

The Program

of

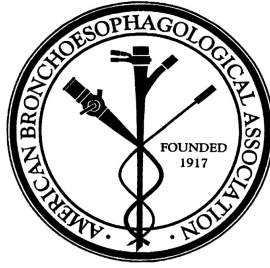
The Eighty-Eighth Annual Meeting

of

**THE AMERICAN
BRONCHO-ESOPHAGOLOGICAL
ASSOCIATION**

**Thursday and Friday
May 1-2, 2008**

**J. W. Marriott Grande Lakes
Orlando, Florida**



PURPOSE

The purpose of this program is to provide Otolaryngologists–Head and Neck Surgeons, Pulmonologists, Gastroenterologists and other interested physicians, clinicians, and scientists with an opportunity to update their knowledge of diseases involving the upper aerodigestive tract.

EDUCATIONAL OBJECTIVES

- ◆ The aim of these scientific sessions is to provide physicians with up-to-date information pertinent to the clinical evaluation and endoscopic management of laryngeal, tracheobronchial, and esophageal disorders.
- ◆ Basic and clinical studies addressing structure function, and diseases of the aerodigestive tract, and disorders of swallowing, voice, and airways will be addressed.
- ◆ Special focus will be placed on issues relevant to laryngology.
- ◆ A variety of research regarding innovative techniques and instrumentation, as well as discussions of relevant illnesses and disorders associated with broncho-esophagology, will be presented for discussion.

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

EDUCATIONAL OBJECTIVES (cont.)

Disclosure

In accordance with ACCME and ACS policies, all faculty members will disclose relevant financial relationships with commercial entities and will disclose their intent to discuss drugs or devices or the uses of drugs or devices that have not been approved by the Food and Drug Administration (FDA)

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Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American College of Surgeons and the American Broncho-Esophagological Association. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™

The American College of Surgeons designates this educational activity for a maximum of 7.5 *AMA PRA Category 1 Credits™*. Physicians should only claim credit commensurate with the extent of their participation in the activity.



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12:30 PM

Thursday, 1 May 2008

**BUSINESS MEETING
ABEA MEMBERS ONLY**

Announcements

Introduction of New Members

Comments by Proposer

**Presentation of ABEA Pins and
Certificates**

Election of Members

Active Members

Senior Members

Corresponding Members

Honorary Members

Associate Members

Granting of Senior Membership Status

Fifty-Year Certificates

None

In Memoriam

John Joe, MD

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Bruce N. Rothman, MD

Election of Nominating Committee

Appointment of Auditing Committee

New Business

Old Business

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THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

1:00 PM

Thursday, 1 May 2008

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New Haven, CT

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

1:05 PM

Thursday, 1 May 2008

PROGRAM OVERVIEW:

ANDREW BLITZER, MD, DDS

New York, NY

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

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Thursday, 1 May 2008

PRESIDENTIAL CITATION HONORING

ELLEN FRIEDMAN, MD

Presented by

Clarence T. Sasaki, MD

1:12 PM

Thursday, 1 May 2008

**INTRODUCTION OF
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President

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THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

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Thursday, 1 May 2008

SESSION 1

AIRWAY ISSUES

Moderator: J. Scott McMurray, MD

Madison, WI

1:16 PM

Thursday, 1 May 2008

The Modulating Effects of Hypoxia and Hypercarbia on the Glottic Closing Force

Jagdeep S Hundal, MD*

Clarence T Sasaki, MD

Mikhail Wadie, MD*

William Rosenblatt, MD*

New Haven, CT

Purpose of Study: Aspiration has been identified as one of the independent risk factors for development of respiratory tract infections, the incidence of which varies from 10-65% in ICU patients. The primary defense mechanism for protection of lower airway is glottic closure reflex (GCR). This reflex is elicited by stimulation of internal branch of superior laryngeal nerve and can be altered by various factors.

Aim: This study was designed to study the biomechanical effects of hypoxia and hypercarbia, a common occurrence among critically ill patients, on GCR.

Material & Methods: Five adult male Yorkshire pigs were used in the study. Both internal superior laryngeal nerves were simultaneously stimulated using bipolar platinum-iridium electrodes and the force of evoked glottic closure was measured using a pressure transducer positioned between both vocal cords. Glottic closing force (GCF) was then measured by placing a pressure transducer between adducting vocal cords under three different protocols; Protocol I (Control), protocol II (Hypoxia PaO₂ 90, 70, & 50) and protocol III (Hypercarbia PaCO₂ 60 & 70). Six measures were recorded under each experimental paradigm and student t-test applied to calculate statistical significance between mean GCF recorded under each protocol against protocol.

Results: Hypoxia reduced GCF by 75, 40 and 29% for PaO₂ of 90, 70 and 50 respectively while hypercarbia reduced GCF by 40 & 27% for PaCO₂ of 60 and 70 respectively.

Conclusion: This is the first study which highlights the biomechanical impact of hypoxia and hypercarbia on glottic closure reflex, providing a unified explanation for increased incidence of life threatening aspiration in all critically ill patients.

1:24 PM

Thursday, 1 May 2008

The Role of the Subglottal Shape in Turbulence Reduction

Sid Khosla, MD*

Shanmugam Murugappan, PhD*

Raghavaraju Lakhamraju, MS*

Richard King*

Ephraim Gutmark, PhD, *

Cincinnati, OH

Purpose of Study: In previous work, we found that airflow at the superior edge of the vocal folds, in the excised canine larynx, can be laminar even when tracheal airflow is predominantly turbulent. Turbulent flow directly above the folds may lead to irregular rough voice. Thus, it is important to determine the mechanism of turbulence reduction. From fluid mechanics, it is known that a smoothly converging duct will reduce turbulence. In this study, we test the hypothesis that the majority of the turbulence reduction is due to the smoothly converging shape of the subglottis.

Methods: In excised canine larynges, hot-wire anemometry is used to measure the turbulence intensity (TI) from the upper trachea to the superior edge of the vocal folds. Laminar flow is seen when the TI is approximately less than 2%. For our measurements, flow into the trachea had a TI = 20% (significant turbulence); measurements were made as a function of area between the two vocal folds (Af).

Results: TI decreases from the inferior edge of the subglottis to the superior edge; the degree of reduction increases as Af decreases. The airflow in the glottis becomes laminar when Af becomes small enough.

Conclusions: The smoothly converging shape of the subglottis can produce significant reduction in turbulence. These findings have important voice implications for operations that may change the subglottal shape (such as vocal fold medialization or airway reconstruction); clinical applications will be discussed.

1:30 PM

Thursday, 1 May 2008

**A New Treatment Option for Laryngeal Sensory
Neuropathy**

David L. Sycamore, MD*

Stacey L. Halum, MD*

Indianapolis, IN

Objective: Laryngeal sensory neuropathy may produce a variety of symptoms including chronic cough, globus sensation, odynophonia and/or odynophagia. Etiologies are often postsurgical, postviral or idiopathic, although the diagnosis is generally one of exclusion. While many patients respond to gabapentin and amitriptyline, usefulness of these medications is limited by sedating side effects and development of drug tolerance, respectively. The aim of this study is to introduce pregabalin (Lyrica[®]) as a potential new therapy for laryngeal sensory neuropathy.

Study Design: Retrospective clinical investigation.

Methods: Charts were reviewed from twelve consecutive patients who were prescribed pregabalin (75mg po BID starting dose) for symptoms of laryngeal sensory neuropathy. Outcomes were reviewed by analyzing pre and post-treatment questionnaires asking patients to rate (0-5) symptoms of cough, globus, and throat discomfort. Side effects and evidence of drug tolerance were also recorded.

Results: All patients improved with pregabalin. Mean pretreatment symptom severity rating was 4.3, while mean post-treatment symptom rating was 1.6 after one month of pregabalin therapy. None of the patients had difficulties with drug tolerance, but two patients stopped using the pregabalin due to sedating side effects.

Conclusion: Pregabalin therapy appears to be an effective treatment option for laryngeal sensory neuropathy. Future, prospective studies are needed to compare outcomes between pregabalin and other medications.

1:36 PM

Thursday, 1 May, 2008

**Multi-Institutional Multimodality Dynamic Education for
Airway Endoscopy Skill Development**

Ellen S. Deutsch, MD

Wilmington, DE

Thomas Christenson, MD*

Joseph Curry, MD*

Karen Zur, MD

Ian Jacobs, MD

Philadelphia, PA

Purpose of the study: Airway endoscopy is a difficult skill for beginning residents to master. We conducted a multi-institutional endoscopy practicum for 16 junior-level Otolaryngology and Surgery residents. Learning modalities included lectures, animal laboratory, high-fidelity patient simulation mannequins and a virtual bronchoscopy simulator with haptic feedback. This diverse variety of educational modalities available concurrently is unique among such courses. Our hypothesis was that participants would prefer hands-on learning modalities.

Design and method of study and analysis:

Course participants and faculty rated the usefulness of each modality for learning airway management, developing endoscopy skills, functioning as a leader within a team, and providing a realistic experience, using a Likert scale (1: disagree to 5: agree). Open-ended comments were also solicited.

Summary of Results: Both residents and faculty found value in each learning modality. The mean resident score for every category and every modality was greater than 4 (range 4 to 5) for developing cognitive, psychomotor and affective skills; managing normal and abnormal conditions, understanding the prevention and management of complications, improving endoscopy skills, and understanding team process (average of mean scores for lecture: 4.63; animal laboratory: 4.75; high-fidelity simulator: 4.5; and virtual simulator: 4.5), and providing overall and manual feel realism (excluding lectures; average of means: 4.91, 4.2 and 4.29). There was insufficient statistical power to demonstrate an advantage of one method over another.

Conclusions: Enthusiastic and positive survey responses lend support to the idea that multi-modal educational opportunities are complementary; and that these educational experiences are valued by the participants.

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Thursday, 1 May, 2008

**Clinical Outcomes of Bedside Percutaneous
Tracheostomy with Suspension Laryngoscopy for Airway
Stabilization**

Dawn B. Sharp, MD*

Paul F. Castellanos, MD,
Birmingham, Alabama

Dilational percutaneous tracheostomy (PDT) is a technique developed over 20 years ago for critically ill patients as a bedside alternative to traditional open tracheostomy. PDT has, in large measure, been repudiated by most because of airway control concerns and the risks of dire complications. We describe a new technique blending suspension laryngoscopy with PDT thereby addressing these concerns and report our outcomes.

A retrospective chart review of 50 consecutive cases was conducted. This included "all comers" in that, if the patient could undergo any type of tracheostomy, PDT with SL was offered and successfully performed in all but one patient.

Patients' records were reviewed for age, sex, diagnosis, length of intubation, ventilator settings, and timeline to procedure, laryngotracheal findings, and complications.

Forty-nine patients underwent PDT with SL, 40 performed in the intensive care unit and 9 in the operating room (OR). Procedures performed in the OR were due to lack of intensivist availability. Two major complications occurred: mucous plug with post PDT blood in the trachea and severe bradycardia in response to suspension.

Neither had clinical consequences. Four minor complications occurred: 2 mild endotracheal bleeding, 1 cartilage ring fracture and 1 transient bradycardic event. Early in the series, 1 required conventional open tracheostomy due to unfavorable endotracheal visualization.

In conclusion, our results strongly support that PDT with SL is as safe as open tracheostomy. In addition, this new technique offers many benefits over conventional PDT and open tracheostomy techniques.

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Thursday, 1 May, 2008

DISCUSSION

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Thursday, 1 May, 2008

SESSION 2

SPEECH AND SWALLOWING

Moderator: Mark Courey, MD
San Francisco, CA

1:54 PM

Thursday, 1 May 2008

Glottic Closure Reflex: Effect of Various Sensory Stimuli

Jeong-Soo Woo, MD*

Jagdeep Hundal, MD*

Clarence T Sasaki, MD

Stephen P. Kelleher

New Haven, CT

The glottic closure reflex (GCR) is believed to constitute the primary mechanism for prevention of intraglutative aspiration. It is also believed that the internal branch of the superior laryngeal nerve (iSLN) represents the principal afferent in the generation of evoked vocal cord adduction.

This study is stimulated by the possibility of identifying alternative afferent pathways that could be utilized to re-establish GCR in a rehabilitative setting and to quantify the glottic closing force (GCF) of these responses. The porcine model was selected because of its anatomic and physiologic similarities to that of humans.

In five 40 kg Yorkshire pigs, the iSLN, trigeminal, pharyngeal plexus, glossopharyngeal, radial, and intercostal nerves were surgically isolated and electrically stimulated at anesthesia levels of 1.0 MAC or less. During stimulation of each nerve, the GCR was measured by electromyography (EMG) and the GCF was measured using a pressure transducer. The only afferent nerve that elicited the GCR and GCF in these five subjects was the iSLN. The average GCF was 288.9 (+/- 84.8) mmHg. We conclude that iSLN appears to represent the primary or sole afferent capable of generating the GCR.

2:00 PM

Thursday, 1 May 2008

**Prospective Study of Thyroid Hormone
Replacement on Objective Voice Parameters**

Hakan Birkent, MD*
Ozgur Karacalioglu, MD*
Timur Akcam, MD*
Mustafa Gerek, MD*
Ankara, Turkey
Albert Merati, MD FACS
Seattle, WA

Background/Objectives: Hypothyroidism has long been considered to have an impact on phonation. In this paper, objective evaluation of dysphonia in hypothyroid females was performed in order to characterize their vocal function; their subsequent response to thyroid hormone replacement was prospectively studied. It was hypothesized that thyroid replacement therapy in this cohort of hypothyroid women would have an objectively measurable impact on vocal function.

Methods: Prospective evaluation of objective voice parameters and concurrent determination of serum thyroid status was executed in a cohort of post-operative total thyroidectomy patients both prior to and following thyroid hormone replacement. Objective voice parameters were compared before and after treatment using Wilcoxon signed ranks test.

Results: Twenty-four female subjects are recruited over an 18-month period. All post-operative subjects were hypothyroid (mean TSH 81, range 25-100) prior to replacement. Following hormone therapy, their mean TSH dropped to 1.2, (range 0.3 3.8). Mean fundamental frequency increased from a pre-treatment average of 223Hz to 237Hz ($p < 0.01$). Other measured voice parameters (jitter, shimmer, noise to harmonic ratio, and maximum phonation time) were not affected ($p > 0.05$).

Conclusions: Thyroid hormone replacement following total thyroidectomy has a measurable impact on MFO in female patients. The mechanism of this effect is not known.

2:06 PM

Thursday, 1 May 2008

**Flow Fields and Acoustics in a Unilateral Scarred
Vocal Fold Model**

Shanmugam Murugappan, PhD*

Sid Khosla, MD*

Raghavaraju Lakhamraju, MS*

Keith Casper, MD*

Ephraim Gutmark, PhD,*

Cincinnati, OH

Susan Thibeault*, PhD,*

Madison, WI

Introduction: We used a unilateral scarred excised canine larynx model to evaluate the relationship between vocal fold motion and the resulting acoustics and supraglottal flow fields. The effect of varying subglottal pressure on periodicity and acoustic spectral content was also characterized.

Methods: 5 canine larynges were unilaterally scarred by complete resection of the vocal fold mucosa and superficial layer of the lamina propria. Two months later, these canines were sacrificed. High speed video imaging was then used to study the vocal fold vibrations. Particle Imaging Velocimetry and pressure measurements were used to correlate the transient fluid flow structures to the radiated sound field.

Results: A higher phonation threshold was required to excite the motion of the vocal fold in scarred larynges. Also, it was found that the higher harmonics, which are important for intelligibility, were decreased compared to normal larynges; however these higher harmonics were excited with larger subglottal pressures. The flow patterns observed in the supra glottis was found to be a function of the subglottal pressure and showed both similarities and variation to the symmetric phonation model.

Conclusions: The current study indicates that higher subglottal pressures may excite higher harmonics (hence intelligibility) for unilateral vocal fold scarring. This implies that therapies that raise the subglottal pressure, such as the Lee Silverman Voice Treatment (LSVTM) presently used for Parkinson's dysphonia, may be helpful. Other clinical implications and areas of further research will be discussed.

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

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Thursday, 1 May 2008

**Temporal Effects of Dehydration Challenge on
Phonation**

Mahalakshmi Sivasankar, PhD*

Elizabeth Erickson, BS*

WITHDRAWN

2:18 PM

Thursday, 1 May 2008

**Patient Compliance with Proton Pump Inhibitor
Therapy in an Otolaryngology Practice**

Neil N. Chheda, MD*

Gregory Postma, MD

Augusta, GA

Purpose: Proton pump inhibitor (PPI) medications are used for the treatment of a variety of otolaryngologic disorders. It has been demonstrated that taking the medication 30 to 60 minutes before a meal containing protein optimizes acid suppression. The rate of PPI compliance of optimal dosage patterns in an otolaryngology practice is not known. We sought to determine the rate of proton pump inhibitor compliance in patients seen in an otolaryngology practice.

Design: Interview of 175 consecutive patients taking PPI at an academic Voice and Swallowing center.

Results: Overall, 56% of patients took their PPI in the correct manner. The rate of compliance was not significantly different ($p=.09$) for patients prescribed by an otolaryngologist (61.4%) or a non-otolaryngologist (45.2%). Median length of therapy was 12 months. There was no significant difference ($p=1.0$) for compliance rates among patients taking the medication for less than or equal to 12 months versus greater than 12 months. A significantly greater percentage ($p=.046$) of patients were compliant with medication instructions when prescribed by the Voice and Swallowing center versus those prescribed by outside providers.

Conclusion: Nearly half of all patients seen at a Voice and Swallowing center were non compliant with proper PPI usage. This percentage is similar to that found for other chronic medications. Patient education can lead to higher rates of compliance, and possibly improved treatment outcomes.

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Thursday, 1 May 2008

BROYLES-MALONEY HONORABLE MENTION

**Sleep Related Deglutition in Patients with Sleep-
Apnea Syndrome**

Kiminori Sato, MD, PhD

Tadashi Nakashima, MD

Kurume, Japan

Deglutition is a vital function, and the clearance of the pharynx by deglutition is important in protecting the airway. We reported on the patterns of human adult and child deglutition during sleep at the previous meetings. In this paper we investigated the sleep-related deglutition in patients with obstructive sleep apnea syndrome (OSAS).

Deglutition during sleep was examined in ten patients (48±11 years old) with OSAS via time-matched recordings of polysomnography, and surface electromyography (EMG) of the thyrohyoid and suprahyoid muscles.

During sleep, deglutition was episodic, and was absent for long periods. Deglutition did not occur during apnea or hypopnea periods. The mean number of swallows per hour during the total sleep time was 5.4±3.1. The mean period of the longest absence of deglutition was 43.5±14.7 minutes. Most deglutition occurred in association with respiratory electroencephalographic arousal after apnea or hypopnea in rapid eye movement (REM) sleep and non-REM sleep. Some deglutition occurred in association with spontaneous electroencephalographic arousal after snoring. Deglutition was related to the sleep stage. The mean number of swallows per hour was 6.2±6.1 during stage 1 sleep, 6.0±3.4 during stage 2 sleep, 3.0±5.2 during stage 3 sleep, and 0 during stage 4 sleep. The deeper the sleep stage, the lower the mean deglutition frequency. The mean number of swallows per hour was 4.5±3.0 during REM sleep.

Deglutition was infrequent and displayed a unique pattern in patients with OSAS during sleep.

2:30 PM

Thursday, 1 May 2008

**Laryngeal Sensation Following Treatment with
Proton-Pump Inhibitors in Patients with
Laryngopharyngeal Reflux and Paradoxical Vocal
Fold Movement**

Kathy Yu, MD*

Cukier-Blaj, Sabrina, MS*

Murry, Thomas, PhD

Aviv, Jonathan E, MD

New York City, NY

Purpose: To determine if Proton Pump Inhibitors (PPI) contribute to changes in subjective and objective measures of laryngeal function and sensation in patients with concurrent Laryngopharyngeal Reflux (LPR) and PVFM.

Study Design/Methods: Fifteen patients with LPR and concurrent PVFM were studied. LPR was confirmed by the Reflux Symptom Index (RSI), and by Transnasal Flexible Laryngoscopy (TFL). PVFM diagnosis was made via TFL. Laryngopharyngeal (LP) sensory discrimination thresholds were determined by calibrated air pulse testing of varying pressures to the aryepiglottic mucosa until a Laryngeal Adductory Reflex (LAR) was observed. The RSI, LP sensation, and presence of PVFM were obtained before and after undergoing PPI treatment.

Results: Twelve patients had objective improvement in LP sensation after treatment with PPIs. Nine of the 12 patients (75%) experienced improved LP sensation and PVFM.

Conclusions: Chronic cough and PVFM may be associated with hyposensitivity of the LP that improves with PPI treatment. The underlying pathophysiology may be attributed to decreased neuro-sensitivity of the LP mucosa that no longer transmits information to the vocal folds accurately, resulting in PVFM. Alternatively, decreased LP sensation may lead to reduced chemosensitivity that results in increased collection of particulate matter in the LP. Thus, PVFM may be an adaptive mechanism to protect against further particulate inhalation.

Summary: Patients with LPR and PVFM exhibit improvement in laryngeal sensory neuropathy with an associated resolution of PVFM after treatment with PPIs.

DISCUSSION

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2:42 PM

Thursday, 1 May 2008

BREAK WITH EXHIBITORS

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

2:57 PM

Thursday, 1 May 2008

**INTRODUCTION OF THE CHEVALIER
JACKSON LECTURE**

BY CLARENCE T. SASAKI, MD

2:59 PM

Thursday, 1 May 2008

CHEVALIER JACKSON LECTURE

REZA SHAKER, MD

Milwaukee, WI

**Reciprocal Physiology and Pathophysiology of the
Upper Gut and the Airway**

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Thursday, 1 May 2008

SESSION 3

INNOVATIVE DRUGS AND DEVICES

Moderator: Gregory Grillone, MD
Boston, MA

3:29 PM

Thursday, 1 May 2008

**Photoangiolytic Laser Treatment of Early Glottic Cancer:
A New Treatment Strategy**

Steven M. Zeitels, MD
James A Burns, MD
Gerardo Lopez-Guerra, MD*
Robert E. Hillman, PhD*
Boston, MA

The 532nm pulsed-KTP and 585nm pulsed-dye lasers have been demonstrated to be effective for managing vocal-fold dysplasia. Based on this experience, we evaluated treating early glottic cancers by selectively targeting the intralesional microcirculation. This approach was derived from Folkman's concepts of neoplastic growth resulting from tumor angiogenesis. Staged microlaryngeal treatment was adopted because it facilitated optimal functional results and was considered safe because early glottic-cancer rarely metastasizes. Furthermore, intercurrent disease for ~2 months is typical when treating these tumors with radiotherapy.

A prospective pilot group of 23 (T1-13, T2-9, T4-1) patients with primarily early-glottic cancer were treated. 12/22 had bilateral disease; 6/12 were treated entirely (bilaterally) by laser photoangiolytic and 6/12 only underwent treatment of the less-involved vocal-fold. All have had micro laryngoscopic-documented resolution of the disease. No patient has cancer presently and none have undergone post-treatment radiotherapy or open surgery. Median follow-up is 21 months; 9/22 are cancer-free >2 years. Objective voice measures revealed overall improvements in the post-surgical group. These results substantiated stroboscopic findings of enhanced mucosal-wave function and vocal-fold vibration.

Angiolytic lasers effectively involuted early glottic cancer, which suggests that photoangiolytic of neoplastic blood supply through microsurgically-directed nonionizing radiation results in complete tumor regression. This approach is conceptually attractive since it is repeatable, preserves all conventional cancer treatment options, and results in outstanding vocal function by improving phonatory mucosal pliability. Preliminary observations suggest that this new and novel cancer-treatment strategy is effective, however, larger patient cohorts and longer follow-up will be necessary to establish incontrovertible oncological efficacy.

3:35 PM

Thursday, 1 May 2008

Comparison of an Oropharyngeal pH Probe and a Standard Dual or Triple pH Probe for Diagnosis of Laryngopharyngeal Reflux

Justin S. Golub, MD*

Seattle, WA

Michael M. Johns III, MD

John M. DelGaudio, MD*

Adam M. Klein, MD*

Atlanta, GA

Purpose: To compare the ability of an oropharyngeal aerosol-detecting pH probe and a standard dual or triple pH probe in measuring laryngopharyngeal reflux (LPR).

Design: Prospective clinical trial.

Methods: Fifteen subjects with varying degrees of LPR symptoms had 24 hour simultaneous placement of the oropharyngeal probe (Restech; San Diego, CA) and either a standard dual or triple pH probe. Acid exposure was defined as a 10% decrease in pH below baseline for the oropharyngeal probe or a pH < 4 at the UES probe of the dual/triple pH probe.

Results: The mean acid exposure length was 4.5 min (SD=5.9) or 0.314% total for the oropharyngeal probe and 4.4 min (SD=6.0) or 0.306% total for the UES probe when excluding meals and sleep. This represents a difference of only 7 sec. The correlating mean number of events was 15.5 (SD=14.6) for the oropharyngeal probe and 11.3 (SD=14.9) for the UES probe. When including meals and sleep, the mean acid exposures were 10.8 min (SD=10.3) or 0.75% total for the oropharyngeal probe and 7.3 min (SD=8.5) or 0.51% total for the UES probe. The correlating mean number of events was 7.4 (SD=8.9) for the oropharyngeal probe and 10.3 (SD=7.8) for the UES probe.

Conclusions: The oropharyngeal probe has the ability to reliably document LPR events in a well-tolerated manner when compared to the gold-standard double or triple lumen probe. Excluding events during meals and sleep may increase the specificity of the oropharyngeal probe.

3:41 PM

Thursday, 1 May 2008

**Transnasal Esophagoscopy (TNE): White Light
versus Narrow-Band Imaging (NBI)**

Timothy O'Brien, MD*

J. Bradley Turner, MD*

Kourosh Parham, MD, PhD*

Farmington, CT

Purpose of the Study: TNE is rapidly becoming integrated into otolaryngologic practice. A recent report has shown an incongruence between endoscopic diagnosis of Barrett esophagus (10%) and biopsy proven Barrett (3%; Halum et al., Laryngoscope 2006). The goal of this study is to determine whether performing TNE using NBI improves on diagnostic yield in the otolaryngologist's hand. NBI involves use of filtered light to enhance mucosal microvasculature pattern and has been shown to be highly sensitive to detecting Barrett under conventional esophagoscopy performed by the gastroenterologist.

Design and Method of Study and Analysis: A retrospective chart review of 91 patients with laryngopharyngeal reflux and/or dysphagia who underwent TNE by the same otolaryngologist between November 2005 and October 2007 was carried out. Pentax EE-1580K (white light only) and Olympus GIF-N180 with NBI endoscopes were used in 65 and 26 patients, respectively. Microcup biopsy of the squamocolumnar junction was obtained when Barrett esophagus was suspected.

Summary of Results: Biopsy proven Barrett esophagus was found in 9.9% of the patients. When divided into white light only and with NBI, 5/65 (7.7%) and 4/26 (15.4%), respectively, had biopsy proven Barrett esophagus.

Conclusions: Narrow-band imaging offers a useful adjunct that has the potential to increase the diagnostic sensitivity of TNE in the hand of the otolaryngologist.

3:47 PM

Thursday, 1 May 2008

**Spontaneous and Evoked Laryngeal
Electromyography of Canine Thyroarytenoid
Muscles Using a Nerve Monitoring System**

Andrew R. Scott, MD*
Peter Siao Tick Chong, MD*
Gregory W. Randolph, MD*
Christopher J. Hartnick, MD
Boston, MA

Purpose: To determine the feasibility of performing spontaneous and evoked intraoperative laryngeal electromyography (L-EMG) using nerve monitoring equipment and to directly compare recording electrode configurations and methods of recurrent laryngeal nerve (RLN) stimulation.

Methods: Four beagles underwent crush injury of the left RLN and 2 beagles underwent left RLN transection using previously described techniques. Animals then underwent serial spontaneous and evoked L-EMG with the NIM Response nerve monitoring system under sedation. Recordings with endotracheal tube surface electrodes and monopolar needle electrodes were made from each side. Transpharyngeal, percutaneous and open RLN stimulation was performed. L-EMG procedures were repeated every one to two weeks to evaluate inter-subject and inter-trial differences. Direct comparisons were made between stimulating methods and recording electrode configurations.

Results: Low amplitude motor unit action potentials, polyphasic potentials, fasciculations, and fibrillations were detected in injured animals using paired monopolar needle recording electrodes using this system of spontaneous L-EMG. Evoked L-EMG with surface recording electrodes allows for summation of compound motor unit action potentials, limiting inter-trial and inter-subject variability of maximally evoked amplitude. Recording evoked responses with needle electrodes generates sharper waveforms, facilitating calculation of latency and wave duration. Percutaneous needle stimulation of the RLN is possible at currents slightly higher than direct stimulation. Discrete, transpharyngeal stimulation of the RLN is not possible.

Conclusions: Typical patterns of nerve injury can be detected using this system of intraoperative L-EMG. Evoked L-EMG parameters including amplitude, latency, and wave duration have now been established for injured and healthy canine RLNs using this system.

3:53 PM

Thursday, 1 May 2008

**High Resolution Ultrasound Resolution in
Cadaveric Human Vocal Folds**

Seth H. Dailey, MD

Madison, WI

Chih-Chung Huang BS*

Sun Lei, PhD*

K Kirk Shung, PhD*

Los Angeles, CA

Purpose: Detailed imaging of the vocal folds will enhance diagnosis and therapy in phonosurgery, yet the most appropriate imaging modality is not yet known. High-resolution ultrasound (HRUS) may prove useful in the detection of epithelial and lamina propria disease but has not yet been subjected to empirical study. We therefore sought to determine if a 50 MHz high resolution ultrasound (HRUS) transducer can detect particles of known size and density in the lamina propria of human cadaveric vocal folds.

Study Design: With IRB approval, 10 human cadaveric larynges were obtained within an hour of death from the UW School of Medicine Department of Anatomy, flash frozen and preserved at -80 Celcius. After the larynges were thawed to room temperature, a longitudinal incision into the vocal fold lamina propria was made and a 250-400 μ m glass spherule, a 100 μ m foam and a 50 μ m foam particle were placed by the surgeon under microscopic control near the junction of the lamina propria and the thyroarytenoid muscle. Each vocal fold was then imaged with the 50 MHz transducer and detection of the particles noted by the ultrasonographer.

Results: The 100 μ m foam particle was detected 90% of the time and the 50 μ m particle was detected 60% of the time using the 50MHz transducer.

Conclusion: HRUS appears to have high sensitivity to objects placed within the lamina propria of human cadaveric vocal folds and offers promise as a useful modality for vocal fold imaging.

3:59 PM

Thursday, 1 May 2008

**Patient Tolerance of the Flexible CO₂ Laser versus
the 585-nm Pulsed Dye Laser for Office-Based
Laryngeal Surgery**

Aaron Moberly, MD*

Stacey L. Halum, MD*

Indiana, IN

Study Purpose: The 585-nm pulsed dye laser (Cynosure) has been shown to be well tolerated in office-based treatment of benign laryngeal disease. While the new flexible CO₂ laser (Omniguide) can be readily used in the office, patient tolerance has not been established. The aim of this study was to determine patient tolerance of office-based surgery with the flexible CO₂ laser in comparison with the 585-nm pulsed dye laser.

Design and Methods: Prospective clinical trial. All patients with benign laryngeal pathology who were candidates for office-based surgery were asked to participate in the study. Each patient underwent un-sedated office-based surgery with topical/local anesthesia and laser fiber transmission via a working flexible laryngoscope. Approximately half of each lesion was treated with the CO₂ laser, while the remaining half was treated with the pulsed-dye laser (with laser order alternated between patients). Immediately after treatment, patients rated the discomfort and burning sensation on a scale from 0-10 for each laser. Patients completed follow-up questionnaires to assess postoperative discomfort, and postoperative healing was assessed by videostroboscopy examination at one month after surgery.

Results: Ten patients were enrolled in the study, with pathology including laryngeal recurrent respiratory papilloma, granuloma, amyloid, and leukoplakia. Patients consistently reported that the flexible CO₂ laser caused less discomfort and burning than the pulsed-dye laser, but both were well tolerated. Post-operative discomfort was minimal for most patients, and videostroboscopy demonstrated no evidence of scar tissue or web formation.

Conclusion: Flexible CO₂ laser laryngeal surgery is well tolerated in an office-based setting.

4:05 PM

Thursday, 1 May 2008

**Transoral Laser Microsurgery (TLM) for Cancer of
the Posterior Pharyngeal Wall**

Alexios Martin, MD*

Wolfgang Steiner, MD

Arno Olthoff, MD*

Goettingen, Germany

Martin C. Jaeckel, MD*

Hans Christiansen, MD *

Martina Kron, PhD*

Ulm, Ulm, Germany

Purpose of the Study: Cancer of the posterior pharyngeal wall (oro- and hypopharynx) is of relatively seldom occurrence among head and neck tumors. It poses special challenges to radiotherapeutic or conventional surgical treatment because of its localization. Purpose of this study was to assess the feasibility of transoral laser microsurgery (TLM) in the treatment of this type of cancer.

Design and Method of Study and Analysis: A retrospective chart analysis was carried out. Patients with previously untreated cancer of the posterior pharyngeal wall were eligible for this study. Exclusion criteria were pre-treatment, simultaneous second primary cancers and N3 neck disease. Twenty-five patients matched the inclusion criteria and were treated by TLM with selective neck dissection and/or postoperative radio (chemo) therapy.

Summary of Results: Twenty-five patients were included in this series. The median follow-up interval was 42 months. All cases were treated by TLM, 68% had an additional neck dissection and 52% and adjuvant radio(chemo-)therapy. Most patients (68%) had advanced stage disease. Overall survival (5-years Kaplan-Meier) was 37% for early and 41% for advanced disease, while disease-specific survival (5-years Kaplan-Meier) was 88% for early and 56% for advanced disease respectively. Oncological and functional outcomes as well as morbidity and complications are discussed thoroughly.

Conclusions: Our data supports the conclusion that TLM offers a valid alternative to standard therapeutic regimen in the challenging treatment of cancer of the posterior pharyngeal wall. Oncological and functional results compare favorably, while morbidity and complications tend to be relatively low.

4:11 PM

Thursday, 1 May 2008

DISCUSSION

4:16 PM

Thursday, 1 May 2008

PANEL I

**ENDOSCOPIC LASER RESECTION OF
LARYNGEAL CANCER: IS IT
ONCOLOGICALLY SAFE?**

Moderator: James Burns, MD
Boston, MA

Participants:

Gady Har-El, MD
Boston, MA

Steffan Maune, MD
Kiel, Germany

Stanley Shapshay, MD
Albany, NY

Steven Zeitels, MD
Boston, NY

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5:00 PM

Thursday, 1 May 2008

ADJOURN

7:15 AM

Friday, 2 May 2008

**BUSINESS MEETING
ABEA MEMBERS ONLY**

Announcements

**Report of Nominating Committee
Election of New Officers**

Report of the Treasurer

Audit Committee Report

Report of Secretary

**Report of Editor
Webmaster Report**

Recognition of Departing Council Members

Old Business

New Business

Recognition of Departing Officers

Introduction of New President

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RECOGNITION OF
CHEVALIER JACKSON AWARD RECIPIENTS
1959-2008

1959	Louis H. Clerf, MD
1960	(no award)
1961	Herman J. Moersch, MD
1962	Paul H. Holinger, MD
1963	Edwin N. Broyles, MD
1964	Leroy A. Schall, MD
1965	Herbert W. Schmidt, MD
1966	Paul G. Bunker, MD
1967	Joel Pressman, MD
1968	Verling K. Hart, MD
1969	Joseph P. Atkins, MD
1970	Anderson C. Hilding, MD
1971	Robert M. Lukens, MD
1972	Charles M. Norris, MD
1973	Arthur M. Olsen, MD
1974	Charles F. Ferguson, MD
1975	Shigeto Ikeda, MD
1976	Blair W. Fearon, MD
1977	Francis W. Davidson, MD
1978	Seymour R. Cohen, MD
1979	M. Stuart Strong, MD
1980	DeGraff Woodman, MD
1981	Albert H. Andrews Jr., MD
1982	Gabriel F. Tucker, Jr., MD
1983	Howard A. Andersen, MD
1984	Paul H. Ward, MD
1985	Bruce N. Benjamin, MD
1986	Loring W. Pratt, MD
1987	Robert S. Fontana, MD
1988	Charles W. Cummings, MD
1989	Bernard R. Marsh, MD
1990	David R. Sanderson, MD
1991	William W. Montgomery, MD
1992	John A. Tucker, MD
1993	Gerald B. Healy, MD
1994	Vincent J. Hyams, MD
1995	Lauren D. Holinger, MD
1996	Stanley M. Shapshay, MD
1997	Robert H. Ossoff, MD
1998	John Frederickson, MD
1999	Haskins Kashima, MD
2000	Eiji Yanagisawa, MD
2001	William W. Montgomery, MD
2002	Jack L. Gluckman, MD
2003	Ellen M. Friedman, M.D.

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2004 Robin T. Cotton, M.D.
2005 Charles W. Vaughn, MD
2006 Andrew Blitzer, MD, DDS
2007 Gayle E. Woodson, MD
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8:00 AM

Friday, 2 May 2008

CHEVALIER JACKSON AWARD

Presenter: Clarence T. Sasaki, MD

Recipient:

ROBERT J. TOOHILL, MD

Milwaukee, WI

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Thursday, 1 May 2008

SESSION 4

IN THE LAB: FROM MICE TO MEN

Moderators: Michael Rothschild, MD

New York, NY

Michael Setzen, MD

Manhasset, NY

8:02 AM

Friday, 2 May 2008

**The Effect of Hepatocyte Growth Factor on
Treatment of Rat Vocal Fold after Injury**

Tsunehisa Ohno, MD*

Bernard Rousseau, PhD*

Lesley C. French, MD*

Robert H. Ossoff, DMD MD

Nashville, TN

The effective treatment of the injured vocal fold remains a therapeutic challenge. Although various strategies have been used to manage vocal fold injury, optimal treatment has yet to be established. Hepatocyte growth factor (HGF) has strong anti-fibrotic and anti-inflammatory properties. Previous studies have shown restoration of scar tissue and improved vibration from injured vocal folds treated with HGF. However, the cellular mechanisms regulating the effects of HGF on vocal fold wound healing remain unknown. The purpose of this study was to investigate the effects of HGF on gene expression of extracellular matrix and inflammatory cytokines during wound healing of the injured vocal fold using real-time reverse transcriptase polymerase chain reaction (RT-PCR).

Sixty five rats were used in this study. Five uninjured rats were used to establish baseline for PCR. In the remaining rats, vocal fold injury was created bilaterally and animals were assigned to three groups: sham-treatment (saline), HGF-treatment (50uL, 2ng/uL), or a non-treatment group. Those in the sham and HGF treatment groups received treatment at day 0 and every other day until day of sacrifice (1, 3, 7, and 14). Statistical analysis was performed to investigate differences in gene expression among the treatment groups at each time point.

Results revealed downregulated expression of procollagen type I, type III, and TGF-beta at day 7 and 14 in the HGF-treatment group compared to the non-treatment and sham-treatment groups. These data suggest that HGF manipulation of collagen synthesis may provide an optimal cellular environment for restoration of the injured vocal fold.

8:08 AM

Friday, 2 May 2008

Upregulation of Ganglioside 9-O-acetyl GD3 Expression in Recurrent Laryngeal Nerve Regeneration

Philip Weissbrod, MD*

Belachew Tessema, MD *

Michael Pitman, MD *

Steven Schaefer, MD*

New York, NY

Qin Qiong, MS*

Sansar Sharma, PhD*

Valhalla, NY

Objective: Ganglioside 9-O-acetyl GD3 (9-O-acGD3) is expressed during periods of axonogenesis in embryologic development and appears to be expressed in rats selectively following crush injury to peripheral nerves. Our objective is to evaluate 9-O-acGD3 expression following crush injury to the rat recurrent laryngeal nerve (RLN).

Study Design: Eight female Sprague-Dawley rats 200-250 g underwent crush injury to the right RLN using a calibrated aneurysm clamp with a force of 1.19 N for 60 seconds. Crush injury was confirmed by direct visualization of the immobile vocal fold during spontaneous respiration. Animals were sacrificed on post operative days (POD) 3, 5, 7 and 10 for immunohistologic evaluation of the RLN. Control and crushed nerves were harvested and sectioned longitudinally and subsequently labeled with mouse monoclonal IgM anti-9-O-acGD3, rabbit polyclonal anti-GFAP, and anti-neurofilament200.

Results: Uniformly at POD3, staining for all tested antibodies was negative. Starting at POD5, anti-neurofilament200 and anti-9-O-acGD3 were upregulated indicating a correlation between axonal growth and expression of 9-O-acGD3. Ganglioside expression peaked at POD7 and was absent by POD10.

Conclusion: Ganglioside 9-O-acGD3 is upregulated in the recurrent laryngeal nerve following crush injury. More specifically, expression is seen in Schwann cells and neurons, and correlates to the period of early axonal regrowth. This work supports the role of 9-O-acGD3 as an important component in facilitating axonal regrowth following peripheral nerve injury. In addition, 9-O-acGD3 could potentially be a target for future therapeutics aimed at improving reinnervation following nerve injury.

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BROYLES-MALONEY AWARD

The Broyles-Maloney Award was established to encourage advancement of the art and science of bronchoesophagology and closely related subjects. Competition for the award is limited to persons whose abstracts are submitted for inclusion in the Annual Scientific Program. The award is given for outstanding manuscript, thesis or accomplishments in bronchoesophagology, laryngology or related science.

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1990	Thomas F. Dowling, MD Jamie Koufman, MD
1991	(no award)
1992	(no award)
1993	Jos. J.M. van Overbeek, MD, PhD
1994	Steven D. Gray, MD
1995	Jonathan E. Aviv, MD John H. Martin, PhD Ralph Sacco, MD Beverly Diamond, PhD Andrew Blitzer, MD, DDS
1996	(no award)
1997	Ira Sanders, MD Liancai Mu, PhD
1998	Nancy M. Bauman, MD Degiang Wang, MD Eric S. Luschei, PhD Debra M. Jaffe, MD
1999	Robert Berkowitz, FRACS Qi-Jian Sun, PhD John Chalmers, PhD Paul Pilowsky, PhD
2000	Asif Amirali, MD Greg Tsai, MD Nicole Schrader, MD Donald Weisz, PhD Ira Sanders, MD
2001	(no award)
2002	Shin-ichi Kanemaru, MD Hisayoshi Kojima, MD Akhmar Magrufov, MD Koichi Omori, MD Yasuyuki Hiratsuka, MD Shigeru Hirano, MD Juichi Ito, MD Yasuhiko Shimizu, MD

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2003 Ira Sanders, M.
2004 Clarence T. Sasaki, MD
2005 Tomoko Tateya, MD
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2007 J. Scott McMurray, MD
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Ethan Handler*, BS*
Michael L Syring, BS*
Joel H Blumin, MD
Joseph E Kershner, MD
Nikki Johnston, PhD*

8:14 AM

Friday, 2 May 2008

BROYLES-MALONEY AWARD

Presenter: Clarence T. Sasaki, MD

Recipient:

TINA SAMUELS, MS*

Madison, WI

Mucin Gene Expression in Human Laryngeal Epithelium: Effect of Laryngopharyngeal Reflux

Tina L Samuels, MS*

Ethan Handler, BS*

Michael L Syring, BS*

Joel H Blumin, MD

Joseph E Kershner, MD

Nikki Johnston, PhD*

Milwaukee, WI

Educational Objective: At the conclusion of this presentation, the participants should be able to discuss the mucin gene profile in human laryngeal epithelia and the effect of laryngopharyngeal reflux (LPR).

Objectives: 1) Document the mucin gene profile in normal human laryngeal epithelium, not reported in the literature to date, and compare with that in patients with reflux-attributed laryngeal injury/disease.

2) Investigate the effect of low pH pepsin on mucin mRNA levels in vitro.

Study Design Prospective, translational Methods:

Laryngeal biopsy specimens were obtained from 1) patients with clinically diagnosed LPR (n = 3), and 2) a control population who had no signs or symptoms of reflux (n = 2). Signs were assessed by means of the Reflux Finding Score and symptoms assessed using the Reflux Symptom Index. Reverse transcription

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polymerase chain reaction (RT-PCR) was performed to establish the mucin gene profile in these two populations. Human hypopharyngeal cultured FaDu epithelial cells were exposed to pH 7, 5, 4, and 2 with/without pepsin (0.1mg/ml) for 20 minutes at 37°C and the effect on mRNA levels of selected mucins determined using real-time RT-PCR.

Results: Mucin 1-5, 7, 9, 11, 13, 15, 16, 18, 19, and 20 were detected in normal laryngeal epithelium. Mucin 6, 8, 12, and 17 were not detected in normal laryngeal epithelium. Mucin 2, 3, and 5 were expressed at reduced levels in patients with reflux-attributed laryngeal injury/disease. Of these three mucin genes, mucin 2 and 3 were upregulated following exposure to low pH ($p < 0.02$), presumably as a protective response. Pepsin inhibited this upregulation ($p < 0.02$).

Conclusion: Reflux laryngitis is associated with down-regulation of mucin gene expression. These findings provide a further clue into the mechanism of pepsin-associated mucosal inflammation.

8:20 AM

Friday, 2 May 2008

**Regeneration of the trachea with pluripotential stromal
vascular fraction cells from adipose tissue**

Teruhisa Suzuki, MD*

Fukushima, Japan

Yasuhiro Tada, MD*

Yukie Suzuki, MD*

Koichi Omori, MD

Ken Kobayashi, PhD*

Tokyo, Japan

Tatuo Nakamura, MD*

Kyoto, Japan

Purpose of the Study: Our group has clinically used an artificial graft made from a collagen sponge for the regeneration of tracheal tissue. However, the artificial graft requires about two months for epithelial regeneration. We reported that adipose-derived stem cells (ASCs) accelerated regeneration of the trachea. Freshly isolated adipose-derived stromal vascular fraction cells (SVFs) that have advantages over ASCs in that they are more readily collected and do not require any culturing prior to use. The purpose of the present study was to identify the effect of accelerating the regeneration process of the trachea using SVFs compared to serial-passaged ASCs.

Methods: Collagenous gel, including rat ASCs or SVFs, was stratified on the surface of the collagenous sponge to form a type-I or type-II scaffold, respectively. These bio-engineered scaffolds, together with control scaffolds prepared without cells, were implanted onto tracheal defects in rats. After implantation the artificial grafts were examined histologically.

Summary of results: At 14 days post-implantation, a well-developed pseudostratified columnar epithelium with well-differentiated ciliated cells and goblet cells, similar to a normal tracheal epithelium, was observed for both type-I scaffold model but not for the control scaffold model. Regeneration of the epithelium was histologically found to proceed similarly with both type-I and type-II scaffolds.

Conclusions: These results suggest that implanted SVFs accelerate epithelization on the regenerated trachea similar to ASCs. Because SVF can be obtained from the adipose tissue without culture, a bio-engineered scaffold including SVFs will be suitable for future clinical applications of tracheal regeneration.

8:26 AM

Friday, 2 May 2008

DISCUSSION

A Novel In-Vivo Phonation Model Using Rabbit

Lesley C. French, MD*
Bernard Rousseau, PhD*
Ping Jiang, Ge, MD*
Tsunehisa Ohno, MD*,
David L. Zealear, PhD*
C. Gaelyn Garrett, MD
Robert H. Ossoff, DMD, MD
Nashville, TN

As a young resident, Dr. Gray and colleagues (Gray, Titze, Lusk, 1987) published a report on microscopic injury of the vocal folds using an evoked canine phonation model. Despite more than 20 years since this report, data regarding the influence of phonation on changes in tissue microarchitecture remain sparse. Moreover, our understanding of cellular responses to experimental induced phonation is limited. Our laboratory has developed an in-vivo rabbit phonation model to investigate phonation induced gene regulation, extracellular matrix deposition, and post-injury tissue remodeling.

In the current experiment, we applied cricothyroid muscle stimulation combined with retrograde glottal airflow to investigate experimental induced phonation and electromyographic responses from 10 rabbits. Measurements of subglottal air pressure, fundamental frequency, vocal intensity, and laryngeal muscle activity were recorded and analyzed.

Experimental induced phonation was achieved by electrical stimulation of the cricothyroid muscle using 50 Hz, 4mA, 1ms pulses with retrograde glottal airflow delivered at 143 cm³/sec. Fundamental frequencies were elicited ranging from 16 to 1462 Hz, vocal intensity ranging from 68-86 dB, and phonation duration of up to three hours. No alterations of muscle gene expression were evident as measured by messenger RNA expression of Kir6.1, Kir6.2, SUR2AB, and IL-10.

The in-vivo rabbit phonation model described is a useful animal model for studies of cellular and tissue responses to experimental induced phonation. In contrast to the canine model, the rabbit vocal fold microarchitecture more closely parallels that of humans; the rabbit is also a quiet animal, allowing for increased control over non-experimental vocalization.

8:38 AM

Friday, 2 May 2008

The Investigation of the Potentiality of the Cell Culture Medium with Autologous Blood Serum for Cell Transplantation Therapy for Injured Vocal Fold

Shin-ichi Kanemaru, MD, PhD*

Tatsuo Nakamura, MD, PhD*

Masaru Yamashita, MD*

Hiroo Umeda, MD*

Oono Tsunehisa, MD*

Shigeru Hirano, MD, PhD*

Juichi Ito MD, PhD*

Kyoto, Japan

Koichi Omori MD, PhD

Fukushima, Japan

Aim: The biggest obstacle of the cell transplantation therapy is its safety. We have already succeeded in regeneration of the injured vocal fold in canine model by transplantation of the bone marrow derived stromal cells (BSCs). This therapy needs cell culture. The safety of the ordinal culture medium with an animal serum such as fetal bovine serum (FBS), however, has not been confirmed yet. Though autologous blood serum (ABS) substitute for an animal serum is the safest additive for the culture medium, the growth promoting action of ABS is thought to be inferior to that of an animal serum. In this in vitro study, we investigated the potentiality of the culture medium with ABS for clinical applications.

Material and Methods: The canine ABS and the following three types of medium were prepared. Medium I, II and III are alpha-Minimum Essential Medium (alpha-MEM) as blood serum free medium for control, alpha-MEM with 15% ABS and Dulbecco Modified Eagles Medium (D-MEM) with 10% FBS for ordinal medium, respectively. The growth rates of the canine cultured BSCs in these three mediums were estimated.

Results: After 2 weeks BSC culture, the number of cells in medium I, II and III increased 2, 8-10 and 14-15 times, respectively. These meant that the number of cell division times were about 1, 3-4, 4 times in each medium. There were no differences in cell shape between in these culture mediums.

Conclusions: ABS has satisfactory cell growth promoting action to apply clinically as a substitute for FBS.

8:44 AM

Friday, 2 May 2008

**Extracellular Matrix Production Activity of the
Vocal Fold Macula Flava Demonstrated by Real
Time PCR: A Rat Study**

Ichiro Tateya, MD, PhD*

Kyoto, Japan

Nathan Welham, PhD*

Masaru Yamashita*, MD, PhD*

Diane M. Bless, PhD*

Madison, WI

Purpose: Vocal fold stellate cells (VFSCs) have been reported to be present in the macula flava of human and rat vocal folds. Electron microscopic studies raise a hypothesis that the vocal fold stellate cells provide extracellular matrix (ECM) components for the vocal fold lamina propria. However, it has not been functionally proved yet. The purpose of this study is to clarify the ECM production activity of the cells in the vocal fold macula flava by comparison with those in the lamina propria by real time PCR. A rat model is ideal to investigate VFSCs because rat VFSCs and macula flava have various characteristics similar to those of human.

Study design and methods: Prospective randomized animal study. Larynges were collected from six normal Sprague-Dawley male rats (4 months old). The posterior macula flava and lamina propria of the vocal folds were collected using the microdissection technique. mRNA expression of rat procollagen type I alpha1-chain, procollagen type III alpha1-chain, hyaluronic acid synthase (Has) I, Has II, elastin and beta-2 microglobulin (beta-2MG) genes were examined by real time RT-PCR and the expression level was compared between the macula flava and lamina propria.

Results: There was no significant difference between the macula flava and lamina propria in mRNA expression of procollagen type I, III, Has II, and elastin. Has shown significantly lower expression in macula flava than in lamina propria.

Conclusion: Macula flava doesn't have higher ECM production activity than the lamina propria in normal adult rats.

8:50 AM

Friday, 2 May 2008

A Surgical Model to Create Vocal Fold Injury in Mice

Masaru Yamashita, MD, PhD*

Nathan Welham, PhD*

Diane Bless, PhD*

Madison, WI

Purpose: Rodents are popular experimental models in many disciplines, due to ease of handling and biological suitability for studying many disease states. To date, the rodent model of choice for laryngological research, particularly that involving surgical manipulation, has been the rat. Mouse models hold the advantage of amenability to gene knockout; however the small size of the mouse larynx has restricted its use to non-surgical studies. The purpose of this study was to develop a surgical platform and methodology to create wounds in mouse vocal folds, with the eventual goal of applying these techniques to future studies with knockout models.

Method: FVB strain mice were used in this study. A custom steel wire laryngoscope was developed and positioned to anesthetized animals to facilitate endoscopic visualization of the larynx. Mechanical injury to vocal fold tissue was created using a bent fine spinal needle. Evaluation of the surgical site was performed using histological examination.

Results: Endoscopic vocal fold visualization was successful in every case. Histological findings confirmed mechanical removal of vocal fold mucosa. Vocal edema and associated airway restriction required careful postoperative monitoring.

Conclusion: These results demonstrate the feasibility of creating vocal fold wound in mice. The availability of numerous gene knockout models make the mouse an attractive candidate for vocal fold research; although the relative anatomical simplicity of the mouse larynx means that it will most likely be complementary to other established models. The mouse model is a promising tool for the study of development and disease mechanism in vocal folds.

Friday, 2 May 2008

THE SEYMOUR COHEN AWARD

The Seymour Cohen Award is presented to residents, fellows or practicing physicians who submit the best original unpublished paper in either basic research or clinical investigation in pediatric laryngology and bronchoesophagology.

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8:56 AM

Friday, 2 May 2008

THE SEYMOUR COHEN AWARD

Presenter: Clarence T. Sasaki, MD

Recipient:

RICHARD WEMER, MD *

**Immunohistochemical Characterization of the
Rabbit Trachea**

Richard D. Wemer, MD*

Robert A. Weatherly, MD*

Michael S. Detamore, PhD*

Lawrence, KS

Objective: To determine the immunohistochemical characterization of rabbit tracheal cartilage.

Methods: Tracheal tissue specimens were harvested from New Zealand White Rabbits. The tissues were embedded in frozen medium and sectioned. Serial samples were then mounted and stained for Collagen I, Collagen II, aggrecan and decorin. A Verhoeff Van Gieson Stain was performed for elastin characterization. Samples were then evaluated via microscopy and staining patterns were noted.

Results: Tracheal cartilage stained strongly with Collagen II throughout the area of hyaline cartilage. Outside of the cartilage body, no Collagen II staining was detected. Collagen I staining was seen primarily along the periphery of the cartilage and in the perichondrium itself. Elastin fibers were also detected along the periphery of the cartilage in the perichondrium and corresponded highly with the distribution of Collagen I staining. Decorin was seen in the periphery of the cartilage and perichondrium, as well as the surrounding soft tissues. Aggrecan staining

exhibited a striping effect in the tracheal arches, where there were areas void of aggrecan immunostaining and then areas with strong aggrecan immunostaining.

Conclusions: This study is the first to describe the rabbit tracheal cartilage ultrastructure with respect to immunohistochemical characterization. We found that the body of the rabbit trachea is composed of a hyaline-cartilage structure primarily made of collagen type II, which is surrounded by a fibrous region composed of elastin, collagen type I, and proteoglycans. This information is valuable to future tissue engineering efforts and the creation of a biosynthetic substitute for use in laryngotracheal reconstruction.

9:02 AM

Friday, 2 May 2008

Laryngeal Inflammation in a Rabbit Model of Sinusitis

Marcelo Antunes, MD*

Joel Guss, MD*

Noam A. Cohen, MD, PhD*

Natasha Mirza, MD

Philadelphia, PA

Background: Rhinosinusitis and laryngitis often co-exist. Patients with chronic rhinosinusitis exhibit a range of laryngeal symptoms including hoarseness and persistent cough. The one linked airway concept is a unifying theory that explains how inflammatory disease can simultaneously coexist at different sites in the airway. The pathophysiologic relationship, however, has not been defined. Two hypotheses are: (1) inflammatory mediators from inflamed sinonasal tissue induce inflammation in the larynx or (2) infected secretions from the sinonasal cavity are swept down to the pharynx and larynx by mucociliary clearance mechanisms and induce irritation of the laryngeal mucous membranes.

Methods: The larynges of rabbits with experimentally-induced acute maxillary sinusitis were studied for evidence of inflammation. In three rabbits, the maxillary ostium was plugged and a bacterial inoculum placed in the sinus to induce acute sinusitis. After one week, the sinus was unplugged resulting in purulent post-nasal drainage that was allowed to persist for one week prior to sacrificing the animal. Three rabbits served as normal controls. H&E staining was performed. The degree of inflammation in each larynx was rated by a blinded pathologist.

Results: There was no statistically significant difference in inflammatory scores between experimental and control rabbit larynges.

Conclusions: One week of acute sinusitis with purulent post-nasal drip is not associated with laryngitis in a rabbit. While this experimental animal model has its limitations, it is the first study to investigate laryngitis and tracheitis in an animal model with sinusitis and provides the initial step in studying the relationship between rhinosinusitis and laryngitis.

9:08 AM

Friday, 2 May 2008

DISCUSSION

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Friday, 2 May 2008

SESSION 5

**PRACTICAL
BRONCHOSOPHAGOLOGY**

Moderator: Dana Thompson, MD
Rochester, MN

9:14 AM

Friday, 2 May 2008

**The Mucosal Immune Response to
Laryngopharyngeal Reflux**

Martin A Birchall, MD, FRCS,*

Louisa EN Rees, PhD*

Charlotte F Inman PhD, FRCVS*

Anne Phillips, BSc*

Christopher R Stokes PhD, MRCVS*

Michael Bailey, PhD, MRCVS*

Bristol, UK

Laszlo Pazmany, MD, PhD*

Danuta Gutowska-Owsiak, MD*

*Liverpool UK**

Nikki Johnston, PhD*

Milwaukee, Wisconsin

Jamie Koufman, MD

New York, New York

Gregory Postma, MD

Augusta, Georgia

Rationale: Laryngopharyngeal reflux affects up to 20% of western populations. Although individual morbidity is usually moderate, treatment costs are high and there are associations with other diseases, including laryngeal cancer. To date, there have been no studies of the mucosal immune response to this common inflammatory disease.

Objectives: To determine the mucosal immune response to laryngopharyngeal reflux.

Methods: We performed a prospective immunological study of laryngeal biopsies from patients with laryngopharyngeal reflux and controls (n=12, 11), and of primary laryngeal epithelial cells in vitro.

Measurements: Quantitative multiple colour immunofluorescence, using antibodies for lymphocytes (CD4, CD8, CD3, CD79, CD161), granulocytes (CD68,

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EMBP), monocytic cells (CD68, MHC II) and classical and nonclassical MHC (I, II, I²m, CD1d). Uni- and multi-variate analysis and co-localization measurements were applied.

Main results: There was an increase in percentage area of mucosal CD8+ cells in the epithelium ($p < 0.005$), whereas other leukocyte and granulocyte antigens were unchanged. Although epithelial MHC Class I and II expression was unchanged by reflux, expression of the non-classical MHC molecule CD1d increased ($p < 0.05$ luminal layers). In vitro, laryngeal epithelial cells constitutively expressed CD1d. CD1d and MHC I expression were inversely related in all subjects, in a pattern which appears unique to the upper airway. Co-localization of NKT cells with CD1d increased in patients ($p < 0.01$).

Conclusions: These data indicate a role for the CD1d-NKT cell axis in response to laryngopharyngeal reflux in man. This represents a useful target for novel diagnostics and treatments in this common condition.

**Detection of Pepsin in Patients with
Laryngopharyngeal Reflux (LPR) and
Gastroesophageal Reflux Disease (GERD)**

Jamie Koufman, MD

New York, NY

Catherine J. Rees, MD*

Bimjhana Bishwokarma, MS*

S. Carter Wright, MD*

Michael Rubin, MD

Mark O. Lively, PhD*

Nikki Johnston, PhD*

Milwaukee, WI

Peter Dettmar, PhD*

Hull, UK

Purpose: To provide preliminary data and proof of concept for the use of a non-invasive, sensitive enzyme linked immunosorbent assay (ELISA) for human pepsin used as a spit-in-a-cup diagnostic for reflux disease.

Study Design: Prospective controlled study.

Methods: Three patient study groups and controls. Controls: 20 adult volunteers with no prior history of laryngopharyngeal reflux (LPR) or gastroesophageal reflux disease (GERD). Controls were asked to expectorate a single random sputum/saliva sample for pepsin ELISA. Group I: 72 subjects with pH-documented untreated LPR; single random expectorated sample. Group II: 20 similar LPR subjects who provided two expectorated samples, before bedtime and upon rising in the morning. Group III: 36 GERD patients with biopsy-proven esophagitis (but without LPR symptoms), a single random expectorated sample.

Summary of Results: Fifteen percent (3/20) of the normal control subjects had pepsin detected; although two of those were positive at threshold pepsin levels (~3 ng/ml); the third had silent GERD and Barrett esophagitis, diagnosed by subsequent pH testing and esophagoscopy. Pepsin was detected in the expectorated samples of 70% (50/72) of Group I LPR; 95% (19/20) of Group II LPR; and 64% (23/36) of Group III GERD.

Conclusions: Pepsin detection in airway secretions/spit appears to be a sensitive and specific, non-invasive diagnostic for LPR and GERD. The threshold for detection in airway secretions is ~3 ng/ml. The best diagnostic yield for LPR (95%) was seen with double (AM and PM) spit sampling. With a single sample, LPR and GERD patients were pepsin positive 70% and 64% respectively.

**The Validity and Reliability of the Eating
Assessment Tool (EAT-10)**

Debbie A. Mouadeb, MD*

Catherine J. Rees, MD*

Jan S. Pryor, MA, CCC-SLP*

Rebecca J. Leonard, PhD*

Peter C. Belafsky, MD, PhD

Sacramento, California

Gregory N. Postma, MD

Augusta, Georgia

Introduction: Dysphagia, or difficulty swallowing, is a symptom not a disease. Patients with the symptom of dysphagia can have a vast array of clinical diagnoses ranging from acid reflux to terminal cancer. Because dysphagia is a symptom, it is essential that the clinician be able to document the severity of a patient self-perception of the disability caused by the swallowing problem. The EAT-10 is a self-administered survey for the subjective measurement of dysphagia.

Purpose: To assess the validity and reliability of the ten-item Eating Assessment Tool (EAT-10).

Methods: The investigation consisted of three phases: 1) line-item generation 2) line item reduction and reliability and 3) validity analysis. All data was collected prospectively. 629 surveys were administered to 482 patients. Internal consistency was assessed with the Cronbach alpha. Test-retest reliability was evaluated with the Pearson product-moment correlation coefficient. Normative data was obtained by administering the instrument to a community cohort of healthy volunteers.

Results: The EAT-10 displayed excellent internal consistency (Cronbach alpha = 0.960). Test-retest coefficients indicated high reproducibility and ranged from 0.72 to 0.91. Normative data suggest that an EAT 10 is abnormal. The mean EAT-10 improved from 19.87 (+/-10.5) to 5.2 (+/-7.4) after treatment for dysphagia ($p < 0.001$).

Conclusion: The EAT-10 is a self-administered disease specific outcome survey for dysphagia. The instrument has displayed excellent internal consistency, test-retest reproducibility, and criterion-based validity. The instrument may be utilized to document initial dysphagia severity and monitor treatment response in persons with a wide array of swallowing disorders.

9:32 AM

Friday, 2 May 2008

Normal Values for Pharyngeal pH Monitoring

Neil N. Chheda, MD*

Melanie W. Seybt, MD*

Gregory N. Postma, MD

Augusta, GA

Peter C. Belfasky, MD, PhD

Sacramento, CA

Purpose: To determine normative values of pharyngeal pH using a novel pH probe.

Design: Prospective study of asymptomatic adult volunteers.

Methods: The Restech Dx-pH probe is a novel pH device capable of measuring liquid and aerosolized acid levels. Thirty asymptomatic patients (Reflux Symptom Index less than 10 and Reflux Finding Score less than 5) underwent investigation with this probe placed in the oropharynx. Reflux parameters measured from the pharyngeal probe included: percentage of time and number of events with the pH less than 4, 5 and 6 in the upright and supine positions.

Results: The mean age was 35.3 years with 65% female. The median percent time below pH of 4, 5 and 6 in the pharynx was 0.00% (S.D. 0.01), 0.00% (S.D. 0.30) and 0.36% (S.D. 7.15) in the upright position, 0.00% (S.D. 2.21), 0.00% (S.D. 11.19) and 13.3% (S.D. 26.88) in the supine position and 0.00% (S.D. 0.77), 0.00% (S.D. 4.65) and 8.38% (S.D. 12.38) of the total 24 hour study time respectively. The median number of episodes of pH below 4, 5 and 6 in a 24-hour period were 0.00 (S.D. 0.40), 0.00 (S.D. 1.01) and 4.5 (S.D. 29.47) in the upright position, 0.00 (S.D. 0.25), 0.0 (S.D. 2.31) and 12.5 (S.D. 32.62) in the supine position and 0.00 (S.D. 0.46), 0.00 (S.D. 2.65) and 18.0 (S.D. 45.99) for the total time period respectively.

Conclusion: Normative pharyngeal pH values are presented. Further studies are required to determine clinical relevance.

9:38 AM

Friday, 2 May 2008

HONORABLE MENTION
STEVEN D. GRAY RESIDENT AWARD

Trial Vocal Fold Injection

Thomas L. Carroll, MD*

Clark A. Rosen, MD

Pittsburgh, PA

Background: Recent developments in temporary vocal fold (VF) augmentation materials and office-based laryngeal procedures have expanded the role of vocal fold injection (VFI). A variety of clinical scenarios exist in which there is doubt about the potential success of permanent augmentation. Trial VFI is the use of a temporary augmentation material to (1) determine the degree of overall communication improvement when dysphonia and dysarthria are present, (2) determine the degree of vocal quality improvement from augmentation in cases of severe VF atrophy or (3) allow patients to test drive an augmentation procedure. Trial VFI has been used for the last decade and our experience is presented.

Design: A retrospective review was performed on all patients in our surgical database who received a deep VF injection. Two hundred forty-four patients were identified. Patients who received a permanent VFI were excluded, as were those with VF paralysis, resolved paresis, scar, or laryngeal trauma. The remaining 26 patients had the diagnosis of VF atrophy and/or chronic paresis and were reviewed for outcome of trial VFI and for progression to permanent augmentation.

Results: 20/26 patients had a satisfactory response to the TVFI. 9 of the 20 with satisfactory results went on to permanent medialization (injection or thyroplasty). All 9 of those patients were also satisfied with the outcome of their permanent procedure.

Conclusion: Trial VFI has been found to be effective in predicting a positive response to permanent augmentation.

9:44 AM

Friday, 2 May 2008

DISCUSSION

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

9:50 AM

Friday, 2 May 2008

BREAK WITH EXHIBITORS

10:10 AM

Friday, 2 May 2008

**PRESIDENTIAL CITATION FOR
FOREIGN BODY MANAGEMENT**

Presented by Dana Thompson, MD

to

**GLENN ISAACSON, MD
JEFFREY BEDROSIAN**

**Death By Button Battery: Could We Have
Done Better?**

Presentation at: 10:48 AM

and Poster #132

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Friday, 2 May 2008

SESSION 6

LESSONS IN THE PEDIATRIC AIRWAY

Moderator: Ellen Deutsch, MD

Wilmington, DE

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

STEVEN D. GRAY RESIDENT AWARD

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10:12 AM

Friday, 2 May 2008

STEVEN D. GRAY RESIDENT AWARD
Presented by Mark Courey, MD

J. Matthew Dickson, MD*

**Secondary Airway Lesions in Infants with
Laryngomalacia**

Gresham T. Richter, MD

Presenting

Jareen Meinzen-Derr, PhD

Michael J. Rutter, MBChB, FRACS

Dana M. Thompson, MD, MS

Cincinnati, OH

Purposes: To determine the incidence of secondary airway lesions (SAL) in infants with laryngomalacia (LM) and examine their relationship with LM severity and gastroesophageal reflux disease (GERD). To determine if SAL increases the likelihood of supraglottoplasty in patients with LM.

Design/Methods: Retrospective review of a prospective database of 201 infants with LM at two pediatric tertiary referral centers collected from 1998 to 2003. Data pertaining to demographics, LM severity, SAL, surgical intervention, and diagnosis of GERD were analyzed.

Results: Secondary airway lesions were identified in 51.7% (n=104) of LM patients. Subglottic stenosis (grade 1-3) and tracheomalacia were the most frequently discovered SAL (38.8% and 37.8%, respectively). Infants with severe LM had significantly greater incidence of SAL (79.0%) compared to those with moderate (61.5%) or mild (28.8%) disease (p<0.0001). Infants with mild to moderate LM who also

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had SAL were more likely to progress to severe LM and require surgical intervention compared to those without SAL (34.5% vs 9.6%, $p=0.002$). Infants with SAL had a higher incidence of GERD than those without SAL (84.6% vs 45.4%, $p<0.0001$).

Conclusions: This study suggests that secondary airway lesions are common in infants with laryngomalacia and more frequently present in those with severe disease. Secondary airway lesions lead to an increased incidence of surgical intervention and GERD in infants with laryngomalacia.

10:18 AM

Friday, 2 May 2008

Cell Density of Lamina Propria of Neonatal Vocal Folds

Tara Rosenberg, BS*
John Schweinfurth, MD
Jackson, MS

Objectives: 1) To measure the cell density within the lamina propria of the neonatal vocal folds. 2) To examine changes in cell density in the lamina propria with increasing gestational age of neonatal vocal folds.

Study Design: Histologic analysis.

Methods: Intact neonatal larynges were sourced from fresh cadaveric specimens. Hematoxylin and eosin stained slides were used to visualize the laryngeal structures, and pictures of the vocal folds were taken at 10x magnification. The cell density of the lamina propria was calculated by counting the cells within each of five 100 μ m² regions within the study area, and the totals were then averaged for each area.

Results: A total of 62 sections from 14 larynges with gestational ages 19 to 36 weeks were examined. Histologic analysis revealed a uniform appearance of the vocal fold without apparent layers. The cell density of the lamina propria was greater than 30 cells per 100 μ m² for 51.2% of larynges less than 27 weeks gestation. However, only 14.3% of the pictures from larynges over 27 weeks gestation had an average cell density of over 30 cells per region (p=0.005).

Conclusions: As described by previous studies, the cell density of the lamina propria of the neonatal vocal folds is a hypercellular monolayer. The vocal fold maturation process, however, appears to mature earlier than previously thought with decreasing cell density in the lamina propria by 27 weeks gestation.

10:24 AM

Friday, 2 May 2008

**Comparison of Pediatric Voice Handicap Index
Scores with Perceptual Voice Analysis in Patients
Following Airway Reconstruction**

Alessandro de Alarcon MD *
Susan Baker, PhD, CCC-SLP*
Lisa N. Kelchner, PhD, CCC/SLP, BRS-S*
Janet Middendorf, MA, CCC-SLP*
Barbara Weinrich, PhD, CCC-SLP*
Cincinnati, Ohio*

Objective: Compare a subjective patient/family derived voice handicap survey to an observer derived method of voice disturbance.

Design: Retrospective review.

Setting: Tertiary care referral center.

Patients: Children referred for voice evaluation following reconstructive airway surgery.

Intervention: Voice assessment by a team, including pediatric otolaryngologists and speech-language pathologists, as well as parent/patient completed survey of voice handicap.

Main Outcome Measures: Overall Pediatric Voice Handicap Index (pVHI) score and Overall Severity score on the Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V)

Results: One hundred subjects were identified with data available for review. Of those, ten were identified with history of anterior and posterior costal cartilage graft laryngotracheoplasty between 2000-2007. Demographics: 4 Males; 6 Females. Age range 5-11 years (mean 7.1 years). Overall pVHI score (Scale 0-92) range 18-55 (mean 37). Overall CAPE-V score (Scale 0-100) range 21-97 (mean 57). Percent CAPE-V (Score/100) and percent pVHI (Score/92) were calculated. Mean CAPE-V percent was higher with a value of 57 (SD = 28) versus 40.2 (SD = 12) for the pVHI percent (p=0.12). Median for CAPE-V percent was higher at 46 versus 39.7 for the pVHI percent (p=0.13).

Conclusions: Children who undergo laryngotracheoplasty often have voice disturbance. This study suggests that there is a mismatch between self-reported voice handicap by a subjective patient/parent survey (pVHI) versus expert observer indices of voice disturbance (CAPE-V). In this patient population both of these tools provide important information in the overall voice assessment.

10:30 AM

Friday, 2 May 2008

The Impact of Supraglottoplasty on Aspiration in Severe Laryngomalacia

Gresham T. Richter, MD*

Christopher T. Wootten, MD*

Michael J. Rutter, MBChB, FRACS

Dana M. Thompson, MD, MS

Cincinnati, OH

Purpose: To examine the impact of supraglottoplasty on aspiration in infants with severe laryngomalacia (LM).

Design: Retrospective review of a prospective database from two tertiary care pediatric institutions (1998-2003). Patients: Fifty consecutive infants with severe LM who underwent supraglottoplasty (mean age-4.9mos) and functional endoscopic evaluation of swallow (FEES) with or without laryngopharyngeal stimulation testing (LPST).

Intervention: Cold-knife microlaryngeal supraglottoplasty and reflux management. Main Outcome Measure: Aspiration resolution.

Results: Preoperative FEES identified laryngeal penetration in 88% (n=44) of infants with severe LM. Laryngeal penetration with aspiration beyond the vocal cords was noted in 72% (n=36). Postoperative FEES (mean F/U exam-3.8mos) indicated resolution of laryngeal penetration and aspiration in 88% (n=39) and 83% (n=30) of these patients, respectively. Patients without preoperative aspiration (n=14) showed no evidence of aspiration following supraglottoplasty. Multiple medical comorbidities were present in the 6 patients with persistent aspiration including, congenital heart disease (5/6), congenital syndromes (4/6), seizure disorder (2/6), and need for tracheostomy (2/6). In aspirators, the mean preoperative LPST was 8.5 mmHg. This improved on average by 4.0 mmHg per patient following supraglottoplasty (paired T-Test, $p < 0.0001$).

Conclusions: This study suggests that cold-knife supraglottoplasty improves laryngeal penetration and aspiration in infants with severe LM. Supraglottoplasty did not cause aspiration in preoperative non-aspirators. In patients with multiple medical comorbidities, supraglottoplasty may not improve aspiration.

10:36 AM

Friday, 2 May 2008

Brown Fat Content of the Neonatal Larynx and Neck

Tara Rosenberg, BS*

John Schweinfurth, MD

William Daley, MD

Jackson, MS

Objectives: To identify and describe the location and function of brown fat in proximity to the neonatal larynx.

Study Design: Histologic analysis.

Methods: Intact neonatal larynges were sourced from fresh cadaveric specimens. Histologic slides were prepared to examine the laryngeal structures and to identify brown fat foci.

Results: A total of 16 larynges with gestational ages 19 to 36 weeks were examined. Histologic examination of the larynges showed multifocal brown fat content in cervical soft tissue typically near lymphatics and neurovascular bundles. Foci were also noted between the thyroid gland and thyroid cartilage. Few foci were found to be located within the larynx proper, but many were located near the airway.

Conclusions: Relative to its location, the brown fat content of the neonatal larynx and surrounding neck tissue has several possible functions. Foci of brown fat in close proximity to the airway may be important in affecting inspired air temperature or optimizing vocal performance/capacity. In addition, the location of brown fat foci near the thyroid and parathyroid glands may suggest a role in the function of these glands in the early days of life. This study encourages and warrants further investigation in this area of histology of the pediatric larynx.

10:42 AM

Friday, 2 May 2008

Phonation Threshold Pressures in Children

J. Scott McMurray, MD

Shannon M Theis, PhD*

Madison, WI

Purpose: Objective measures of voice disturbance continue to be difficult and controversial in children. Phonation threshold pressure (PTP) measures the minimum subglottal pressure required to initiate phonation, and increases with epithelial and subepithelial lesions of the vocal fold. Measuring PTP may provide an easy and reproducible objective measure of pediatric voice pathology. The purpose of this investigation was to determine the feasibility of measuring phonation threshold pressure (PTP) in children with voice disorders.

Design: Retrospective case series.

Methods: The records of 40 children (ages 4-13) under evaluation for a variety of voice disorders were reviewed. Phonation threshold pressures and perceptual impressions of vocal quality were recorded during evaluations for hoarseness, both before and after voice therapy by a speech-language pathologist who specializes in pediatric voice evaluation and treatment.

Summary of Results: The PTP measures ranged from 3 to 12 cmH₂O. There was a trend toward a lower PTP with increased vocal quality. Following treatment, PTP also decreased within individual subjects when their vocal quality improved.

Conclusion: PTP was feasible in children as young as 4 years. As vocal quality improved, PTP tended to decrease. A decrease in PTP implies less effort required to generate sound. This noninvasive objective measure was easy for the children to perform and may provide a simple means to follow changes in the voice during medical, surgical and behavioral treatment. Further study to obtain normative values as well as to correlate PTP with specific laryngeal pathologies should be pursued.

10:48 AM

Friday, 2 May 2008

Death By Button Battery: Could We Have Done Better?

Jeffrey Bedrosian, MD*

Glenn Isaacson, MD

Philadelphia, PA

Purpose: To describe our management of an esophageal foreign body causing exsanguinating hemorrhage, why we failed, and how others might be saved.

Design: Descriptive clinico-pathological study.

Methods: We describe the clinical presentation of a 2-year-old boy with an erosive aortoesophageal fistula caused by a 21 mm button battery. Emergency management and autopsy findings are described. We reviewed the world's literature to better understand the local corrosive effects of button batteries in animal models and to search for a better algorithm for the control of aortoesophageal fistulae.

Results: Aortoesophageal fistulae occur most commonly as sequelae of expanding thoracic aneurysms. Malignant neoplasms, gastroesophageal reflux and esophageal foreign bodies (especially fish bones) may result in abnormal communication between the aorta and esophagus. Until the 1980s, these lesions were 100% fatal. Intrathoracic vascular control of the aorta, often facilitated by hypothermic cardiopulmonary bypass has permitted reconstruction of the aorta and esophagus in a few rare cases.

Alkaline containing button batteries can cause visceral erosion through a combination of electrical energy, physical pressure and local leakage of concentrated caustic agents. Rapid removal of ingested batteries minimizes injury. As batteries larger than 15 mm are more likely to lodge in the thoracic esophagus, there is a movement in the public health community to ban large disc batteries from the market.

Conclusion: High clinical suspicion, rapid correct management and luck have led to occasion survival in patients with aortoesophageal fistula. Large disk batteries are more likely to lodge in the esophagus and to cause injury.

Friday, 2 May 2008

DISCUSSION

10:54 AM

Friday, 2 May 2008

PANEL II

**ILVR SPONSORED
LARYNGOPHARYNGEAL REFLUX:
PEARLS AND PITFALLS**

Moderator: **Milan Amin, MD**
New York, NY

Participants:

Mark Courey, MD
San Francisco, CA

Jamie Koufman, MD
New York, NY

Gregory Postma, MD
Augusta, GA

Reza Shaker, MD
Milwaukee, WI

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

11:50 AM

Friday, 2 May 2008

Introduction of New President

JAMIE KOUFMAN, MD
New York, NY

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

12:00 PM

Friday, 2 May 2008

ADJOURN

12:15 PM

Friday, 2 May 2008

Annual Photograph of the Membership

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

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**J. W. Marriott
Grande Lakes
Orlando, Florida**

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AMERICAN LARYNGOLOGICAL ASSOCIATION

AMERICAN RHINOLOGIC ASSOCIATION

All ABEA, ALA, ARS, ANS, AOS and TRIO
registrants and guests are invited.

Scientific Posters will be attended by authors.

*Abstracts of ABEA submissions to the
Combined Scientific Poster Session
appear on pages (94-127) of this program booklet.*

#105

Cervical Spine Disease Associated Dysphagia

Matthew Sitton, BA*

Flowood, MS

John Schweinfurth, MD

Jackson, MS

Educational Objectives: At the conclusion of this presentation, participants will be able to identify cervical spine problems associated with dysphagia and discuss potential evaluation and management strategies.

Purpose: To examine the prevalence and character of dysphagia in cervical spine disease and treatment outcomes.

Study Design: Retrospective case series.

Methods: Institutional review board approval was obtained. Patients with dysphagia and cervical spine disease were included in the study. Cervical spine and videofluoroscopic radiology was reviewed and swallowing performance rated using the dysphagia outcome and severity scale (DOSS). Means were compared using a paired t-test.

Results: Fifteen patients met criteria and were included in the study. There were 6 males and 9 females. Mean age was 60. Eleven patients had anterior osteophytes involving the fourth cervical vertebra of which 9 suffered significantly limited posterior translation of the epiglottis. Five patients with osteophytes that were treated surgically had improvement in DOSS score from 3.6 to 6.6 ($p=0.001$). The non-surgical group had a mean initial DOSS score of 5.1.

Conclusions: Cervical spine disease is most commonly associated with subjective solid food dysphagia. Patients with cervical osteophytes proximal to C4 and those with additional deficits presented with the lowest initial DOSS score. Surgical intervention resulted in significant improvement in swallowing function.

#106

**Measures of Voice Production Following Intervention for
Vocal Fold Scar and Pathologic Sulcus Vocalis**

Seong Hee Choi, PhD*
Seth H. Dailey, MD*
Charles N. Ford, MS
Diane M. Bless, PhD*
Nathan V. Welham, PhD*
Madison, WI

Objective: Vocal fold scar and pathologic sulcus vocalis are associated with disruption of the lamina propria, resulting in suboptimal vibratory function and severe dysphonia. Patients are often managed using a variety of approaches aimed at either improving glottal closure and/or improving tissue pliability; however there is no consensus regarding which intervention strategies are most appropriate for a given clinical presentation. The purpose of this study was to evaluate outcomes for a series of patients following three commonly employed interventions: Injection laryngoplasty, cordotomy with lamina propria graft, and Type I thyroplasty.

Methods: Twenty four patients with vocal fold scar and/or pathologic sulcus vocalis were evaluated prior to, and at up to 18 months following intervention. Ten patients underwent injection laryngoplasty using Cymetra, Radiesse or Restylane materials. Seven patients underwent cordotomy and placement of autologous fascia or Alloderm. Seven patients underwent Type I thyroplasty. Acoustic, aerodynamic, videostroboscopic, auditory perceptual, and psychosocial data were collected at each pre and post-intervention time point.

Results: Patients demonstrated highly variable outcomes, irrespective of treatment modality. All treatments demonstrated success in certain patients; however no single treatment was consistently effective in all patients. Significant improvement at one month was not necessarily predictive of long term outcome.

Conclusions: These results highlight the significant clinical challenge presented by vocal fold scar and pathologic sulcus vocalis, and the need for careful tailoring of surgical intervention to individual patient presentation.

#107

A Protocol to Prevent Airway Obstruction after Pediatric Tonsillectomy

Glenn Isaacson, MD
Philadelphia, PA

Objective: To evaluate the efficacy of a protocol designed to prevent post-tonsillectomy airway obstruction in children with obstructive sleep apnea.

Design: Computerized retrospective review of single surgeon case series.

Setting: Tertiary children's medical center.

Patients: Children with sleep study-proven obstructive sleep apnea or children aged 3 years or less with clinically suspected obstructive sleep apnea.

Methods: These children were treated according to a protocol that included: 1) rapid bloodless tonsillectomy; 2) repeated release of the tonsillar retractor; 3) avoidance of uvular edema; 4) intranasal oxymetazoline administration; 5) routine placement of a nasal airway; 6) extended recovery room observation. Children less than 18 months of age and massively obese children were scheduled for intensive care unit admission (ICU) observation. Outcome measures were: 1) rate of unexpected ICU; 2) incidence of post-extubation pulmonary edema; 3) incidence of aspiration pneumonia.

Results: During the period March 2004 August 2007, 864 children underwent adenotonsillectomy by a single surgeon 604 for the indication of obstructive sleep apnea (73) or adenotonsillar hypertrophy with obstruction (215). Eighty were aged 3 years or less. Twelve older children had sleep study proven obstructive sleep apnea. There were two unexpected admissions to the pediatric ICU for persistent upper airway obstruction none required intubation. No child developed post-obstructive pulmonary edema. Three children were treated for infiltrates consistent with aspiration pneumonitis.

Conclusion: Most cases of post-extubation pulmonary edema and pneumonia can be avoided in high-risk children following a protocol that anticipates and avoids precipitating causes of upper airway obstruction.

#108

Removal of an Open Safety Pin for a Distal Bronchial Segment Using Cardiac Catheterization Instrumentation

Yoram Stern, MD*
Elchanan Bruckheimer, MD*
Tommy Schonfeld, MD*
Petah Tikva, Israel

Purpose: To describe an original application of cardiac catheterization instrumentation for removal of distal bronchial sharp foreign bodies.

Patient and Methods: A four-year-old male with a one month history of subfebrile fever and intermittent cough prior to his admission. Chest X-ray revealed an open safety pin and an infiltrate in the right lower lobe. Flexible bronchoscopy revealed a granulation tissue in the posterior basal segment of the right inferior lobar bronchus, however, the foreign body was not seen. A rigid bronchoscope could not reach this distal segment, therefore lobectomy was considered. Under general anesthesia a 6Fr cardiac catheterization introduction sheath was placed in the right inferior lobar bronchus using fluoroscopy to verify its position. A cobra catheter was advanced to the occluded posterior basal segment. A Terumo guide wire and the catheter were advanced through the granulation tissue distal to the pin. A 5mm Amplatz goose neck snare was advanced through the catheter and opened distal to the pin. The loop was manipulated on the pin which was then closed by tightening the loop. A Rosen J-wire was used to pull the pin through an 8Fr sheath, to the oropharynx where it was removed.

Results: No pulmonary damage was noted. A chest X-ray revealed absorption of the RLL infiltrate and the child was discharged home after two days with resolution of the symptoms.

Conclusion: Cardiac catheterization instrumentation can be used in selective cases to remove complicated distal foreign bodies.

#109

Repair of Pharyngocutaneous Fistula after Total Laryngectomy: A Novel Endoscopic Approach

Andrew J. McWhorter, MD*
Duncan F. Hanby, MD*
Melda Kunduk, PhD CCC-SLP*
Baton Rouge, LA

Purpose of the Study: 1) To describe a novel endoscopic approach for the repair of a persistent pharyngocutaneous fistula after total laryngectomy. 2) To review the current literature on repair of pharyngocutaneous fistula after laryngectomy.

The post-operative pharyngocutaneous fistula is a problem that continues to plague the field of head and neck surgery. With an incidence ranging from 8.7 to 22%, it is one of the most common early major post-operative complications after total laryngectomy. Current popular methods to repair these defects range from conservative wound care to primary closure to free tissue transfer. Although many studies have been published describing great success using these techniques, significant morbidities are often incurred by these patients during the reconstruction. In addition, there is a significant economic burden associated with the performance and care of regional and free tissue flaps. We report a novel endoscopic approach to the repair of a pharyngocutaneous fistula following total laryngectomy. In addition, we review the current literature pertaining to the repair of pharyngocutaneous fistulae.

Methods: Case report and literature review

Results: Successful resolution of pharyngocutaneous fistula. Review of current literature.

Conclusion: Endoscopic repair of pharyngocutaneous fistulae can be successfully performed in appropriately selected patients. This approach has the potential to have decreased morbidity and significantly less overall cost than repairs using regional and free tissue flaps.

#110

**Endoscopic Posterior Cricoid Split with a Fiber
Based CO2 Laser**

Matthew T. Brigger, MD*
Christopher J. Hartnick, MD
Boston, MA

The recent introduction of a fiber based delivery system for the CO2 laser represents a significant advantage over the current delivery system requiring a direct line of sight. We report on the utility of a fiber based CO2 laser system within a tertiary care pediatric otolaryngology practice specifically focusing on the use for endoscopic posterior cricoidotomy for cartilage graft expansion laryngotracheal reconstruction in children with posterior glottic stenosis.

The fiber based delivery system has been used in two endoscopic posterior cricoid splits to date. The fiber based system represents an advantage over traditional line of sight CO2 lasers mounted to a surgical microscope. Primary advantages include the ability to modify the angle and direction of laser energy as well as the option to visualize the surgical field endoscopically while using the laser. Our experience of the advantages and disadvantages is discussed in reference to other endoscopic laser options as well as open approaches. Additionally, further applications and future directions are reviewed.

In conclusion, the fiber based CO2 laser represents significant advantages over traditional line of sight CO2 laser systems. The system can be used to overcome some of the difficulties associated with endoscopic posterior cricoid splits for laryngotracheal reconstruction. A description of the setup and technique is provided as well as photographic and video demonstration.

#111

Endoscopic Stapling in Zenker's Diverticulum Repair: A Comparison of New and Conventional Techniques

Mariah Salloum, MD*
Jagdish Dhingra, MD*
Boston, MA

Purpose: The purpose of this study is to evaluate the efficacy and safety of the treatment of Zenker's diverticulum using an endoscopic stapling procedure as compared to conventional techniques.

Methods: A retrospective analysis of Zenker's diverticulum repairs done by the same surgeon in a community-based practice over the past 5 years was performed. Methods of repair included open cricopharyngeal myotomy, endoscopic CO2 laser cricopharyngeal myotomy, and endoscopic stapling of the diverticulum wall. Outcome measures were compared - including length of surgery, length of hospital stay, complications, and time of recovery to oral feeding.

Results: Fourteen cases were identified. Five endoscopic stapling procedures, four laser myotomies, and five open repairs were performed. The average operative time of the endoscopic stapling technique was less than with open or endoscopic laser myotomy, and these patients had a decreased length of hospital stay and shorter time to oral feeding. Complications of endoscopic techniques included two postoperative leaks (laser myotomy) managed conservatively and one iatrogenic tear of the Zenker's pouch resulting in a conversion from endoscopic to open repair.

Conclusion: By evaluating three different techniques done by the same surgeon, we show that endoscopic stapling repair of Zenker diverticulum is an easily learnt, safe and desirable technique with shorter operative time, less complications, and a quicker recovery period. These are critical advantages in treating a disease of the aged population, and especially for patients with multiple comorbidities for whom surgical intervention may otherwise not be an option.

#112

**Unilateral True Vocal Fold Paralysis Presenting
With Airway Obstruction**

Ahmed M.S. Soliman, MD
Roya Azadarmaki, BS
Natasha Mirza, MD
Philadelphia, PA

Objective: To present a case series of 8 patients with unilateral true vocal fold paralysis who presented with airway obstruction.

Methods: A retrospective review of the authors' patients at two institutions with unilateral true vocal fold motion impairment was carried out. Of these, 8 patients were identified who presented with stridor and dyspnea. Five were a result of thyroidectomy, 1 from recurrent laryngeal nerve section for spasmodic dysphonia, 1 after anterior cervical discectomy and fusion, and one where no etiology was identified.

Results: Two patients underwent tracheotomy. Two patients underwent partial arytenoidectomy. Five patients underwent Botulinum toxin injection; two were treated with breathing therapy and one opted for no treatment at all. Some patients received more than one treatment modality.

Conclusions: Unilateral vocal fold paralysis may present with airway obstruction. Treatment should be incremental and starts with breathing therapy and botulinum toxin injection. Partial arytenoidectomy or tracheotomy may be necessary for refractory cases.

#113

**Midline Glossotomy and Intraoperative CT
scanning for Management of Deeply Embedded
Foreign Bodies**

Soham Roy, MD*
Jose Ruiz, MD*
Michael Rodriguez, MD*
Miami Florida

Objective: Discuss midline glossotomy and intraoperative CT scans in managing a deeply embedded foreign body.

Study Design: Case Report

Methods/Results: A 53 year old male was transferred to our institution after direct laryngoscopy was unsuccessfully attempted at another institution for removal of a foreign body in the vallecula. A CT scan at our institution identified a 3 cm foreign body lodged deeply into the base of tongue. DLB was attempted at our institution but no foreign body could be found. A midline glossotomy was then performed through the tongue base and central tongue. Despite deep dissection, the object could not be located. The patient was returned under anesthesia to the CT scanner where radiolucent pledgets were placed into the glossotomy; CT images identified the foreign body lateral and deep to the pledgets. Guided dissection then allowed the foreign body to be located and removed. An immediate followup CT showed complete removal of the object. The midline glossotomy was closed with absorbable sutures and the patient was discharged two days later with no complications.

Conclusion: Deeply embedded foreign bodies of the upper aerodigestive tract are a diagnostic and therapeutic challenge for otolaryngologists. Foreign bodies may become embedded in the tongue base after swallowing, intubation, or even during rigid endoscopy. In this case, a midline glossotomy was necessary to reach a deeply embedded object. Intraoperative CT was invaluable in locating the object by placing radiolucent markers in the midline glossotomy. These are useful tools in the management of complicated aerodigestive foreign bodies.

#114

**Vocal Cord Paralysis in Infants with
Tracheoesophageal Fistula**

Yael Oestreicher-Kedem, MD*

Ari DeRowe, MD

Hagit Nagar, MD *

Gad Fishman, MD*

Yoseph Ben-Ari, MD*

Tel-Aviv, Israel

Purpose: To describe the clinical characteristics and management of vocal cord paralysis in infants who were born with a tracheoesophageal fistula (TEF).

Design and Materials: A retrospective case study in a tertiary care pediatric hospital. Included were infants born with TEF, who presented in the pediatric otolaryngology after TEF repair due to hoarseness or dyspnea, and then were diagnosed to have vocal cord paralysis.

Summary of Results: Five infants, four males and one female were included in the study. One infant presented with stridor post TEF repair and one presented prior to the repair. All children underwent flexible laryngotracheobronchoscopy and were treated in the pediatric intensive care unit and pediatric pulmonology unit for a period of 20 days to 14 months before referral and diagnosis of before vocal cord paralysis. One infant was diagnosed with a unilateral vocal cord paralysis and four with bilateral paralysis. Age at diagnosis of paralysis was 20 days to 14 months. Four infants required a tracheostomy.

Conclusions: vocal cord paresis in infants is a difficult diagnosis. The risk for recurrent laryngeal nerve injury in TEF and TEF repair should be emphasized in these children. We recommend that all newborns with TEF should be examined by an otolaryngologist to confirm the mobility of the vocal cords and to rule out other associated airway malformations prior to the repair in all cases and after repair if respiratory difficulties develop.

#115

**Endoscopic Cricopharyngeal Myotomy Using the
CO₂ Laser**

Edward J. Damrose, MD
Allen Ho, MD*
Yael Ostreicher, MD*
Stanford, California

Purpose: To retrospectively review outcomes following CO₂ laser-assisted endoscopic cricopharyngeal myotomy in the treatment of dysphagia.

Design and Method: Retrospective case-study. Two patients with Zenker's diverticulum and three with cricopharyngeal spasm underwent endoscopic CO₂ laser-assisted cricopharyngeal myotomy with primary closure of the mucosal defect. Charts were reviewed for blood loss, length of operation, length of hospitalization, postoperative complications, and swallowing outcome using the MD Anderson dysphagia inventory. Results: Bleeding was minimal. Operative times averaged ninety minutes. Hospitalization averaged 72 hours. All esophageal mucosal defects could be closed primarily. There were no postoperative complications. No patient developed subcutaneous emphysema or mediastinitis. Dysphagia was improved in all patients. One patient dependent on gastrostomy tube feedings secondary to aspiration was able to resume oral alimentation.

Conclusions: Endoscopic cricopharyngeal myotomy can be a useful adjunct in the treatment of dysphagia secondary to cricopharyngeal spasm or Zenker's diverticulum. Closure of mucosal defects is easily accomplished and may decrease the incidence of postoperative subcutaneous emphysema.

#116

Bronchoscopic Management of Plastic Bronchitis

Diego Preciado, MD, PhD*
Sukgi Choi, MD
Washington, DC

Objectives: Plastic bronchitis is a rare disease characterized by the formation of thick, tenacious, arborizing muco-fibrinous tracheobronchial casts that result in life-threatening airway obstruction and pulmonary failure. Patients with congenital heart disease who have undergone a Fontan operation are at high risk for having this problem develop. We review two children with a history of having undergone a Fontan procedure and subsequently developing plastic bronchitis. A particular emphasis is placed on their clinical evolution, the role of rigid bronchoscopy, and on adjunctive management therapies.

Study Design and Methods: Case report of two patients with plastic bronchitis at a tertiary referral children's hospital.

Results: Both patients required repeated bronchoscopies, one requiring four separate ones over a week's period, for rigid optical guided removal of the casts. Extra-corporal membrane oxygenation (ECMO) was also needed in this one child. Both were also managed with nebulized n-acetylcysteine, tissue plasminogen activator, bronchodilators, and azithromycin. Pulmonary function returned to baseline in both children, one unfortunately suffered a hemorrhagic stroke as a consequence of ECMO.

Conclusions: Plastic bronchitis is an unusual clinical scenario of unknown cause that occurs in multiple clinical settings, but especially in those children who have undergone a Fontan operation. Management of this distressing situation is difficult. The intrinsic cardiopulmonary physiology of children with Fontan procedures, including the risk of arrhythmias, hypo-oxygenation, and pulmonary hypertension make this condition even more complex. As highlighted by these two cases, aggressive bronchoscopic intervention along with adjunctive medical therapy is necessary for successful outcomes.

#117

Airway Foreign Body Associated With Subglottic Stenosis

Jeb Justice, MD*
J. Fredrik Grimmer, MD*
Salt Lake City, Utah

Purpose: Report on the necessity of tracheostomy to remove an airway foreign body in a patient with subglottic stenosis.

Design and Methods: Case report.

Summary of Case: A 9-month-old boy had a witnessed choking spell followed by respiratory distress. Attempts to pass a 4.0 and 3.5 endotracheal tube by emergency medical services failed. A 3.0 endotracheal tube was ultimately passed and a popping sound was heard. The patient was then transported to a tertiary-care children's hospital. Past medical history was significant for occasional wheezing although the patient had normal exercise tolerance. Chest exam demonstrated diffuse coarse breath sounds. Chest- x-ray was negative. The patient was subsequently taken to the OR for removal of a suspected airway foreign body. Laryngoscopy revealed an edematous elliptical-shaped subglottis. A 3.7 bronchoscope met resistance but could be passed. In the distal trachea a hard, spiny, plaster-like material was lodged at the carina obstructing 80% of the airway. The foreign body was too large to pass through the cricoid using optical forceps. The mass was also too large to pass distally into the right mainstem bronchus. A tracheostomy was performed and the foreign body was removed through the tracheostomy site. The airway was secured with a 3.5 Shiley pediatric tracheostomy tube. Repeated bronchoscopy one week later demonstrated a Cotton-Meyers grade II subglottic stenosis. Two attempts at balloon dilation were unsuccessful. The patient is currently tracheostomy dependent with the goal of decannulation after laryngotracheal reconstruction.

Conclusion: Tracheostomy may be necessary to remove airway foreign bodies in the setting of subglottic stenosis.

#118

**Staged Surgical Management Of Hypopharyngeal
Traction Diverticulum**

Ronda E Alexander, MD*

David J. Myssiorek, MD*

New York, NY

Jeffrey S Silber, MD*

New Hyde Park, NY

This presentation is intended to educate participants so that they will be able to identify historical factors, signs and symptoms, and radiographic results supporting the diagnosis of traction diverticulum; discuss appropriate surgical management; and demonstrate familiarity with the literature and historical causes of traction diverticulum. The format is a case report and review of the literature.

Report: A 50-year-old woman who underwent cervical spine fixation 6 years prior presented with dysphagia, regurgitation of undigested food, halitosis and weight loss. Operative examination demonstrated a hypopharyngeal diverticulum with spinal hardware visible in a defect in the mucosa. She underwent open cervical approach to removal of the hardware. Endoscopic staple diverticulotomy as described by Scher et al. was performed 8 weeks later in the ambulatory surgical setting. After a period of enteral feeding via nasogastric tube in the initial post-operative period, she was able to resume oral nutrition in the interim between the surgical procedures. Following the second procedure, she was able to resume normal diet immediately and she experienced minimal symptoms.

Conclusions: Traction Diverticulum is appropriately treated by removing the inciting anatomic factor(s). Staged surgical management should begin with the removal of the nidus followed by marsupialization of the diverticulum pouch. Standard staple diverticulotomy is a viable option for the second stage. This technique allows the patient minimize the length of, or avoid, the second hospitalization for diverticulum management.

#119

**Bilateral Vocal Fold Motion Impairment as a
Delayed Post-Surgical Phenomenon**

Ronda E Alexander, MD*

Daniel B Kuriloff, MD*

New York, NY

Mona Bambha, MD*

Bronx, NY

This report describes a unique case of delayed bilateral vocal fold motion impairment (VFMI) that presented 5 weeks after surgery for thyroid disease. A 71-year-old woman was seen for management of multiple thyroid nodules, one of which showed Hürthle cell features. She underwent uneventful total thyroidectomy with identification and preservation of bilateral superior and recurrent laryngeal nerves. At 5 weeks after surgery, she began manifesting stridor and respiratory difficulty. On exam, her vocal folds were immobile with a marginal glottic opening. Laryngeal electromyography (LEMG) revealed patterns consistent with re-innervation of the right thyroarytenoid (TA) and denervation of the left TA muscle. Over the ensuing months, she developed progressive improvement in mobility of the vocal folds and a repeat LEMG showed recovery of nerve function. Radiologic and serologic investigations were unrevealing. While vocal fold motion abnormalities are a known potential complication of thyroid surgery, the literature reports that these cases occur in the immediate post-operative period. Herein, we present a case in which the deficiency appeared after a significant delay. At 5 weeks after surgery, this timing is more consistent with a post-viral idiopathic vocal fold paralysis rather than a surgical incident. The case brings to light the importance of maintaining a broad differential diagnosis in the face of unexpected physical findings.

#120

**Transtomal Shaver Excision of Tracheal
Papillomatosis**

Karen B Zur, MD
Philadelphia, PA

The management of laryngotracheal papillomatosis is often fraught with difficulty accessing the distal airway in cases of laryngeal obstruction and proliferative tracheal disease. The purpose of this presentation is to present a novel way to access the distal trachea in a pediatric patient with obstructing laryngotracheal papillomatosis.

This is a three year old girl who was diagnosed with obstructing laryngeal papillomas at the age of one. She required an urgent tracheostomy due to airway obstruction, and was since diagnosed with progressive pulmonary involvement. Due to extensive tracheal disease, she requires bi-monthly débridements to clear the distal tracheostomy tube of obstruction. However, the approach to the distal trachea is complicated by a small glottic airway due to scarring and papillomas.

This presentation will describe a technique utilizing the laryngeal shaver to débride tracheal papillomas via a combined transoral and trans-stomal visualization and instrumentation.

#121

**Incidence and Prevention of Malpractice Litigation
Related to Post Surgical Vocal Fold Paralysis**

Gary Y. Shaw, MD
Lees Summit, MO

Vocal fold dysfunction related to recurrent and/or superior laryngeal nerve injury is a known complication in many surgical procedures. Among these include thyroid, anterior cervical spine, esophageal, and carotid surgery. Despite its well described occurrence patients symptoms are often not diagnosed, misdiagnosed, or ignored. This unfortunately can result in litigation against the surgeon. It is the author's contention that early diagnosis and management by well trained laryngologist will result in a reduction of malpractice claims. Legal data banks regarding this complication were researched and estimated incidence and monetary settlements are discussed. Several case reports are presented.

#122

Tracheoesophageal Fistula Complicating A Retained Foreign Body (Coin) In a Congenital Esophageal Diverticulum

J. Paul Moxham, MD*
Geoffrey K. Blair, MD*
Pia Pace-Asciak, MD*
Vancouver, BC, Canada

Introduction: Esophageal foreign bodies, especially coins, are common in small children. Long term retention of coins can lead to erosive complications.

Study Design: Case Report

Results: We present a case of a 3 year old female who ingested a coin one month prior to presentation. The coin became trapped in a previously undetected congenital esophageal diverticulum. The coin eventually eroded into the trachea causing the patient to present with airway symptoms. We discuss the endoscopic and open approach management undertaken in this case and a review of the literature relating to both long term retention of coins and their complications and the incidence of similar events in congenital esophageal diverticuli.

Conclusions: A combination of endoscopic and open approach management of this difficult foreign body complicated by erosion through a congenital esophageal diverticulum resulted in a stable healthy child who has now been followed for over one year post-operatively.

#123

**Endoscopic Resection of Subglottic
Chondrosarcoma**

Yael Oestreicher-Kedem, MD*

Edward J. Damrose, MD

Stanford, CA

Todd S. Dray, MD

Santa Clara, CA

Purpose: To evaluate the feasibility of endoscopic, transoral resection of macroscopically localized subglottic low grade chondrosarcoma.

Design and Method: Retrospective case-study. Included are patients diagnosed with subglottic laryngeal low grade chondrosarcoma. Tumors were resected endoscopically via direct laryngoscopy with microlaryngeal technique under jet ventilation. The post-operative course, voice quality, respiratory effort and oncologic results were evaluated.

Results: Two male patients aged 49 and 60 years underwent endoscopic translaryngeal enbloc resection of low grade chondrosarcoma of the cricoid cartilage. Extubation was performed immediately after surgery. No patient required tracheostomy or laryngofissure. Both patients were managed in the outpatient setting. Neither patient developed subglottic stenosis. On limited follow up no tumor recurrence has been noted. Voice quality has been stable and dyspnea improved.

Conclusions: Endoscopic transoral resection of subglottic low grade chondrosarcoma is a viable technique with good functional outcomes. Extensive resection of subglottic disease is possible, which may afford patients an alternative to total laryngectomy.

#124

Aspiration of a Cocaine Vial

Jason E. Mudd, MD*

Joshua James, MD*

K. Christopher McMains, MD*

San Antonio, TX

Purpose of the Report: To describe the management of a unique airway foreign body.

Case Report: A 53yo male presented to the Emergency Center after intentionally swallowing a glass vial of cocaine. On arrival, the patient was not in distress and had normal vital signs. A chest X-Ray revealed a foreign body in the right mainstem bronchus. Initial flexible bronchoscopy by the pulmonary service resulted in the patient becoming acutely agitated and he desaturated. The otolaryngology service was then contacted and immediately took the patient to the operating room. Anesthesia induction was performed using mask ventilation. The larynx was exposed with a Dedo laryngoscope and a glass vial was visualized in the subglottis. A microlaryngoscopy tube was carefully advanced past the vial and the patient was successfully ventilated. Using multiple techniques we attempted to remove the vial transorally, but all were unsuccessful. An open procedure was then performed through a standard tracheotomy incision. A vertical incision was made through tracheal rings one through three, the intact vial containing cocaine was removed, and a tracheostomy tube was placed through the tracheal incision. The patient recovered and was decannulated prior to discharge. At the one month follow-up appointment, the patient was asymptomatic and showed only a small anterior subglottic shelf.

Conclusion: This is the first report in the literature describing the aspiration of a cocaine vial. It emphasizes the importance of securing the airway, and various methods used for foreign body removal.

#125

**Subglottic Airway Foreign Body Presenting with
Chronic Stridor**

Keith Casper, MD*
Gresham Richter, MD*
Charles Myer III, MD
Cincinnati, Ohio

Study Design: Retrospective case review.

Details: A 7-year old female presented to the emergency department for worsening stridor and "wheezing" for greater than 3 weeks. She had been seen in numerous emergency departments for similar complaints and placed on numerous therapies including antibiotics and an albuterol inhaler. Despite these treatments, the patient continued to have progressive symptoms. On presentation, the patient was in no acute distress but demonstrated loud biphasic stridor. A/P and lateral airway films were performed which demonstrated an irregular narrowing of the subglottis. The patient was admitted to the airway floor in preparation for operative intervention.

In the operative suite, the patient was brought to an appropriate level of general anesthesia with continuing spontaneous respiration with a combination of intravenous propofol and sevoflurane. Next, a Philips laryngoscope was used to expose the larynx, and a 0 degree Hopkins rod was used for visualization. A foreign body was immediately recognized in the subglottis with surrounding granulation tissue. The subglottic airway was only minimally patent immediately posterior to the foreign body. A medium Jako laryngoscope was then inserted and suspended from the mayo stand. Utilizing the 0 degree Hopkins rod and a variety of microlaryngeal instruments, the

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foreign body was palpated and assessed for mobility. After several different attempts at manipulation, it was felt that the object was not amenable to endoscopic removal.

The patient was left in suspension to facilitate ventilation, and the neck was prepped and draped for transcervical removal. A low transverse incision was made in the neck. Next, the airway was identified and a low tracheotomy was performed. The distal airway was then verified and secured. The patient was taken out of suspension. The midline tracheotomy incision was continued superiorly approximately two tracheal rings. A hemostat was passed superiorly to identify the foreign body. The foreign body was removed with some difficulty using the hemostat. Visualization was enhanced by a 0 degree Hopkins rod placed transorally. After removal, the subglottic mucosa was noted to be edematous and partially denuded; the divided proximal tracheal rings were repaired in standard fashion. A 4.5 pediatric tracheostomy tube was placed in the original distal tracheotomy site.

The patient remained in the hospital until a second microlaryngoscopy and bronchoscopy was performed approximately one week later. The patient was placed on an oral steroid taper and an aggressive antireflux regimen. On evaluation in the operative suite, the subglottis was widely patent without evidence of stenosis and the mucosa was almost completely healed. The patient was decannulated the following day and discharged to home 48 hours later.

During the hospitalization, the parents admitted to having longstanding difficulty with their daughter putting objects in her mouth and nose. Her mother realized after reviewing the operative images that the foreign body was a metallic plastic ring that in hindsight she had been missing for over a month.

#126

**Nasopharyngeal Foreign Bodies Can Mimic Lower
Airway Locations**

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Introduction: Nasopharyngeal foreign bodies are a relatively uncommon occurrence compared to other aerodigestive sites. Even less frequently, a nasopharyngeal foreign body may present with lower airway signs and symptoms, thus mimicking a lower airway location. In other situations, an airway foreign body may be coughed up into the nasopharynx prior to endoscopic evaluation.

Objective: To review the experience with nasopharyngeal foreign bodies mimicking lower airway foreign bodies at a tertiary referral children's hospital.

Methods: Case-series.

Results: 4 cases of nasopharyngeal foreign bodies mimicking lower airway foreign bodies are presented. The concept of panendoscopy at all foreign body removals is suggested as a means to avoid a missed nasopharyngeal location of a foreign body.

Conclusion: Although nasopharyngeal foreign bodies are uncommon, their rare ability to mimic distal sites mandates a thorough pan endoscopic approach.

#127

**Ingestion of a Moth Cocoon, An Unusual Case of
Upper Aerodigestive Tract Foreign Body**

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Ingestion of foreign objects is not uncommon in young children, and may result in an aerodigestive tract foreign body. Unusual or rare foreign material may present unique challenges because caregivers have little or no prior experience with their management and scant reference material to assist them. We present an unusual case of upper aerodigestive tract foreign body, ingestion of a moth cocoon in a 14 month-old child.

While at play, an otherwise healthy fourteen month old female was found with a foreign body in the mouth by her mother, who removed the object immediately. The material appearance suggested mammalian hair and bony fragments. With persistent drooling, anorexia and crabbiness, the mother sought medical care for her daughter. Physical examination revealed generalized irritability, normal vital signs with no respiratory distress or cyanosis. On close inspection of the oral cavity, hundreds of adherent 2-4 mm dark hair-like structures laced the buccal mucosa and tongue. Flexible laryngoscopy, chest and neck x-rays were all unremarkable. Direct laryngoscopy, bronchoscopy, and esophagoscopy showed no evidence of foreign body except the findings in the oral cavity described previously. Attempt at removal of the hair-like structures with irrigation, suction and brushing proved unsuccessful. The patient did well postoperatively and conservative measures lead to resolution of symptoms over 48 hours. Subsequent analysis of the foreign body substance identified the material as a hickory tussock moth cocoon.

With unusual foreign object ingestion, careful history taking and physical examination can lead to appropriate conservative treatment in the pediatric population.

#128

Flexible Endoscopic Removal of a Hypopharyngeal Foreign Body in a Difficult Airway

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Rigid instrumentation is the primary means by which removal of foreign bodies in the upper aerodigestive tract is accomplished. We present a case of removal of an unsuspected hypopharyngeal foreign body in a patient presenting to the operating room for vocal fold injection, in whom rigid instrumentation could not be established.

A 27 year old male presented to our clinic for evaluation of worsening of long-standing dysphonia. His history was significant for neurofibromatosis type II (NF-II), for which he had undergone resection of multiple intracranial and cervical spinal tumors as well as radiation therapy. He reported a long-history of right vocal fold paralysis and a prior type I thyroplasty complicated by implant extrusion. His baseline vocal complaints had significantly worsened in the weeks prior to presentation, as had symptoms of dysphagia and velopharyngeal insufficiency.

Examination confirmed the diagnosis of right vocal fold paralysis, and was additionally remarkable for cervical and mandibular mobility. Due to the patient's comorbid panic disorder, the decision was made to perform vocal fold injection under sedation in the operating room (OR). In the OR, flexible fiberoptic examination of the larynx identified a foreign body in the postcricoid hypopharynx. Fiberoptic intubation was then performed to protect the airway. Direct access to the hypopharynx was not possible due to the limited mandibular and cervical spine mobility. Removal of the foreign body was accomplished via introduction of a urologic stone retrieval basket through the flexible scope (Boston Scientific, Natick, MA). Successful vocal fold injection was then performed uneventfully.

#129

Multiple Nasal Foreign Bodies in a Developmentally Delayed Child

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Madison, WI

14 year old boy with cleft palate and developmental delay presented for routine follow-up in craniofacial anomalies clinic with a several week history of foul-smelling left nasal discharge, nasal congestion and snoring. His past history was significant for nasal foreign bodies (2 pennies and section of pink plastic straw) removed from the left nasal cavity by his mother, a dental hygienist, 17 months earlier.

Physical exam showed a cooperative boy with mucus in the left nasal cavity. The nasal septum was significantly deviated to the right. The remainder of the head and neck exam was non-contributory.

The left nasal cavity was suctioned. Under direct visualization and headlight illumination, several foreign bodies were removed individually from the left nasal cavity using a Hartmann forceps. They included a metal upholstery button, 2 wooden sections of a pencil, a metal flower-shaped earring and a cotton-tipped applicator. All items were encrusted in black debris. Upon removal of the cotton-tipped applicator, brisk nasal bleeding was encountered. This responded to direct pressure and temporary packing of oxymetazoline-soaked pledgets into the nasal cavity.

Once the bleeding was controlled, granulation tissue was visible within the nasal cavity with no additional obvious foreign bodies.

The child was treated with nasal steroid spray and taken to the operating room 6 days later for examination under anesthesia. At that time the granulation tissue had completely resolved and no further foreign bodies or scarring were identified on endoscopic examination. The foul odor and snoring had resolved.

#130

Management of an Esophageal Steak Bone

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Purpose: Esophageal foreign bodies may be difficult to manage when large in size or extra-luminal. We present the difficult case of a 62 year old female with severe Alzheimer's disease and a diet restricted to soft foods who presented with a five day history of dysphagia and was diagnosed on her third trip to the Emergency Department with a bony esophageal foreign body.

Methods: Attempts made with a Weerda laryngoscope, graspers, and esophageal dilation balloons distal to the foreign body were unsuccessful. A Dedo laryngoscope provided adequate exposure and eventually a spoon toothed grasper from a laparoscopic cholecystectomy tray and gentle neck massage allowed delivery of the foreign body.

Results: A four centimeter spiculated T-bone steak bone was removed intact from the esophagus and flexible esophagoscopy showed no evidence of perforation.

Conclusion: Creativity is frequently required for difficult and dangerous esophageal foreign bodies. Bony objects are most effectively removed using toothed graspers.

#131

Traumatic Endolaryngeal Avulsion Without Fracture

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Blunt laryngeal trauma is most often associated with laryngeal fracture. The following case demonstrates significant laryngeal injury without laryngeal fracture. This rare entity is discussed with initial assessment, conservative management, and functional outcome.

A 15 year-old male presented to the emergency department with hoarseness and hemoptysis after blunt trauma to the anterior neck during a bicycle accident. Initial assessment revealed no other significant injuries.

Clinical evaluation including physical examination, flexible laryngoscopy and CT imaging of the neck revealed significant endolaryngeal injury.

Findings included paraglottic hematoma, avulsion of the paraglottic tissue from the inner thyroid lamina, air in the endolaryngeal and cervical soft tissues, and intact vocal fold mobility. Despite these significant soft tissue injuries there were no identifiable fractures of the laryngeal skeleton.

We describe the conservative management of this patient including ICU monitoring, and operative laryngoscopy. This case highlights the potential severity of endolaryngeal injury, which can be present without laryngeal fracture after blunt trauma to the neck.

#132

Death By Button Battery: Could We Have Done Better?

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Purpose: To describe our management of an esophageal foreign body causing exsanguinating hemorrhage, why we failed, and how others might be saved.

Design: Descriptive clinico-pathological study.

Methods: We describe the clinical presentation of a 2-year-old boy with an erosive aortoesophageal fistula caused by a 21 mm button battery. Emergency management and autopsy findings are described. We reviewed the world's literature to better understand the local corrosive effects of button batteries in animal models and to search for a better algorithm for the control of aortoesophageal fistulae.

Results: Aortoesophageal fistulae occur most commonly as sequelae of expanding thoracic aneurysms. Malignant neoplasms, gastroesophageal reflux and esophageal foreign bodies (especially fish bones) may result in abnormal communication between the aorta and esophagus. Until the 1980s, these lesions were 100% fatal. Intrathoracic vascular control of the aorta, often facilitated by hypothermic cardiopulmonary bypass has permitted reconstruction of the aorta and esophagus in a few rare cases.

Alkaline containing button batteries can cause visceral erosion through a combination of electrical energy, physical pressure and local leakage of concentrated caustic agents. Rapid removal of ingested batteries minimizes injury. As batteries larger than 15 mm are more likely to lodge in the thoracic esophagus, there is a movement in the public health community to ban large disc batteries from the market.

Conclusion: High clinical suspicion, rapid correct management and luck have led to occasion survival in patients with aortoesophageal fistula. Large disk batteries are more likely to lodge in the esophagus and to cause injury.

**Endoscopic Photocoagulation Therapy for
Pharyngolaryngeal Hemangiomas Using KTP Laser**

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Hemangiomas are benign lesions with thin, fragile mucosa overlying vascular stroma. Hemangioma often manifests as subglottic lesion in infant, but adult hemangioma is rare in pharyngolaryngeal region. The treatment modality varies including open surgery and endoscopic surgery, and intraoperative bleeding is often troublesome. Angiolytic laser such as KTP laser enables photocoagulation for such hemorrhagic lesions without bleed. We demonstrate here our case series of adult pharyngolaryngeal hemangiomas treated with KTP laser. Seven adult patients with pharyngolaryngeal hemangiomas were treated with KTP laser set at a low power of 1.5 W in continuous mode. Photocoagulation was easily performed for shallow lesions. In case with bulky hemangiomas, laser irradiation resulted in photocoagulation of the surface only. In such cases post-photocoagulated crust was scraped out, and then the laser was repeatedly delivered until no remnant tumor was seen. The procedure was performed under topical anesthesia in office for one case with limited lesion using flexible endoscopy. The lesions were well controlled in all cases with no major complication. Photocoagulation using KTP laser has proved to be feasible and safe for the treatment of pharyngolaryngeal hemangiomas.

#134

Balloon-assisted Removal of Obstructing Bronchial Granuloma

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Purpose: To report balloon assisted removal of an obstructing pedunculated granuloma at the orifice of the anterior branch of the right superior lobe of a 2 year old child and to review safety and efficacy of endobronchial balloon dilatation.

Design And Method Of Study And Analysis: Case report and review of the literature.

Summary of results: A two-year old male presented with recurrent right-upper lobe pneumonia. Flexible bronchoscopy revealed a possible stenosis or web partially obstructing the right superior lobe orifice and Histoplasmosis infection. After medical treatment, rigid bronchoscopy was performed. The opening of the anterior segment of the right superior lobe was a pinhole. A 0.2cc Fogerty balloon was inserted into the narrowed lumen, inflated, and then withdrawn. This dislodged and avulsed a 3x3 mm mass that had been pedicled on the anterior wall of the orifice and had extended into it. The mass was retrieved by suction. Pathologic diagnosis was chronic granuloma with calcifications. Review of the literature did not reveal a report of such a lesion at this location in the absence of foreign body history. Balloon assisted dilation is not often used in distal airways and a technique for tissue removal has not been described to our knowledge. It is commonly performed with fluoroscopic control. In recent years its use has been reported with endoscopic visualization alone. Superficial laceration is commonly encountered. Pneumothorax or pneumomediastinum due to transbronchial rupture is infrequent.

Conclusions: Obstructing bronchiolar granulomas may be underdiagnosed, as this granuloma was not detected by standard bronchoscopic techniques. Balloon dilatation and avulsion of obstructing masses is a useful approach for management of obstructing airway lesions

#135

**Variation in Transforming Growth Factor Beta
Isoform 1-3 Expression Following Vocal Fold Injury
In a Rat Model**

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Kyoto, Japan

The transforming growth factor beta (TGF-beta) superfamily of cytokines serves multiple functions in nearly all aspects of tissue repair including cell growth, differentiation, extracellular matrix formation and the migration of monocytes, lymphocytes, neutrophils and fibroblasts. The three isoforms of TGF-beta found in humans (1, 2, and 3) vary in their levels of expression, location and function at sites of wound healing. Based on cutaneous data, it has been hypothesized that downregulation of TGF-beta 1 and 2, alongside upregulation of TGF beta 3, may result in improved scar outcomes. The purpose of this study was to examine the distribution of TGF-beta isoforms 1-3 following vocal fold injury, using an established rat scar model. Unilateral vocal fold injuries were created, with each contralateral vocal fold serving as a control. Immunohistochemistry was employed to localize TGF-beta isoform distribution within the injured vocal fold, and quantitative real time polymerase chain reaction (RT-PCR) was employed to determine the relative mRNA expression of the three isoforms. Data were collected during the first 7 days post injury. The three TGF-beta isoforms demonstrated differential expression relative to each other and across time points post injury. These results suggest that TGF-beta isoforms 1-3 may hold specific functions and play distinct roles within the overall vocal fold wound healing cascade.

#136

**Predictive Factors For Successful Endoscopic
Zenker's Diverticulum Repair**

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Background: Endoscopic Zenker's diverticulum repair allows for decreased surgical time, shorter hospital stays, and a faster return to normal diet as compared to an open repair. Adequate surgical exposure can not be obtained in up to 30% of patients and thus a method of accurately predicting which patients will fail this approach would be highly valuable with respect to surgical planning and cost containment.

Methods: Prospective, IRB approved study of 10 patients undergoing attempt at endoscopic Zenker's diverticulum repair by one of three surgeons. 10 preoperative anatomic data points were collected and correlated to successful endoscopic exposure.

Results: Exposure was unsuccessful in 20% of patients. Factors which correlated with failure included passive neck extension less than 40 degrees, Body Mass Index greater than 25, and a Mallampati Score greater than 2. These results were not significant.

Conclusions: Endoscopic Zenker's diverticulum repair is generally preferable to an open repair however patients who are overweight, have poor neck extension, and high Mallampati scores may be poor candidates for this approach. Further studies with larger patient populations are needed to further elucidate these findings.

#172

Thyroid Surgery Practice-Building in an Academic Environment

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Objective: To define elements essential to building a high-volume, referral-based head and neck endocrine center.

Design: Retrospective analysis of referral patterns and surgical volumes at an academic medical center.

Methods: Specific factors contributing to program-building were investigated. Outcome measures included surgical volumes, geographic origin of referrals, and prevalence of internet referrals.

Results: Thyroidectomy annual surgical volumes at the primary institution (all surgeons included) increased over a 4-year period by 38% from 78 to 108. The proportion of referrals coming from outside of the institution grew from 31.6% to 65.5%. Individuals who self-referred by internet contact increased from zero to 10 per year. Overall departmental thyroidectomy volumes (at all operative venues) increased by 241% from 69 to 166. The factors that were thought to contribute most to an increased surgical volume were: public thyroid screening events, public symposia, same-day availability and one-stop shopping on-line accessibility, state-of-the-art offerings (IOPH, LNM, endoscopic surgery, outpatient surgery, office ultrasound), and inauguration of a multidisciplinary thyroid center.

Conclusions: While the nature of practice dynamics prevents meaningful analysis to determine the precise origin of growth, several specific measures were felt to be critical to achieving clinical expansion, including formation and institutional recognition of a thyroid center of excellence.

Endoscopic Management of a Penetrating Laryngeal Foreign Body.

Chad Afman

Considered alone, pediatric penetrating neck trauma and airway foreign bodies each present their own unique challenges and potential for life threatening complications. Treatment algorithms exist for each, but when the two exist in the same patient, diagnostic and therapeutic challenges must be recognized and dealt with in a systematic and organized fashion in order to provide the best possible outcome. In this case report, the management of a level II penetrating neck trauma resulting in a laryngeal foreign body is described in a 9 year old female. Radiographic, endoscopic, and open surgical techniques were used to deliver this patient's care.

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