08
Free Paper
Session 16

USE OF POROUS HIGH-DENSITY POLYETHYLENE IN NASAL RECONSTRUCTION

Thomas Romo III
Lenox Hill Hospital, New York, NY, USA

Purpose: To investigate the use of porous high-density polyethylene implants in nasal reconstruction.

Methods: Porous polyethylene implants were used for nasal reconstruction in 292 patients: 113 (39%) underwent primary rhinoplasty; revision rhinoplasty was performed in 179 (61%). Most patients required multiple implants, including columella struts, plumper grafts, dorsal implants, and nasal valve battens. Postoperative follow-up ranged from 6 mo to 7 y.

Results: Complications occurred in 9 patients (3%). Three early and 6 delayed infections necessitated complete implant removal in 5 patients and partial removal in 4 patients. Preoperatively, all patients with complications had compromised skin-soft tissue envelopes secondary to heavy smoking, cocaine abuse, or prior surgery. All implants were easily removed. No other complications, including implant extrusion or skin erosion, were noted.

Conclusions: Porous polyethylene implants allow for fibrovascular ingrowth, which lends stability to the implant. Porous polyethylene implants are well tolerated and provide an ideal material for nasal reconstruction.

17:08-17:16
Free Paper
Session 16

COMPUTER PREOPERATIVE SIMULATION IN RHINOPLASTY

M. Rugina and R. Peynegre
Centre Hospitalier Intercommunal de Créteil, Créteil, France

Purpose: The aim of this prospective study was to evaluate the predictive value of computer preoperative simulation in rhinoplasty.

Methods: Thirty consecutive cases of rhinoplasty were planned by using a computer imaging system and performed in our department. Preoperative face, profile, and nasal tip standard 35-mm slide photographs were taken, scanned, and computer-loaded, and then modified using Corel PHOTO-PAINT software (Corel Corp, Ottawa, Ontario, Canada). Modified images, ie, rhinoplasty simulation, were discussed with the patient, a surgical plan was made, and the operation was performed. At least 6 months postoperatively, the patient was asked to evaluate whether computer preoperative simulation helped in communicating with the surgeon and in representing the future nose. During this postoperative consultation, final photographs were taken and digitized. Original, modified, and final profile images were superimposed to create a multilayer file that allowed measurements of differences among these 3 images.

Results: All patients found computer simulation helpful in preoperative rhinoplasty consultation. Correspondence between the simulated image and the final rhinoplasty result was evaluated as excellent in 25 cases (83.3%) by the patients and in 22 cases (73.3%) by the surgeon. Comparative analysis of images showed a strong correlation between modified and final profile images in 20 cases (66.6%).

Conclusions: Computer simulation of rhinoplasty appears to be effective in predicting final surgical results and is therefore useful for patients considering rhinoplasty and for surgeons planning the operation.

14:00-14:40
Mini-Course 19

SPREADER GRAFTS

Raj Kanodia
Beverly Hills, CA, USA

Spreader grafts are an important key to both the functional and aesthetic aspect of most primary and secondary Septo-Rhinoplasty. The grafts can be multiple and stacked. They can be used to fill the concave mid third of the nose or wedged to push the naso-septal pyramid. Upon removing the bony and cartilaginous hump, many a times, upper lateral cartilage caves in, thereby creating an unpleasant aesthetic pinch and a functional narrowing of the Internal Nasal Valves. Spreader grafts address both these important issues. The numbers, size, shape and placement of the spreader grafts are tailor made to suit the need.

16:00-16:05
Mini-Course 20

NASAL SEPTAL PERFORATIONS

Stephen F. Bansberg
Mayo Clinic, Mayo Foundation, Scottsdale, AZ, USA

The major presenting symptoms of septal perforations are crusting, bleeding, and nasal obstruction. Whistling, pain and rhinorrhea are other symptoms. Aesthetically, there may be dorsal collapse or columellar retraction. The most common etiology remains prior nasal surgery. Other etiologies include nasal trauma (either external or self-inflicted), vasoconstrictive drugs and steroid sprays, and chemical irritants. Inflammatory conditions (Vasculitides, Wegener's), infections (tuberculosis, syphilis), and neoplasms must also be considered. Often times, the etiology is unknown. Treatment options are moisturization, obturation with a silastic prothesis (septal button), and surgical closure. Moisturization is accomplished by saline sprays and irrigation, ointments, and emollients. An advancement in prosthetic closure is use of CT scanning to design a custom made prothesis for large perforations. A Mayo Clinic retrospective review on the use of septal buttons was done by Shinners, et al. Improvements in epistaxis, whistling, and crusting were noted. Seventy percent of buttons were in place after 4 years. There were no significant complications. The results of this study support the use of silastic buttons for treatment of symptomatic septal perforations.

16:00-16:05
Mini-Course 20

SURGICAL CLOSURE OF SEPTAL PERFORATIONS: A REVIEW

John A.M. de Groot
University Medical Centre, Utrecht, The Netherlands

Purpose: The purpose of this retrospective study was to get informed about the results of 4 different techniques of surgical closure of septal perforations that were used in our clinic in the last 15 years.

Materials and Methods: Septal perforations were surgically closed between 1984 and 1997 valuable cases. Mean age: 36.7 years. 64 patients had small perforations (<2cm) and 33 patients had large perforations (>2cm) The mean follow-up 9.8 months.

1. Direct closure after mobilization of the mucoperichondrium, 2. Rotation flaps, 3. Bipendicular flaps and 4. Buccogingival transportation flaps. Techniques 1, 2, and 3 were mainly used in small perforations and technique 4 in large perforations. In 76 patients a transplant (septal cartilage, perpendicular plate or lyodura) was interpositioned between the surgically closed mucoperichondrial layers. No transplant was used in 21 cases.

Results: Complete closure of septal perforations was obtained in 59%. Partial closure in 18%. No closure in 22%. In 69% of the small perforations the closure was successful. Success rate of the used techniques:
Direct closure 80%, Rotation flaps 53%, Bipendicular flaps 71%, and Buccogingival flaps 39%
The results were significantly better if a transplant was used between the mucoperichondrial layers.

Conclusion: In large perforations only technique 4 was successful, but only in 39%. On smaller perforations technique 1, 2, and 3 appeared to be relatively safe procedures. The success rate improved by thru use of a transplant between the closed mucoperichondrial layers, independently of the chosen technique.

16:05-16:20
Mini-Course 22

OVERVIEW OF THE PROBLEM WITH NASAL POLYPS

Joong-Saeng Cho
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There have been a number of different theories put forward for the pathogenesis of nasal polyps. Simple allergic reactions do not explain polyp formation. Nasal polyps are related to inflammation via infection, allergy and other mechanism. In addition, nasal polyps have been associated with condition such as aspirin sensitivity, cystic fibrosis and allergic fungal sinusitis which are different in their pathogenesis and manifestations. Nasal obstruction congestion and facial pain related concurrent chronic sinusitis are common problems in the patients. Some of the patients with nasal polyps are associated with the asthma. Since no single predisposing disease can be account to the formation of nasal polyps treatments has to be directed toward the inflammatory process and/or underlying infection. The treatment is a combination of surgery to the polyps and medical treatment with systemic or topical steroid. Endoscopic managements are playing an important role in lengthening the symptom free interval or cure nasal polyps. Whatever therapeutic regimen is used, nasal polyps are a chronic condition prone to recurrence and in some cases with embarrassing frequency.

16:35-16:50
Mini-Course 22

HOW AND WHY NASAL POLYPS GROW: OPINION OF PATHOLOGISTS

V. P. Bykova
Research Institute for Ear, Throat and Nose, Moscow, Russia

Benign nasal polyps are inflammatory in nature and closely related to chronic and recurrent rhinosinusitis. Consideration of them as neoplastic is only of historic interest and seems now to be an anachronism. Nasal polyps arise originally as edematous prolapse from the swelling mucosa of the lateral wall of the middle meatus and ethmoidal sinuses and so inflammatory edema and cell influx contribute in their manifesting growth. But in a biologic sense the term "growth" means cell proliferation and extracellular matrix formation. The last processes contribute in polyp growth at the proliferative stage of the inflammation and are realized as an incomplete postinflammatory regeneration and sclerosis of the polyp core as well as regeneration of the superficial epithelium. As evidenced by histologic alterations, the current morphologic events in nasal polyps reflect a tendency to decrease little by little the exudative potential and increase stromal cell proliferation and lymphostatic edema. Inflammatory in nature, edema of the polyp stroma becomes rapidly lymphostatic because of the disturbance of the tissue fluid removal. So, morphologically the entity of the nasal polyps should be formulated as a local inflammatory hyperplasia of the nasal mucosa combined with lymphostatic edema and lymphogenic sclerosis—a kind of local mucosal elephantiasis. Dynamics of the polyp growth are regulated by cytokines and adhesion molecules and depend on many factors, including an innate predisposition (rarely), anatomic and histologic peculiarities of the middle and superior meatus, and local deficiency of the mechanisms which are responsible for the complete resolution of the acute inflammation. Among them, the removal of the inflammatory products of low molecular weight via secretion and inactivation of histamine by epithelial cells as a basis for a vicious circle are worthy of notice. Upright walking is favorable to lymphostatic edema and seems to be the main cause of the fact that nasal polyps are virtually confined to humans.

16:50-17:05
Mini-Course 22

ANTI-IGE TREATMENT IN ALLERGIC DISEASES

R. Pawankar, S. Yamagishi, R. Takizawa, T. Yagi.
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Purpose : The strategy for the treatment of allergic diseases like allergic rhinitis or asthma lies in reduction of symptoms by interfering with or modulating the allergic inflammatory cascade. Preference is given to therapeutic measures that can immuno-modulate the allergic inflammation. Over the years, much effort has been focussed on regulating IgE production. The knowledge that Th2 cells secrete IL-4 and IL-13, are key regulators of IgE synthesis has led to development of therapeutic measures, that can suppress the synthesis of these cytokines. Glucocorticoids and cyclosporine inhibit cytokine production. Immunotherapy induces an immune deviation from Th2 to a Th1 cytokine profile thus suppressing IgE synthesis.

Methods : Nonanaphylactogenic anti-human IgE Abs are now in clinical evaluation as a therapeutic agent against atopic disease. This new mAb is nonanaphylactogenic recognizes receptor-bound IgE and prevents the association of IgE with its receptor if immune complexes were formed between IgE and anti-IgE mAb, neutralizes IgE, inhibits IgE synthesis, and reduces the IgE receptor expression on mast cells/ basophils.

Results : Specific humanized anti-IgE mAbs rhu-Mab-E25 and CGP 5190 have been used in clinical trials. However, only rhu-Mab-E25 is currently developed for the treatment of allergic rhinitis or asthma. A double blind placebo controlled multi-centre (Phase II/III) study showed an improvement in symptoms like sneezing, itchy nose, runny nose and stuffiness of the nose and less use of rescue medication in the rhuE25 Mab treated group versus the placebo treated group.

Conclusion : Because of their favorable risk/benefit ratio, the effect on on-going allergic inflammation in both the upper and lower airway, satisfactory pharmacological and clinical efficacy, anti-IgE may be a future therapy targeting a central component of allergic inflammatory response.

16:00-16:40
Mini-Course 24

OBJECTIVE MEASUREMENTS IN RHINOPLASTY

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Purpose This study focuses on objectivication, simplification and standardization of measurements in rhinoplasty. We analyzed and the outcomes on photographs of 65 patients who had changes in nasal tip projection (NTP) and nasolabial angle after open rhinoplasty.

Methods The measurements were done on digitalized pre- and post-operative right-sided profiles of non-smiling patients. The computer-programme was ImageAccess by PIC Systems AG, Glattbrugg, Switzerland. The pre- and post-operative digitalized slides were analyzed using four lines superimposed on the face. One line drawn from the superior aspect of the tragus through the lateral canthus and extended over the nasal root was used to define the nasal frontal angle. A second line was drawn from the defined nasal frontal angle (A) to the vermillion cutaneous junction of the upper lip (B). A third line, drawn perpendicular to the second, meets the most projecting part of the nasal tip (D). The length of this third line (C-D) in millimetres was used as a determinant of NTP. The ratio between the second line (A-B) and a fourth line (E-F) following the columella was used as a criterion of the nasolabial angle in degrees. These figures present the absolute value of NTP and nasolabial angle as measurements were done with life-size calibration. The calibration was defined by the diameter respectively radius of the iris respectively cornea, which is 11.5 ± 0.6 millimetres in adults.

Results Pre- and post-operative slides of 65 patients have been investigated. For 54 (83%) patients the measurements could be performed.

Conclusions Our measuring technique allows easy, precise and objective measurements from digitalized photographs. Therefore a better understanding of rhinoplastic results are possible.