

The Program

of

The Eighty-Ninth Annual Meeting

of

**THE AMERICAN
BRONCHO-ESOPHAGOLOGICAL
ASSOCIATION**

**Thursday and Friday
May 28-29, 2009**

**J. W. Marriott Desert Ridge
Phoenix, Arizona**



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 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.



**American College of Surgeons
Division of Education**

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

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Michael Setzen, MD – Manhasset, NY
Glenn Isaacson, MD – Philadelphia, PA

12:30 PM

Thursday, 28 May 2009

**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

Francis L. McNellis, MD

Richard A. Rasmussen, MD

In Memoriam

Howard A. Andersen, MD

Melvin R. Link, MD

Charles Morgan Norris, MD

Election of Nominating Committee

Appointment of Auditing Committee

New Business

Old Business

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

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1917–2008**

1917	Chevalier L. Jackson, MD
1918	Hubert Arrowsmith, MD
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1932	Richard McKinney, MD
1933	Waitmam F. Zinn, MD
1934	Henry Hall Forbes, MD
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1936	Joseph C. Beck, MD
1937	Gordon Berry, MD
1938	John Kernan, MD
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1940	Gabriel Tucker, MD
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1943	Robert L. Morehead, MD
1944	Carlos E. Pitkin, MD
1945	Carlos E. Pitkin, MD
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1948	Paul H. Holinger, MD
1949	Leroy A. Schall, MD
1950	Chevalier L. Jackson, MD
1951	Herman J. Moersch, MD
1952	Fred W. Dixon, MD
1953	Edwin N. Broyles, MD
1954	Clyde A. Heatly, MD
1955	Daniel S. Cuning, MD
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1957	Walter B. Hoover, MD
1958	Francis W. Davidson, MD

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

PRESIDENTS

(Continued)

1959	Verling K. Hart, MD
1960	F. Johnson Putney, MD
1961	Alden H. Miller, MD
1962	Joseph P. Atkins, MD
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1964	Charles N. Norris, MD
1965	Daniel C. Baker, Jr., MD
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1967	Francis E. LeJeune, MD
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1986	David R. Sanderson, MD
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1988	Robert W. Cantrell, MD
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1991	Charles W. Cummings, MD
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1993	Haskins K. Kashima, MD
1994	Eiji Yanagisawa, MD
1995	Robert H. Ossoff, DMD, MD
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2003 Charles N. Ford, MD
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2007 Clarence T. Sasaki, MD
2008 Jamie A. Koufman, MD

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

1:00 PM

Thursday, 28 May 2009

PRESIDENTIAL WELCOME

JAMIE KOUFMAN, MD

New York, NY

PROGRAM OVERVIEW

DANA THOMPSON, MD
Rochester, MN

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

1:15 PM

Thursday, 28 May 2009

PRESIDENTIAL CITATIONS HONORING

ELLEN DEUTSCH, MD

Wilmington, DE

GREGORY POSTMA, MD

Augusta, GA

Presented by

Jamie Koufman, MD

1:20 PM

Thursday, 28 May 2009

**INTRODUCTION OF
GUEST OF HONOR**

Dana Thompson, MD

GUEST OF HONOR

JAMES PEPA

Newark, NJ

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

GUESTS OF HONOR
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1951	Fernand Eeman, MD – Ghent, Belgium
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1962	Edwin N. Broyles, MD – Baltimore, MD
1963	Sam E. Roberts, MD – Kansas City, MO
1964	Lyman Richards, MD – Wellesley Hills, MA
1965	Berling K. Hart, MD – Charlotte, NC
1966	Julius W. McCall, MD – Cleveland, OH
1967	Francis W. Davidson, MD – Danville, PA
1968	Dean M. Lierle, MD – Iowa City, IA
1969	Leroy A. Schall, MD – Barnstable, MA
1970	Herman J. Moersch, MD – Rochester, MD
1971	Louis Clerf, MD – Saint Petersburg, FL
1972	Joseph P. Atkins, MD – Philadelphia, PA
1973	Ricardo T. Acuna – Mexico City, Mexico
1974	Paul H. Holinger, MD – Chicago, IL
1975	Arthur M. Olsen, MD – Rochester, MN
1976	Francis LeJeune, MD – New Orleans, LA
1977	Alden H. Miller, MD – Los Angeles, CA
1978	Charles Norris, MD – Philadelphia, PA
1979	Charles F. Ferguson, MD – Osterville, OH
1980	Emily Lois Van Loon, MD – Philadelphia, PA
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1982	Frank D. Lathrop, MD – Pittsford, VT
1983	John E. Bordley, MD – Baltimore, MD
1984	Gabriel F. Tucker, MD – Chicago, IL
1985	Stanton A. Friedburg, MD – Chicago, IL
1986	F. Johnson Putney, MD – Charleston, SC
1987	Howard A. Anderson, MD – Rochester, MN
1988	John Paul Frazer, MD – Rochester, MN
1989	Paul H. Ward, MD – Los Angeles, CA
1990	D. Thane R. Cody, MD – Jacksonville, FL
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1992	Bruce Benjamin, MD – Sydney, Australia
1993	David R. Sanderson, MD – Scottsdale, AZ
1994	Michael E. Johns, MD – Baltimore, MD
1995	John A. Kirchner, MD – Woodbridge, CT
1996	Robert W. Cantrell, MD – Charlottesville, VA
1997	Eiji Yanagisawa, MD – New Haven, CT
1998	Lauren Holinger, MD – Chicago, IL
1999	William R. Hudson, MD – Durham, NC
2000	Robert H. Ossoff, DMD, MD – Nashville, TN
2001	Trevor J. I. McGill, MD – Boston, MA
2002	Flavio Aprigliano, MD – Rio de Janeiro, Brazil
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2004	Minoru Hirano, M.D. – Kurume, Japan
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2007 Frank W. Lucente, MD – Brooklyn, NY
2008 Marvin P. Fried, MD – Bronx,
2008 Marshall Strome, MD – Cleveland, OH
2009 James Pepa – Newark, NJ

SPECIAL REPORT

Martin Birchall, MD

London, U.K.

**Tracheal Transplantation:
Still in the First Year**

DISCUSSION

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

*** Indicates non-member**

Thursday, 28 May 2009

SESSION 1

TISSUE ENGINEERING I: TRACHEA

Moderator: Martin Birchall, MD
London, U.K.

1:36 PM

Thursday, 28 May 2009

**Xenogeneic Hydrated Decellularized Tracheal
Matrix as a Scaffold for Tracheal
Reconstruction**

Thomas W. Gilbert, PhD*

Sebastien Gilbert, MD*

Nathaniel Remlinger, BS*

Caitlin C. Czajka *

Donna Beer Stolz *

Stephen F. Badylak *

Pittsburgh, PA

Introduction: Regenerative medicine approaches, such as extracellular matrix (ECM) scaffold technology, have been used to reconstruct various tissues in pre-clinical studies and in clinical applications. The present study has investigated the remodeling of porcine hydrated decellularized tracheal matrix (HDTM) in canine models.

Methods: Full circumferential scaffolds of HDTM were implanted heterotopically in both the neck beneath strap muscles adjacent to the native trachea and wrapped with omentum in the abdominal cavity. Specimens were harvested at 2 and 8 weeks for histologic analysis and mechanical testing. Patches of DTM (2 cm x 3 cm) were used for patch tracheoplasty of a ventral tracheal defect (1 cm x 2 cm). Tissue was harvested after 8 and 26 weeks for standard histologic analysis, immunostaining (acetylated tubulin and F-actin), and scanning electron microscopy.

Results: Histologic examination of the heterotopic implants showed infiltration of the scaffold with mononuclear cells and new blood vessels. The cartilage rings were still present regardless of the implant site and maintained mechanical integrity. Specimens from the patch tracheoplasty model have been evaluated at two months for remodeling. The specimens showed maintenance of the cartilage rings. The specimens showed evidence of a pseudostratified columnar epithelium with secretory cells. The presence of microvilli and cilia were confirmed with immunofluorescent staining and with SEM. Cilia were observed primarily at the periphery of the graft, while microvilli were uniformly present across the surface.

Conclusion: A hydrated form of DTM with preserved cartilage integrity shows promise for an off-the-shelf functional tracheal replacement.

1:42PM

Thursday, 28 May 2009

**Tissue Engineered Approach for Stenosis
of the Trachea and/or the Cricoid**

Shin-ichi Kanemaru. MD, PhD*

Shigeru Hirano MD, PhD

Ryo Asato MD*

Masaru Yamashita M.D. PhD*

Hiroo Umeda MD*

Koichi Omori MD, PhD

Atsushi Suehiro MD

Tatsuo Nakamura MD, PhD*

Kyoto, Japan

Aim: We previously reported that the artificial Trachea (AT) was useful material for implantation to the tracheal defect after resection of cancer. There are many causes for stenosis of the respiratory tract. Stenosis of the trachea and/or the cricoid (STC) is very difficult to treat among them. The aim of this study is to estimate AT for the treatment of STC.

Study Design: Clinical study

Materials and Methods: AT was composed of spiral stent and Marlex mesh made of polypropylene and was covered by collagen sponge made from porcine skin. Three patients with STC were treated by this tissue engineering method. All of them had suffered from STC that was caused by one burn contracture and two long end tracheal intubations. They underwent staged operations. At the 1st staged operation, after resection of the stenotic regions, the edge of tracheal cartilage was sutured to the edge of the skin. The tracheal lumen was exposed to outside and T-shaped canula was inserted in this large tracheostoma. Two months after the 1st operation, after separation of the trachea and skin, trimmed AT with venous blood and basic fibroblast growth factor was implanted to the defect of cartilage.

Results: All patients were able to breathe easily and had no discomfort in daily activity. We also observed enough air space of the trachea and the cricoid by the image of CT and fiber scope, 2 months after the 2nd operation.

Conclusion: This new regenerative therapy showed a great potential for the treatment of STC.

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STEVEN D. GRAY RESIDENT AWARD

The Steven Dean Gray Resident Award was established as part of the continuing legacy of Dr. Gray in order to recognize excellence in resident research in both laryngology and bronchoesophagology.

**RECIPIENTS OF THE
STEVEN D. GRAY RESIDENT AWARD**

2003	Sarah Hodges, MD Randal Leung, MBBS
2004	Seth Cohen, MD Jonathan P. Lindman, MD
2005	Grace SY Yang, MD
2006	None
2007	Tsunehisa Ohno, MD
2008	J. Matthew Dickson, MD
2009	Wataru Okano, MD

1:48 PM

Thursday, 28 May 2009

STEVEN D. GRAY RESIDENT AWARD

Presented by Jamie Koufman, MD

Wataru Okano, MD*

**Bioengineered Trachea with Fibroblasts
in Rabbit Model**

Wataru Okano, MD*

Yukio Nomoto, MD*

Teruhisa Suzuki, MD*

Yasuhiro Tada, MD*

Masao Miyake, PhD*

Koichi Omori MD

Fukushima, Japan

Ken Kobayashi, PhD*

Keio, Japan

Tatsuo Nakamura MD*

Kyoto, Japan

Purpose: Although our group had almost successful results of clinical application of the tracheal prosthesis, delayed epithelial regeneration on the luminal surface of the prosthesis is one of the problems. In our previous studies using rats, it is indicated that tracheal fibroblasts accelerated proliferation and differentiation of the tracheal epithelium in vitro and in vivo. The purpose of this study is to evaluate the effects of bioengineered trachea with fibroblasts on epithelial regeneration of larger tracheal defects using rabbit.

Methods: We developed the bioengineered scaffolds which consisted of polypropylene mesh, collagen sponge and collagenous gel with fibroblasts. The bioengineered scaffold was transplanted in the tracheal defect of 12 rabbits, whereas the scaffold without fibroblasts was transplanted in that of 12 rabbits for control. The regenerated epithelium on the grafts was histologically examined with light microscopy and scanning electron microscopy.

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Results: Seven days after transplantation, in bioengineered model, stratified squamous epithelium was observed on most of the surface of the defects, while columnar ciliated epithelium was observed on a small part of the surface. However, in control model, no epithelial regeneration was observed. Fourteen days after transplantation, in bioengineered model, columnar ciliated epithelium was observed on most of the surface of the defects. The average thickness of regenerated epithelium in bioengineered model was significantly larger than that in control model.

Conclusions: This study indicated that bioengineered trachea with fibroblasts had the stimulatory effects to hasten regeneration of normalized epithelium in larger tracheal defect.

1:54 PM

Thursday, 28 May 2009

**Bioabsorbable Drug Eluting Stents for the
Treatment of Tracheal Stenosis in an Animal Model**

Christopher A. Sullivan, MD*

Mike Baskin, BS*

Scott Hardison, BS*

Winston-Salem, NC

Purpose: To study the feasibility of a drug eluting bioabsorbable tracheal stent for the treatment of tracheal stenosis.

Design & Methods: A rat model of tracheal scarring was developed. A bioabsorbable tracheal stent containing a type I collagen gene inhibitor (CGI) was fabricated. In-vitro analyses of drug elution and biodegradation were carried out. Rats were randomly divided into no treatment, biodegradable stent placement and drug-eluting biodegradable stent placement groups. Tracheal wounds were created and animals were treated according to randomization. At specified time points, animals were sacrificed and trachea and lung tissue were harvested. Tissue was analyzed grossly and histologically for scar tissue formation, fibroblast activity and re-mucosalization of tracheal wounds.

Summary of Results: In vitro data showed drug was released from the tracheal stents into solution. 2/21 animals died due to airway obstruction from stent migration. All drug eluting stents dissolved between 5 and 14 days. Non-drug eluting stents did not degrade completely in all cases. Drug eluting stents showed prevention of scar tissue formation and complete tracheal reepithelialization with normal respiratory mucosa. No treatment and non-drug eluting stent animals formed scar tissue and did not re-epithelialize at the site of injury. Fibroblast activity was lowest in drug-eluting stent treated animals.

Conclusions: Bioabsorbable CGI-eluting tracheal stents are well tolerated in a rat model, prevent tracheal scar tissue formation and promote re-mucosalization with normal respiratory epithelium. These data support the feasibility of topical CGI drug delivery via a bioabsorbable tracheal stent for the treatment of tracheal stenosis.

DISCUSSION

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Thursday, 28 May 2009

SESSION 2

VAGAL FUNCTION AND DYSFUNCTION

Moderator: Yolanda Heman-Ackah, MD

Philadelphia, PA

2:04 PM

Thursday, 28 May 2009

**Management of Recurrent Laryngeal Sensory
Neuropathic Symptoms**

Byron K Norris, MD*

John M. Schweinfurth, MD

Jackson, MS

The purpose of this study is to identify management strategies for the treatment of upper respiratory symptoms stemming recurrent laryngeal nerve dysfunction.

Study Design and Methods: A cohort of individuals with a known diagnosis of true vocal cord paralysis and additional symptoms of sensory neuropathy with persistent dysphonia, laryngeal spasm, and/or chronic cough were followed for symptomatic improvement after initiating treatment with a neuromodulator (amitriptyline or gabapentin). Patients were followed monthly with serial laryngoscopy. Treatment outcome was defined by improvement or resolution of symptoms on a self reported outcome scale.

Summary of Results: Nine patients were identified with persistent vocal cord paralysis and neuropathic symptoms. Of these, 78% had symptoms related to chronic cough treated with neuromodulator therapy over a mean follow-up of 13 months. The median dose of amitriptyline was 25 mg daily and gabapentin was 300 mg three times daily. The mean time after the initiation of therapy to complete response was 2 months.

Conclusion: Patients with suspected recurrent laryngeal neuropathy frequently respond to neuromodulator therapy. The addition of reflux precautions and acid suppression therapy is helpful in cases of chronic and recurrent laryngospasm. We discuss the association of recurrent laryngeal nerve synkinesis and sensory neuropathy to chronic cough and explore the role of pharmacotherapy in the management of this disorder.

2:10 PM

Thursday, 28 May 2009

**Vagal Sensorimotor Function as it Relates to the
Cricopharyngeal Muscle [CPM] and the Upper
Esophageal Sphincter [UES]**

Joel H. Blumin, MD
Safwan s. Jaradeh, MD*
Robert J. Toohill, MD
Milwaukee, WI

Objectives: The sensorimotor innervation of the UES has not been fully defined. Previous suggestions are the recurrent laryngeal nerve [RLN], superior laryngeal nerve, pharyngeal plexus[PP] or cervical sympathetic chain. The purpose of this study is to present neuroanatomical dissections, clinical data and basic studies that indicate the SLN as the probable source of the sensorimotor innervation to the UES.

Methods: Review of recent studies detail neuroanatomical histological, video fluoroscopic, electromyographic [EMG] findings and sensorimotor innervation of the UES.

Results: 35 patients underwent CPM partial myectomy and had histological study of the muscle. 15 of these underwent detailed video fluoroscopic procedures in the lateral and anterior-posterior [AP] view. 59 patients had CPM EMG evaluation [18 bilateral] for a total of 77 studies. 31 myectomy specimens from histological study showed 22 with neurogenic deterioration, 5 with predominately neurogenic changes with some element of myopathy and 4 had myopathic changes only. The 15 that had vide of fluoroscopic study all demonstrated CPM dysfunction predominantly in the AP view. EMG indicated 19 CPMs to be normal, 43 had axonal degeneration without further denervation and 15 had ongoing active denervation. Simultaneous inferior constrictor and laryngeal EMG studies were compared to CPM findings. The strongest correlation was with the inferior constrictor followed by the cricothyroid and the least was the thyroarytenoid. Anatomical dissections demonstrated a significant branch of the external SLN that proceeds to the CPM.

Conclusions: Vagal sensoromotor innervation via the SLN very likely provides the UES with the vital functions that are necessary for smooth normal deglutition.

2:16 PM

Thursday, 28 May 2009

**Local Neurotoxins for Prevention of Laryngeal
Synkinesis after Recurrent Laryngeal Nerve Injury**

Bryan R. McRae, MD*

John C. Kincaid, MD*

Kelly K. Hiatt, MD, PhD*

Bloomington, IN

Jan F. Hawkins, DVM*

West Lafayette, IN

Stacey L. Halum, MD

Bloomington, IN

Background: Persistent vocal fold immobility after recurrent laryngeal nerve (RLN) injury is not due to an absence of reinnervation, but is instead due to synkinesis from spontaneous aberrant reinnervation that characteristically ensues after RLN injury. This study aimed to administer local neurotoxins to the laryngeal adductor muscles after RLN injury, to determine whether aberrant reinnervation could be selectively inhibited.

Study Design: Animal experiment.

Methods: Unilateral RLN transection was performed in 24 male Fischer 344 rats. Three weeks later, the denervated laryngeal adductor complex was injected with 4 μ l of phenol (50%), high (25 μ g/ μ l) or low dose (0.5 μ g/ μ l) vincristine (VNC), or saline. One month after the injection, animal larynges were evaluated under anesthesia with videolaryngoscopy and laryngeal electromyography (LEMG). Larynges from euthanized animals were then harvested, sectioned, and analyzed via immunohistochemistry for the presence of reinnervation based on nerve to motor endplate contact.

Results: One phenol and three high-dose VNC animals died of toxicity-related complications prior to completion of the study. Videolaryngoscopy suggested increased lateralization of the immobile vocal fold in neurotoxin-treated animals. Impaired spontaneous reinnervation of the adductor complex was noted in all surviving animals. One phenol and one low-dose VNC animal demonstrated only single motor units (+1 recruitment) on LEMG; the others demonstrated only insertional activity and fibrillations (no motor units/recruitment). Spontaneous abductor (PCA) reinnervation was not affected by adductor neurotoxin injection. Immunohistochemistry findings were supportive of LEMG results.

Conclusions: Low-dose vincristine injections appear safe and effective in selectively inhibiting spontaneous reinnervation after RLN injury in an animal model.

2:22 PM

Thursday, 28 May 2009

**Paced Glottic Closure for Controlling Aspiration
Pneumonia in 5 Patients with Neurological Deficits
of Various Etiologies**

Michael Broniatowski, MD

Nina S More, MS, JMS*

Sharon Grundfest-Broniatowski, MD*

Harvey M Tucker, MD

Ellen Lancaster, MA, CCC-SLP*

Kate Krival, PhD, CCC-SLP*

Aaron J Hadley, BE*

Dustin J Tyler, PhD*

Cleveland, OH

Purpose of the Study: To determine whether paced vocal fold adduction can check aspiration in patients with various neurological conditions.

Design and Method of Study and Analysis: Five patients with fluoroscopically documented aspiration and repeated pneumonias were enrolled. Two previously reported patients with hemispheric stroke were compared to three additional subjects with brainstem stroke (BS), cerebral palsy (CP) and multiple sclerosis (MS). A modified Finetech-Brindey stimulator was implanted subcutaneously and linked to the ipsilateral recurrent laryngeal nerve via perineural electrodes. Vocal fold adduction and glottic closure were effected with pulse trains (42 Hz, 1.2 mA, 188-560 μ sec) and recorded with Enhanced Image J $\hat{\text{A}}$. Fluoroscopy results with and without stimulation were assessed by a blinded reviewer. Pneumonia rates were compared before, after and during the 6-12 months enrollment periods.

Summary of Results: There was statistically significant vocal fold adduction ($p < .05$) for all patients, further verified with bolus arrest ($p < .05$ for thin and thick liquids). Pneumonia was prevented in four of the five patients during enrollment. The fifth patient with BS was unable to completely seal the glottis and open the cricopharynx.

Conclusions: Vocal fold pacing for aspiration pneumonia from a variety of neurological insults appears appropriate as long as the glottis can be sealed. It is not sufficient when the cricopharynx must be independently opened.

DISCUSSION

BREAK WITH EXHIBITORS

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

3:00 PM

Thursday, 28 May 2009

**INTRODUCTION OF THE CHEVALIER
JACKSON LECTURER**

Presenter: JAMIE KOUFMAN, MD

3:02 PM

Thursday, 28 May 2009

CHEVALIER JACKSON LECTURE

CLARENCE T. SASAKI, MD

New Haven, CT

**THE VAGUS NERVE: DISPELLING
THE ANIMAL SPIRITS**

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Thursday, 28 May 2009

SESSION 3

TISSUE ENGINEERING 2: LARYNX

Moderator: Gresham Richter, MD
Little Rock, AR

3:29 PM

Thursday, 28 May 2009

Collagen Sponge as a Cell Transplantation Scaffold for the Treatment of Vocal Fold Scarring: An In Vitro Preliminary Study

Satoshi Ohno, MD*

Shigeru Hirano, MD, PhD

Ichiro Tateya, MD, PhD

Shin-ichi Kanemaru, MD, PhD*

Juichi Ito, MD, PhD*

Kyoto, Japan

Purpose of the Study: Vocal fold scarring remains a therapeutic challenge. To replace the scar tissue with pliable mucosa, our group have previously reported the efficacy of implantation of bone marrow derived stromal cells (BSCs) containing mesenchymal stem cells into a scarred vocal fold. An appropriate scaffold is necessary to increase the survival rate of the implanted cells, leading to optimal results. Terudermis® is collagen sponge derived from calf dermis. It has many large pores to permit cell entry and is degraded in vivo, which suggests this material to be a good candidate of scaffold for cell transplantation. In this study we investigated the efficacy of Terudermis® as a scaffold in vitro.

Design and Method of Study and Analysis: After harvesting bone marrow from the femora of GFP (Green Fluorescent Protein) transgenic mouse, adherent cells were cultured and selectively amplified. BSCs (2×10^5 cells) were seeded onto Terudermis® (5mm—5mm) and incubated for 3 days in Dulbecco's Modified Eagle Medium containing 10% fetal bovine serum and an antibiotic-antimycotic mixture.

Summary of Results: BSCs adhered to Terudermis® and proliferated 3-dimensionally. Some adhered cells were stained with vimentin, indicating that these cells were mesodermal cells.

Conclusions: The results indicate that Terudermis® has a potential as a cell transplantation scaffold for the treatment of scarred vocal folds.

3:35 PM

Thursday, 28 May 2009

**Regenerative Effect of Basic Fibroblast Growth
Factor on Extracellular Matrix in Aged Rat
Vocal Folds**

Tsunehisu Ohno, MD*

Mi Jin Yoo, BA*

Erik R. Swanson, MD*

Robert H. Ossoff, DMD, MD

Bernard Rousseau, PhD*

Nashville, TN

Shigeru Hirano, MD, PhD

Kyoto, Japan

Age-related changes of the vocal fold extracellular matrix (ECM) are associated with histological alterations in the quantity and distribution of ECM components including excessive collagen deposition, thick bundle collagen formation, and reduced hyaluronan (HA). Therapeutic agents that target these underlying changes may have potential utility for regeneration of aged vocal folds. Basic fibroblast growth factor (bFGF) modulates ECM production and stimulates fibroblast proliferation. Our previous studies have revealed increased extracellular HA following administration of bFGF to aged vocal folds. However, the effects of bFGF on short-term changes in gene expression and long-term changes in the deposition of aged vocal folds ECM remain unknown. The purpose of the current study was to investigate the effects of bFGF on gene expression and histology of aged rat vocal folds. Fifteen, 18-month-old, Sprague-Dawley rats received serial treatment 2 times per week for 2 weeks. For gene expression analyses, ten animals received either sham-treatment or bFGF-treatment bilaterally into the vocal fold and were sacrificed 2 weeks after initial treatment. For histological analyses, an additional five animals received either sham- or bFGF treatment into aged vocal folds with the contralateral side serving as control, and were sacrificed 1 month after initial treatment. Results revealed significantly increased matrix metalloproteinase-2, procollagen type I and hyaluronan synthase-2, and -3 gene expression at 2 weeks, and a significant increase in HA deposition in bFGF-treated vocal folds, compared to sham-treated vocal folds, 1 month after treatment. The current study demonstrated regenerative effects of bFGF on ECM in aged rat vocal folds.

3:41 PM

Thursday, 28 May 2009

Laryngeal Regeneration Using Tissue Engineered Technique: In a Canine Model

Yoshiharu Kitani, MD*

Hiroo Umede, MD*

Atsushi Suehiro, MD*

Yo Kishimoto, MD*

Juichi Ito, MD, PhD*

Kyoto, Japan

Shin-ichi Kanemaru MD, PhD*

Osaka, Japan

Purpose: We have previously reported that the polypropylene mesh covered with collagen sponge was very useful material for the regeneration of trachea and cricoid cartilage. The regeneration of larynx using this material was very difficult because of easy infection. To prevent this problem, this scaffold was wrapped with autologous fascia lata. The aim of this study is to regenerate the larynx after partial hemilaryngectomy with this new biomaterial.

Design /Methods: A left partial hemilaryngectomy was performed on 12 adult beagles. They were divided into two groups. The defect size was about 1.8 cm \times 1.0 cm. Both sides of a sheet of polypropylene mesh were coated with 1% or 3% collagen sponges in group I or II, respectively. In group I, this scaffold was wrapped in fascia lata, harvested from left thigh. It was fixed with 3-0 absorbable sutures. And in group II, the defect was covered with fascia in first, and then the scaffold was fixed. Endoscopic examinations were periodically performed. Six months after the treatment, three-dimensional computed tomography was performed for evaluation of level of vocal fold and vibratory examination was also performed with an excised larynx.

Results: In group I, exposure or dislocation of mesh was found in 3 of 6 cases, but in group II, no exposure of mesh was observed. Both morphology and function of vocal fold were better in group II than in group I.

Conclusions: This study suggests that 3% collagen coat-polypropylene mesh, wrapped with autologous fascia, is useful material for laryngeal regeneration.

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THE SEYMOUR COHEN AWARD

Presenter: Jamie Koufman, MD

Recipient:

KIMINORI SATO, MD, PhD

**Expression and Distribution of Hyaluronic Acid
and Cd44 in Unphonated Human Vocal Fold
Mucosa**

Kiminori Sato, MD, PhD

Hirohito Umeno, MD*

Tadashi Nakashima, MD*

Fukuoka, Japan

Satoshi Nonaka, MD*

Yasuaki Harabuchi, MD*

Asahikawa, Japan

Vocal fold stellate cells (VFSCs) in the human maculae flavae (MFe) are inferred to be involved in the metabolism of extracellular matrices (EMs). The MFe are also considered to be an important structure in the growth and development of the human vocal fold mucosae (VFMe). Tension caused by phonation is hypothesized to stimulate VFSCs in the anterior and posterior MFe to accelerate production of EMs. If the hypothesis is fact, some morphologic differences should be detected between VFMe that have been phonated and those that have remained unphonated since birth. Distribution of hyaluronic acid (HA) and expression of CD44 (a cell surface receptor for HA) were examined in VFMe which were unphonated since birth.

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Five VFMe (three adults, two children) which have remained unphonated since birth were investigated. In all cases, VFMe including MFe were hypoplastic and rudimentary. The VFMe did not have a vocal ligament, Reinke's space nor a layered structure, and the lamina propria appeared as a uniform structure. In the children, HA was distributed in the VFMe including MFe. In the adults, there was little HA in the VFMe including MFe. In both groups, VFSCs in the MFe and fibroblasts in the Reinke's space expressed little CD44.

This study has supported the hypothesis that the tensions caused by vocal fold vibration stimulate VFSCs in the MFe to accelerate production of EMs and form the layered structure. Phonation is an important factor in the growth and development of the human VFMe.

3:53 PM

Thursday, 28 May 2009

**ProExc May Be an Important Prognostic
Marker for Laryngeal Dysplasia and
Malignancy**

Naveen Bhandarkar MD*

Odile David, MD, MPH*

H. Steven Sims, MD*

Chicago, IL

Introduction: Recurrent Respiratory Papillomatosis (RRP) is a disease process that creates a significant economic and quality of life burden for patients. Though most cases are benign, degeneration of RRP into squamous cell carcinoma (SCCA) is often catastrophic. So, surveillance for cellular dysplasia that might portend worsening disease is important. HPV creates cellular atypia and cytopathic change, however, and the distinction between viral induced changes and cellular transformation may be difficult. Intracellular protein markers may be useful.

Methods: This was a retrospective study with IRB approval. 31 specimen blocks from 16 patients and 24 surgical procedures were prepared for Topoisomerase alpha and mini-chromosome maintenance protein 2 (ProExc[®]). The strength and localization of ProExc[®] staining as well as the presence of atypia on hematoxylin and eosin staining was recorded for each block with patient information blinded. The data were then cross referenced to the patients.

Results: The nuclei of papilloma specimens stained positive for ProExc[®]. Cells that were read as dysplastic on H&E staining tended to stain more strongly in the nucleus than non-dysplastic cells. Specimens collected from patients with laryngeal squamous cell carcinoma had predictable nuclear staining patterns.

Conclusion: ProExc[®] is expressed in papilloma cells and localization to the nucleus is similar to that reported in cervical epithelium. The pattern of staining for benign laryngeal lesions, RRP and squamous cell carcinoma are distinct. MCM-2 and TOP patterns may be important for treating HPV laryngeal disease.

**Intracellular Distribution and Activity of the
JAK/STAT Components in Respiratory
Papillomatosis**

Andrea F. Lewis, MD*

John Schweinfurth, MD

Steven Bigler, MD*

Holly McIntire, MD*

Todd Spataro, MD*

Jackson, MI

Purpose: To evaluate the activity of signal transducers and activators of transcriptions (STATs) and by Janus kinases (JAK) in recurrent respiratory papillomatosis compared to normal upper respiratory epithelium.

Study Design and Methods: An immunohistochemical survey of Ki67, STAT 1-5 and JAK 1-3 proteins using monoclonal antibodies was performed on papilloma specimens collected over a three year period compared to controls. A minimum of four test runs using known positive and negative controls for each antibody was performed. Specimens were compared based on stain intensity. JAK/STAT indices were correlated with Ki-67 and clinical behavior of the disease using Pearson's correlation.

Summary of Results: Epithelium from a total of 33 individuals followed over a period of 3 years with RRP were examined and compared to that of normal respiratory epithelium. In the experimental specimens, the basal layer had fewer cells staining for JAK3 than the rest of the epithelium regardless of the intensity of the stain and very predominant hollowing out of nuclei in specimens compared to controls. Pearson's correlation of staining intensity revealed Ki67 was negatively correlated with clinical score ($p=0.04$). JAK3 intensity was positively correlated with STAT 6 intensity ($p=0.003$). STAT 2 intensity positively correlated with STAT 5a % ($p=.002$).

Conclusions: The JAK/STAT family and especially JAK3, are integral to humoral immunity and a loss of their function leads to immunodeficiencies in humans. We have discovered several irregularities in the intracellular distribution and activity of these proteins in RRP which may lead to the elucidation of specific susceptibility for the disease.

4:05 PM

Thursday, 28 May 2009

Laryngeal Complications of Flexible Endoscope Channel Disruption

Priya D. Krishna MD*

Melissa McCarty Statham, MD*

Clark A. Rosen, MD

Pittsburgh, PA

Introduction: Endoscope damage can result in exposure of the airway to cleaning solutions such as glutaraldehyde (Cidex), commonly used for cold sterilization of endoscopes. This report details the clinical course of four patients who suffered acute glutaraldehyde exposure during office injection procedures using a damaged endoscope.

Methods: Clinical records of four office patients undergoing office injection procedures were reviewed. One patient underwent a calcium hydroxyapatite injection and the other three had voice gel injections.

Results: Two patients developed acute mucosal injury in the form of supraglottitis and laryngitis and another two patients had no sequelae. The two patients with sequelae required inpatient admission with airway monitoring (one requiring ICU admission) and were treated with steroids and antibiotics. The other two patients were treated as outpatients empirically with the same regimen. The same defective endoscope was used for all procedures and noted after careful examination to have retained glutaraldehyde inside the scope due to a perforation in the lining of the working channel.

Conclusion: Endoscope channel rupture can retain cleaning fluids such as glutaraldehyde, which can lead to mucosal injury to supraglottic and glottic structures. Diligent endoscope maintenance (pressure testing), flushing the channels, and monitoring cleaning fluid retention in the channels must be maintained.

4:11 PM

Thursday, 28 May 2009

DISCUSSION

4:15 PM

Thursday, 28 May 2009

PANEL I

**VOCAL FOLD CYSTS AND THEIR
SEQUELAE**

Moderator: Jamie Koufman, MD
New York, NY

Panelists:

Robert Ossoff, DMD, MD
Nashville, TN

Blake Simpson, MD
San Antonio, TX

Gayle Woodson, MD
Springfield, IL

Karen Zur, MD
Philadelphia, PA

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5:00 PM

Thursday, 28 May 2009

ADJOURN

7:15 AM

Friday, 29 May 2009

**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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8:00 AM

Friday, 29 May 2009

CHEVALIER JACKSON AWARD

Presenter: Jamie Koufman, MD

Recipient:

PETER KOLTAI, MD

Stanford, CA

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Thursday, 28 May 2009

SESSION 4

LARYNGOLOGY AND VOICE

Moderators: Nicolas Maragos, MD
Rochester, MN

Andrew Blitzer, MD
New York, NY

**Neurosarcoidosis Affecting the Vagal Nerve:
Case Series and Review of Literature.**

Eran E. Alon, MD*
Dale C. Ekbom, MD*
Rochester, MN

Background: Sarcoidosis is a granulomatous disease of unknown origin affecting many target organs. Neurosarcoidosis is reported in only 5-10% of patients with known sarcoidosis and can be difficult to diagnose with possible devastating sequelae. The cranial nerves are affected in 50% - 75% of patients. Neurosarcoidosis affecting cranial nerve 10 is extremely rare. Our study reviewed direct CN X involvement by neurosarcoidosis, although isolated recurrent laryngeal nerve palsy may also be seen from compression due to mediastinal lymphadenopathy.

Objectives: To review patients presenting to our Medical Center with a diagnosis of neurosarcoidosis affecting the Vagal nerve; presenting symptoms, progression, treatments, and outcome.

Methods: Chart review of patients presenting to our medical center in the past 10 years with a diagnosis of neurosarcoidosis specifically affecting cranial nerve ten.

Results: A chart review of 53 patients revealed only 4 with findings suggestive of vagal neurosarcoidosis. All were male with a mean age of 50 (42-57) at presentation of symptoms. 2 of 4 patients presented initially with cough, one had recurrent syncope, and another presented with left facial pain. Vagal nerve involvement included vocal fold paresis or paralysis in all 4 patients, 2 of which reported coughing with exposure to various odors while one was found to have a unilateral palatal weakness. All but one had positive findings on head MRI.

Conclusion: Neurosarcoidosis involving the vagal nerve is a rare finding, but should be kept in mind in the differential diagnosis of vocal fold paresis or paralysis.

8:08 AM

Friday, 29 May 2009

**Vocal Exercise vs. Voice Rest Following
Botulinum Toxin Injections: A Randomized
Crossover Trial**

Randal C. Paniello, MD

Julia Edgar, PhD*

Jamie Barlow*

Jannie Serna*

St. Louis, MO

Purpose: There is evidence that the intensity of muscle activity immediately following intramuscular botulinum toxin injection may affect the clinical result. We tested this effect in patients undergoing botulinum toxin injections for adductor spasmodic dysphonia.

Study Design and Methods: During each of 3-5 injection cycles, patients completed a battery of voice recordings and clinical outcomes instruments administered via telephone, at 2-4 week intervals. Cycle 1 was the baseline control; cycle 2 was randomized between a one-hour reading aloud task ("exercise") or a 24 hour period of complete voice rest. For cycle 3, the patient completed the task not performed in cycle 2. The primary outcome measure was the result of the voice-related quality of life (VRQOL) instrument. Patients willing to continue for cycles 4 and 5 repeated the experiment at one-half the injection dosage.

Results: Nine patients completed at least three injection cycles, 8 females and 1 male, with a mean age of 60.8 (range 42-76). The VRQOL results were significantly higher for cycles that followed the exercise task. Patients reported subjectively that these were some of the best injection cycles they had ever experienced. Some achieved equivalent results with the half-dose injection plus exercise. Most of the voice rest cycles were not significantly different from the patients' baseline cycles.

Conclusion: These results support the recommendation that patients be encouraged to vocalize for the first few hours or days following a laryngeal botulinum toxin injection for best results. Possible mechanisms are discussed.

8:14 AM

Friday, 29 May 2009

**Implant of Atelo-Collagen Sheet for Treatment
of Vocal Fold Scar and Sulcus**

Tsuyoshi Kojima, MD*

Shigeru Hirano, MD, PhD

Yo Kishimoto, MD*

Juichi Ito, MD, PhD*

Kyoto, Japan

Objective: Vocal fold scarring and sulcus deteriorate vibratory properties of the vocal fold mucosa, resulting in a hoarse, harsh, and weak voice. Histological studies have revealed disorganization of extracellular matrix including collagen, elastin, hyaluronic acid, fibronectin, and decorin, which occurs after cordectomy, repeated phonotrauma or inflammation. Although collagen injection or implantation of fat or fascia have been attempted to modify the structure and function of damaged vocal folds, the optimal treatment has not been established. An appropriate scaffold is necessary to regenerate the tissue property by recruiting cells and growth factors from surrounding tissues. The present study examined feasibility of atelo-collagen sheet as such regenerative scaffold.

Methods: Seven patients with post cordectomy scar or sulcus underwent implant of atelo-collagen sheet. The procedure consists of elevation of microflap, implant of the material, and PDS suture. Vocal outcomes were evaluated at each time point for pre- and post- operation using stroboscopic and acoustic analyses.

Results: Acoustic analysis showed gradual improvement in shimmer, jitter and HNR over time in most cases in one year with individual variation. Restoration of periodic vibration was also observed in most patients by Video stroboscopy.

Conclusion: Implant of atelo-collagen sheet may have positive regenerative effects on vocal fold scarring and sulcus.

8:20 AM

Friday, 29 May 2009

**Long Term Acoustic Comparison of
Thyroplasty versus Autologous Fat Injection**

Dana M Hartl, MD, PhD

Stephane Hans, MD, PhD*

Lise Crevier Buchman, MD, PhD*

Jacqueline Vaissière PhD*

Daniel F Brasnu, MD

Paris, France

Objective: Thyroplasty or autologous fat injection provides voice improvement in unilateral vocal fold paralysis. Thyroplasty is considered a permanent medialization whereas fat injection is considered contemporary. The objective of this study was to compare the evolution of acoustic parameters for these procedures over 2 years.

Patients and Methods: From 1994 to 1998, 46 consecutive patients (17 women, 29 men) were treated by intracordal injection of autologous fat, then from 1999 to 2002, 48 consecutive patients (19 women, 29 men) were treated using the Montgomery Thyroplasty Implant System®. Voice was prospectively recorded preoperatively and at 1, 3, 12 and 24 months. Six patients (13%) in the injection group underwent a second injection and 1 patient (2%) in the thyroplasty group underwent revision. Jitter, shimmer and noise-to-harmonic ratio (N/H) were calculated for a 1000 ms midvowel /a/.

Results: One month postoperatively, in groups, jitter, shimmer and N/H significantly improved (Wilcoxon's test, $p < .05$ in all cases). Parameters did not change significantly at 3 or 12 months ($p > .05$), except for N/H which improved after 12 months (injection $p = .0004$, thyroplasty $p = .018$). No difference was noted between the techniques preoperatively or at 1, 3 or 12 months (Mann-Whitney test, $p > .05$). The acoustic parameters did not change significantly after 24 months for the 23 patients in the injection group. At 24 months, there was no difference in acoustic parameters between the treatment groups.

Conclusions: The two techniques provided comparable objective voice improvement. At 2 years, autologous fat injection provides comparable acoustic improvement when compared to thyroplasty.

8:26 AM

Friday, 29 May 2009

DISCUSSION

8:32 AM

Friday, 29 May 2009

**Voice Production Mechanisms Following
Phonosurgical Treatment of Early Glottic Cancer**

Robert E. Hillman, PhD., CCC-SLP*

Daryush D. Mehta, SM*

Boston, MA

Dimitar D. Deliyski, PhD*

Columbia, SC

Steven M. Zeitels, MD, FACS

Boston, MA

Although normal, or near-normal, conversational voices can be achieved in the phonosurgical management of early glottic cancer, there are still acoustic and aerodynamic deficits in vocal function that must be better understood to help further optimize phonosurgical interventions. Stroboscopic assessment is inadequate for this purpose. A newly-developed color ultra-high-speed videoendoscopy (HSV) system (up to 10,000 images/second) that simultaneously acquires time-synchronized recordings of other vocal function measures was used to perform a detailed examination of voice production mechanisms in 14 patients who had undergone phonosurgical treatment for early glottic cancer. Automated digital image processing techniques were used to quantify glottal phonatory function and to delineate relationships between vocal fold vibratory properties and acoustic measures of voice production. Results showed that 77%–93% of patients displayed abnormal elevations in vibratory asymmetry measures, but that open quotients fell within normal limits in 71% of cases, reflecting restoration of phonatory glottal closure. HSV-derived measures of vibratory asymmetry and open quotient were not significantly correlated with acoustic perturbation or harmonics-to-noise measures, and only mild-to-moderate relationships were revealed when acoustic measures were correlated with the standard deviations of the image-based parameters. Overall, these results imply that abnormal levels of within-cycle asymmetry, which can be attributed to the post-surgical persistence of mechanical differences between opposing vocal folds, do not produce concomitant degradations of the acoustic signal, as long as glottal closure is restored and the asymmetric patterns are sufficiently regular across glottal cycles. The ongoing search for additional phonatory sources of acoustic deficits will be discussed.

8:38 AM

Friday, 29 May 2009

**Characterization of Supraglottic Phonation in
Children Post Airway Reconstruction**

Lisa N. Kelchner PhD, CCC- SLP*

Susan Baker-Brehm PhD, CCC-SLP*

Barbara Weinrich PhD, CCC-SLP*

Janet Middendorf, MA, CCC-SLP*

Alessandro de Alarcon, MD

Cincinnati, OH

Objectives: 1. Examine acoustic, aerodynamic and perceptual data as correlated to number and type of surgical procedures in a cohort of children identified as using only supraglottic phonation for voicing. 2. Identify specific compression patterns of supraglottic phonation and their perceptual outcomes.

Design: Retrospective review

Setting: Tertiary care referral center

Patients: Children referred for voice evaluation following reconstructive airway surgery

Intervention: Comprehensive voice assessment by a team, including pediatric otolaryngologist and speech-language pathologists.

Main Outcome Measures: 1) Acoustic parameters 2) Aerodynamic parameters 3) Endoscopic findings 4) Perceptual Ratings 5) surgical interventions.

Results: 20 subjects were identified with data available for review. Acoustic measures revealed a range of: average fundamental frequencies (Fo) that were low for age/gender (101Hz-358Hz); diminished intensity levels(Io) (60 dB- 82 dB); and reduced maximum phonation times (MPT) (3-18 seconds). Four primary supraglottic compression patterns were identified: latero-medial (n=4), anterior-posterior (n=2), mixed (n=9); and arytenoid-petiole (n=5). CAPE-V overall severity scores ranged from 39-98. Surgical History: 10 subjects underwent one open procedure, 2 underwent 2 open procedures, and 8 underwent more than three open procedures. Cricotracheal Resection (n=5) and Laryngotracheoplasty with anterior and posterior grafting (n=13) were the most commonly performed procedures.

Conclusions: Supraglottic phonation is not an uncommon voice outcome in children who have undergone complex airway reconstruction. Despite the extent of altered laryngeal function for voicing, examination of the compensatory compression patterns

used by these children yield important insights for behavioral intervention and potential surgical intervention.

8:44 AM

Friday, 29 May 2009

**Measuring the Effects of Medialization
Thyroplasty on Subglottal Airflow Using a
Silicone Model**

Jedidiah J. Grisel, MD*

Siddarth M. Khosla, MD*

James E. Aubry, BA*

Raghava R. Lakhamraju, MS*

Shanmugam Murugappan, PhD*

Cincinnati, OH

Purpose: Turbulent airflow in the glottis can lead to irregular vibration and a raspy voice. It has been shown that the converging shape of the subglottis markedly reduces turbulence. Subglottal airflow characteristics (mean velocity and turbulence) are measured using single probe hotwire anemometry. This study demonstrates the effects of medialization thyroplasty (MT) on the subglottal shape and subsequent glottal airflow using a silicone model.

Methods: Model Validation: First, model validation was performed on a human cadaveric larynx. A plaster cast of the endolarynx was created, which was then converted to a silicone model. Velocity and turbulence of subglottal airflow were measured for the model and larynx (with and without supraglottal tract). Results of the model and larynx were compared.

Airflow Measurement: Four human cadaveric larynges were measured. Silicone models of each larynx were created. MT was then performed on each larynx and postoperative models were created. Velocity and turbulence of pre- and postoperative models were measured and compared.

Results: The silicone model demonstrates significant anatomical similarity to the cadaveric human larynx. Furthermore, mean and turbulence airflow measurements between the cadaver and model were within measurement error range. We also found that the shape of the subglottis reduces incoming turbulence in normal cadaveric larynges and silicone models. Results will be presented on the airflow behavior for pre- and postoperative models.

Conclusions: A novel technique for creating silicone models of the larynx is presented. This technique can be used to measure the effects of laryngeal framework surgery on subglottal airflow.

8:50 AM

Friday, 29 May 2009

**Respiration Related Laryngeal
Electromyography in Children with Bilateral
Vocal Fold Paralysis**

David Wynne, MD*

Robert G Berkowitz, MD

Monique Ryan, MD*

Melbourne, Australia

Aim: To determine the relationship between laryngeal muscle activity and respiration in young children with bilateral vocal fold paralysis (BVFP), by simultaneous laryngeal electromyography (EMG) with recording of chest wall movement and intercostal muscle EMG.

Design: Case reports

Results: Laryngeal EMG was performed on two children, and was combined with recording of chest wall movement in both, and intercostal muscle EMG in one. Laryngeal EMG was performed in a 55 day female who was undergoing tracheostomy for idiopathic congenital BVFP. The posterior cricoarytenoid (PCA) muscle was active in inspiration and the thyroarytenoid (TA) muscle active in expiration. The normal phasic activity observed was suggestive of a good prognosis for recovery. The child was decannulated at 11 months. A 5 year old girl developed BVFP following tracheosophageal fistula repair and was tracheostomy dependent underwent laryngeal EMG that showed phasic activity during expiration for both the PCA and TA muscles, indicating aberrant reinnervation of the PCA motor nerve.

Conclusion: Timing of laryngeal muscle activity with respiration in the assessment of pediatric BVFP is essential to demonstrate coordinated laryngeal muscle activity that indicates appropriate medullary respiratory neuronal input to laryngeal motoneurons. Where BVFP occurs due to recurrent laryngeal nerve injury, respiration related laryngeal EMG is required to identify aberrant reinnervation. Laryngeal EMG should be routinely combined with intercostal muscle EMG in the evaluation of children with

significant vocal fold dysfunction of either central or peripheral origin.

8:56 AM

Friday, 29 May 2009

Relaxation Thyroplasty for Mutational Falsetto Treatment

Marc Remale MD. PhD

Ingrid Verduyck, MSc, CCC-SLP*

Georges Lawson, MD*

Yvoir, Belgium

Purpose: Mutational falsetto voice is considered a psychogenic disorder corresponding to the rejection of adulthood. Treatment is based on speech and psychological therapy. But late treatment and denial of the problem can lead to the reinforcement of the trouble.

Methods: Relaxation (type III) thyroplasty was proposed by Isshiki to shorten the vocal folds by incising and depressing the anterior segment of the thyroid cartilage. This results in a lowering of the vocal pitch. This surgery can be performed under local or general anesthesia.

Our series includes 7 male patients with a mean age of 21 years. The assessment was mainly based on the fundamental frequency (Fo) and the voice handicap index (VHI).

Results: Mean Fo was improved from 187 to 104 Hz ($p < 0.001$) and mean VHI was improved from 70 to 21. We didn't observe any postoperative complications. The results are steady with a mean follow-up of 17 months.

Conclusion: Relaxation (type III) thyroplasty can be proposed for lowering the voice in case of mutational falsetto voice after failure of conservative treatments.

9:02 AM

Friday, 29 May 2009

**Predictors and Risk Factors for Aspiration
Pneumonia Following Chemoradiation for Head
and Neck Cancer**

Natasha Mirza, MD

Michael T. Purkey

Marc S. Levine, MD*

Brandon Prendes, BS*

M. Frank Norman, PhD*

Natasha Mirza, MD

Philadelphia, PA

Objectives: Aspiration following chemoradiation for head and neck cancer (HNC) is a common event, but not all patients with aspiration will develop pneumonia. Our aim was to identify predictors and risk factors for the development of pneumonia in patients with aspiration following primary chemoradiation for HNC.

Methods: We performed a retrospective study of 52 patients referred for modified videofluoroscopic barium swallow (MVBS) at our institution from 2003-2007 in order to identify clinical variables associated with the diagnosis of aspiration pneumonia. We then developed a predictive model for aspiration pneumonia in this patient population, using logistic regression analysis.

Results: Independent risk factors for the development of pneumonia were tracheobronchial aspiration on MVBS (OR: 5.0, 95% CI: 1.2-20.5, $p=0.025$), malnutrition (OR: 4.4, 95% CI: 1.3-14.7, $p=0.018$), and smoking history (OR: 1.04/pack-year, 95% CI: 1.01-1.07, $p=0.011$). Age ($p=0.059$) and number of medications ($p=0.058$) also trended toward a statistically significant association. Through logistic regression analysis, we developed a bivariate predictive model for aspiration pneumonia, using the degree of aspiration on MVBS and smoking history as parameters. This clinical model had a sensitivity of 58%, a specificity of 90%, a positive predictive value of 79%, and a negative predictive value of 77% for the development of aspiration pneumonia in our patient population.

Conclusions: Depth of aspiration on MVBS, malnutrition, and smoking history were strongly associated with the development of

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aspiration pneumonia in our patient population. The use of clinical variables to determine risk of aspiration pneumonia is feasible and may help identify high-risk patients.

9:08 AM

Friday, 29 May 2009

DISCUSSION

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

Friday, 29 May 2009

SESSION 5

REFLUX AND DYSPHAGIA

Moderator: Milan Amin, MD
New York, NY

9:14 AM

Friday, 29 May 2009

**Trends in Scientific Interest of the American
Broncho-Esophagological Association**

Joel Jacobson, MD*

Gady Har-El, MD

New York, NY

Purpose: The specialty of otolaryngology in the United States has changed dramatically over the past century, and this is particularly true in the field of broncho-esophagology, which is now multidisciplinary and further subspecialized. The purpose of this study is to trace the evolution of broncho-esophagology over the past 60 years by examining and quantitating the scientific subject matter of the annual ABEA meetings.

Design: The Transactions of the ABEA annual meetings from the 1940TMs to present day were examined in depth for subject matter and were categorized by topic. Each decade was represented by three years. Data were sorted into three domains which were 1) anatomic area 2) adult vs pediatric and 3) subject matter including neoplasms, infectious diseases, foreign bodies, technologies, and trauma. The overall changes were quantified to outline the direction and interests of the ABEA.

Results: 488 scientific sessions and papers were reviewed from the 1940TMs into the present decade, with a mean of 69.7 papers (SD +/- 36.9) representing each decade. Bronchology and pulmonology decreased in percentage of papers from 40 and 20% in 1940 to 1.7 and 2.6 %, respectively, in the 2000TMs ($p < .0001$). Laryngology evolved from 4 % to 58.1 % ($p < 0.001$). There was a trend of increased interest in esophagology which peaked in the 1950TMs at 33 % and leveled off to present day 15% ($p < 0.068$ and < 0.076). Trends in the pediatric versus adult scale, neoplasms, infectious diseases, foreign bodies, trauma, and technologies were less significant.

Conclusions: Analysis of the data reveals changing trends in the focus of the ABEA. The changing focus of the ABEA has paralleled scientific advances in our field as well as the

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rise of other subspecialties such as interventional pulmonology and gastroenterology.

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.

**RECIPIENTS OF THE
BROYLES-MALONEY THESIS AWARD:**

1988	Richard A. Kosarek, MD
1989	(no award)
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

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Shigeru Hirano, MD
Juichi Ito, MD
Yasuhiko Shimizu, MD
2003 Ira Sanders, M.
2004 Clarence T. Sasaki, MD
2005 Tomoko Tateya, MD
Ichiro Tateya, MD, PhD*
Diane M. Bless, PhD*
2006 (No award)
2007 J. Scott McMurray, MD
Charles N. Ford, MD
Nadine P. Conner, MD*
2008 Tina L. Samuels, MS*
Ethan Handler*, BS*
Michael L. Syring, BS*
Joel H Blumin, MD
Joseph E Kershner, MD
Nikki Johnston, PhD*
2009 Nikki Johnston, PhD*
Clive W. Wells*
Tina Samuels, MS*
Joel Blumin, MD

9:20 AM

Friday, 29 May 2009

BROYLES-MALONEY AWARD

Presenter: Jamie Koufman, MD

Recipient:

NIKKI JOHNSTON, PhD*

Milwaukee, WI

**Pepsin Can Damage Laryngeal Epithelial Cells
in Non-Acidic Refluxate**

Nikki Johnston, PhD *

Clive W. Wells*

Tina Samuels, MS*

Joel H. Blumin, MD

Milwaukee, WI

Reflux of gastric contents contributes too many different esophageal and extra-esophageal symptoms, disorders, and diseases, including neoplastic disease. Until recently, diagnosis and treatment solely focused on the acidity of the refluxate. However, despite aggressive acid suppression therapy, many patients have persistent symptoms and injury. Studies using combined multi-channel intraluminal impedance with pH monitoring reveal a role for non- and weakly-acidic reflux in symptoms and injury, highlighting a need to investigate the role of the other components of gastric refluxate. We have recently discovered that pepsin (both active and inactive) is taken up by laryngeal epithelial cells by receptor-mediated endocytosis. This finding reveals a novel mechanism by which pepsin can cause cell damage, potentially even in non-acidic refluxate.

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The objective of this study was to determine whether pepsin, at pH7 and thus in non-acidic refluxate, causes cell damage.

We report mitochondrial damage in laryngeal epithelial cells exposed to pepsin at neutral pH, observed by electron microscopy. In support of these observations, we report cell toxicity of pepsin at pH7, measured by the MTT cytotoxicity assay. The key component of this assay, MTT, measures mitochondrial activity. Furthermore, using a SuperArray for stress and toxicity, we found that pepsin at pH7 significantly alters the expression levels of 26/84 genes implicated in stress and toxicity.

These findings are perhaps the first to explain why many patients have symptoms associated with non-acidic reflux and could have important implications for the development of new therapeutics for reflux: pepsin receptor antagonists and/or irreversible inhibitors of peptic activity.

9:26 AM

Friday, 29 May 2009

Influence of Psychiatric Disorders on the Predictive Value of the Reflux Symptom Index

Samuel L. Oyer*

Stacey L. Halum, MD

Lauren C. Anderson, MD*

Bloomington, IN

Purpose: While the reflux symptom index (RSI) is a validated laryngopharyngeal reflux (LPR) outcomes tool, its predictive value for LPR is controversial. As depression and anxiety may lead to exaggerated patient-perceived symptomatology and RSI values, the aim of this study was to determine if the positive predictive value (PPV) of the RSI for pH probe-documented LPR is influenced by psychiatric history.

Design/Methods: Charts of all patients undergoing pH probe testing for LPR between 1/2006 and 7/2008 at our institution were reviewed. RSI, reflux finding score (RFS), medical history, and pH probe findings were recorded. Patients with anxiety or depression were included in the psychiatric disorder (+PSY) group, while those without comprised the non-psychiatric (-PSY) group. Predictive value of the RSI for pH probe-documented LPR was determined for each group.

Results: 51 patients were included, with 30 patients (59%) in the PSY group and 21 patients (41%) in the +PSY group. The mean RSI of the +PSY group was higher than that of the PSY group ($p < 0.05$), but +PSY patients actually had a lower incidence of abnormal probe studies ($p < 0.02$). Positive predictive value of an elevated RSI for an abnormal pH probe study was poor in the +PSY patients ($p = 0.495$), but strong in the PSY group ($p = 0.004$).

Conclusions: The presence of psychiatric symptoms impairs the predictive value of the RSI for LPR, potentially explaining some of the controversy over the diagnostic utility of the RSI.

9:32 AM

Friday, 29 May 2009

Influence of Treatment on Dysphagia, Stricture and Pneumonia Rates in Head & Neck Cancer Patients

David O. Francis MD*

Ernest A. Weymuller Jr., MD

Albert L. Merati, MD

Seattle, WA

Bevan Yueh, MD*

Minneapolis, MN

Objective: Chemoradiation regimens have improved organ preservation rates and locoregional control, but are associated with frequent reports of dysphagia, pharyngeal/esophageal stricture and pneumonia. Our aims were to: 1) describe modality-specific rates of dysphagia, stricture and pneumonia; 2) determine the adjusted odds for developing these complications by treatment modality; and 3) track temporal changes in rates between 1992 and 1999.

Methods: Head and neck cancer patients between 1992 and 1999 were identified in the combined Surveillance Epidemiology and End Results (SEER) tumor registry and Medicare database. We used multivariate logistic regression models to determine the odds of dysphagia, pharyngeal/esophageal stricture and pneumonia based on modality.

Results: The cohort consisted of 8,192 head and neck cancer patients of which 46% of patients experienced dysphagia, 20% stricture and 23% pneumonia. Compared to surgery alone, patients treated with combined chemotherapy and radiation (Cx/XRT) had significantly higher rates of sequelae. In adjusted analyses, Cx/XRT had more than 2-fold greater odds of dysphagia than surgery alone. Combined therapy (Cx/XRT or surgery/radiation) was associated with significantly increased odds of stricture and pneumonia ($p < 0.05$). Temporally, dysphagia and pneumonia rates were unchanged while stricture rates decreased 5% over this 8-year period ($p < 0.05$).

Conclusions: Head and Neck cancer patients treated with Cx/XRT had significantly higher odds of experiencing dysphagia, stricture

and pneumonia than those treated with surgery alone. These sequelae represent major sources of morbidity in this population.

9:38 AM

Friday, 29 May 2009

**Inhaled Triamcinolone with Proton Pump
Inhibitor for Treatment of Vocal Process
Granulomas: A Series of 60 Granulomas**

Alexander T. Hillel, MD*

Robin Samlan MS, CCC-SLP*

Heather Starmar MA, CCC-SLP*

Li-Mei Lin MD*

Paul W Flint, MD*

Baltimore, MD

Joshua Schindler MD*

Portland, OR

Introduction: Vocal process granulomas are benign lesions associated with gastroesophageal reflux disease (GERD), intubation trauma, and vocal abuse. Otolaryngologists have traditionally treated granulomas with anti-reflux regimens, voice therapy, and/or surgical excision with variable success. Our purpose is to analyze the outcomes of vocal process granulomas treated with proton-pump inhibitors (PPI) and inhaled triamcinolone.

Methods: Medical records of patients with the diagnosis, contact granuloma™ or vocal process granuloma™ were reviewed at a tertiary care medical center between 1995 and 2008. Data included age, gender, intubation history, GERD, previous treatment modalities, treatment course, and recurrence. All patients were treated with daily PPI and inhaled triamcinolone (300 mcg tid).

Results: Sixty-nine granulomas in 56 patients (mean age 44.2 years) were diagnosed, 13 bilateral and 43 unilateral. Forty-five patients were men, 11 were women. Twenty-nine patients, including all 11 women, had a recent history of intubation. Sixty-four granulomas in 52 patients were treated with triamcinolone and a PPI. Of 60 granulomas completing treatment, 5 (8%) were non-responders (mean follow-up 50, range 30.3-78.3 weeks), 13 (22%) were partial responders (mean 11, range 3-30 weeks), while 42 (70%) were complete responders (mean 20.7, range 5.9-84.6 weeks). Three recurrences occurred, 2 in non-responders following surgery and one complete responder. One patient developed oral thrush.

Conclusion: In this study, vocal process granulomas occurred more frequently in men, while women developed granulomas only after intubation. The anti-inflammatory action of inhaled triamcinolone combined with anti-reflux PPIs successfully treats most vocal process granulomas with low rates of side effects and recurrence.

9:44 AM

Friday, 29 May 2009

DISCUSSION

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9:50 AM

Friday, 29 May 2009

BREAK WITH EXHIBITORS

**PRESIDENTIAL CITATION FOR
FOREIGN BODY MANAGEMENT**

Presented by Jamie Koufman, MD

to

STEVEN M. ZEITELS, MD

Boston, MA

**Hypopharyngeal Extrusion of 2.5 Feet of Gore-Tex:
Initial Laser Assisted Office-Based Removal and
Micropharyngeal Completion**

Steven Feinberg, MD*

Gerardo Lopez Guerra, MD*

Steven M. Zeitels, MD

Boston, MA

Extrusion of an implant after medialization laryngoplasty is unusual and warrants removal. Most commonly, it extrudes through the laryngeal introitus but rarely through the pyriform sinus. A case report in which 2.5 feet of GORE-TEX was removed from a patient is presented to evaluate factors that led to this surgical complication and strategies that solved the problem.

An 80 year old female had undergone thyroidectomy and external-beam radiation in the 1950s. In 2002, a second surgeon noted a paralyzed right vocal fold and performed a medialization laryngoplasty with Gore-Tex. In 2008, she saw a third surgeon due to odynophagia and was noted to have a mucosal irregularity (~1cm) in the right pyriform sinus. Due to multiple medical problems, a flexible laryngoscopic biopsy was planned, which revealed extruding GORE-TEX. Remarkably, after 1 foot of Gore-Tex was retrieved, it became lodged in the laryngeal parenchyma. To avoid a long strip of Gore-Tex dangling within her laryngeal

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introitus, an assistant grasped the Gore-Tex tape through the oropharynx and a fiber-based KTP laser was used to sever the Gore-Tex proximally. The next day, she underwent an elective microscopic-controlled removal of another 1.5 feet of GORE-TEX. She healed uneventfully with no further sequelae.

Analysis of this case illustrates a number of factors leading to a rare iatrogenic foreign-body complication. Office-based removal evolved into a unique scenario in which the rapid use of a fiber-based laser to divide the foreign body facilitated stabilizing the airway to allow for elective completion removal in a controlled fashion.

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Friday, 29 May 2009

SESSION 6

ENDOSCOPY

Moderator: Michael Hinni, MD

Phoenix, AZ

10:12 AM

Friday, 29 May 2009

**Office-Based Tracheoesophageal Puncture:
Lessons Learned**

Doug Sidell, MD*

Andrew Erman MA, CCC-SLP*

David Shamouelian, BS*

Abie Mendelsohn, MD*

Dinesh Chhetri, MD

Los Angeles, CA

Objectives: To review our patient outcomes with in-office tracheoesophageal puncture (TEP) compared to TEP performed in the operating room.

Study Design: Retrospective review of cases from an academic institution.

Methods: Procedure related and post-operative course of all patients who had in-office TEP between March 2006 and September 2008 were reviewed. This cohort was compared to a matched population of patients who underwent TEP in the operating room.

Results: There were 12 in-office TEP patients. Nine were male and 3 were female with an average age of 70 years. Ten (83%) had prior radiation therapy to the neck. Three (27%) had a history of free-flap reconstruction. Eleven (92%) patients achieved typical TEP speech. One patient had minor leaking at the stoma site due to cricopharyngeal spasm which resolved with Botox injection. Compared to TEP placement in the operating room, in-office TEP was facilitated by speech pathologist input for puncture site and immediate placement of prosthesis. In general, in-office TEP patients had improved sizing of the TEP and required less frequent TEP changes. This resulted in overall cost savings to patients as well.

Conclusions: In-office TEP is tolerated well and has comparable or improved post-operative outcome compared to traditional TEP placement.

10:18 AM

Friday, 29 May 2009

The Management of Sand Aspiration Complicated by Tracheal Rupture

Mai Thy Truong, MD*

Christina Avila MD*

Peter Koltai MD

Stanford, CA

Purpose: Describe our management of a child who suffered sand aspiration with tracheal rupture leading to respiratory failure.

Result: A 9 year-old boy was playing near a sand cliff when it collapsed, burying him. He was excavated after about 5 minutes. Initially responsive, he developed respiratory difficulty requiring intubation, following which he developed subcutaneous emphysema and pneumothorax and was therefore air lifted to our facility for management. On arrival, he continued to have respiratory instability and was taken to the OR, placed on cardio-pulmonary bypass (CPB) and had airway lavage. Bronchoscopy revealed a linear rupture of the posterior tracheal wall from mid-trachea to the carina. Given the combined injuries, we convert the CPB to extracorporeal membranous oxygenation (ECMO) and intubated him with a double-lumen endotracheal tube which selectively allowed for ventilation of his left mainstem bronchus, isolating the tracheal injury from ventilation. After 12 hours, positive pressure was introduced into the trachea and at 24 hours ventilation through both lumens of the ET tube was resumed. He was taken off of the ECMO after 36 hours and maintained on the ventilator alone. Bronchoscopy revealed a healing tracheal injury and he was extubated. He remained stable and was discharged home.

Conclusions: Sand aspiration is fortunately rare. Concurrent tracheal rupture further complicates an already difficult treatment regime. The few cases reports describe a range of management. CPB was a life saving strategy for our patient, while converting to ECMO provided us a brief healing period of the tracheal rupture.

In-Office KTP Coagulation Necrosis of Recurrent Respiratory Papillomatosis

J. Michael King, MD*

Stacey L. Smith, MD*

C. Blake Simpson, MD

San Antonio, Texas

Purpose: Previous studies have reported the efficacy of pulsed potassium-titanyl-phosphate (KTP) laser for the treatment of recurrent respiratory papillomatosis (RRP). The angiolytic properties of the KTP laser result in subepithelial microvascular necrosis and subsequent sloughing of the disease process. We describe an adjunctive treatment for bulky papillomatosis by means of intralesional photocoagulation, resulting in thermal coagulation necrosis.

Study Design: Retrospective chart review of adult patients with bulky RRP lesions treated with in-office flexible laryngoscopy KTP laser ablation over 21 consecutive months. Fourteen patients underwent a total of 25 office-based intralesional KTP procedures. We reviewed pre- and postprocedure laryngeal stroboscopy findings and self-evaluation.

Methods: The KTP fiber was applied through a flexible laryngoscope in the office setting. All 14 patients had areas of bulky papillomatosis treated with intralesional thermal ablation by penetrating the diseased tissue with the KTP fiber.

Results: Self-rated improvement in voice and/or airway was noted in 10 (71%) patients; 2 (14%) patients reported no improvement; 2 (14%) patients lacked follow-up. No patients with follow-up reported a worse voice. Post-treatment examination showed effective debulking in 10 of 12 (83%) patients with follow-up. Stroboscopy demonstrated vibratory improvement in 3 patients and preservation of preoperative vibration in 9 patients. No patients resulted in worsening of stroboscopic findings. One procedure resulted in a complication consisting of glottic fibrinous exudate that resolved with oral steroid treatment.

Conclusion: Intralesional photocoagulation of bulky RRP should be considered a safe and effective adjunctive method. Further study in a larger cohort using this method seems warranted.

10:30 AM

Friday, 29 May 2009

Endoscopic Nd:YAG Therapy for Laryngeal Venous Malformations

Robert S. Glade, MD*

Gresham T. Richter, MD

Lisa M. Buckmiller, MD*

James Y. Suen, MD*

Little Rock, AR

Objective: Nd:YAG laser is powerful tool in treating venous malformations (VM) involving the upper airway. If left untreated, laryngeal VM can lead to life threatening airway obstruction. We aimed to evaluate the efficacy of endoscopic management of laryngeal VM with Nd:YAG.

Design: 12 year retrospective review

Setting: Tertiary referral center

Methods: Patient records were reviewed for demographics, presenting symptoms, area of involvement, age at first Nd:YAG therapy, total number of treatments, time between treatments, and treatment response.

Results: 17 patients were treated endoscopically with Nd:YAG laser for laryngeal VM. Mean age at first treatment was 23.0 years (range 18-45yr). The majority of patients presented with obstructive sleep apnea (58.8%). 17.5% of patients presented with acute airway obstruction or stridor. The remaining patients presented with minor symptoms including chronic cough and voice changes. VM involved the supraglottis, glottis, or both in 29%, 35%, and 35% of patients, respectively. An average 4 treatments were required per patient (median 3.5, range 1-9). Time between treatments increased with each consecutive laser therapy starting at a mean of 3.8 months between the first and second treatment to 21.7 months between the third and fourth. Marked reduction in VM size and symptom improvement was achieved in each patient following Nd:YAG therapy. Two complications (3%) were encountered after 66 total procedures

Conclusions: Endoscopic management of VM using Nd:YAG laser is both effective and safe. Multiple treatments are often required with increased time elapsed between each consecutive therapy. Nd:YAG of laryngeal VM helps avoid tracheotomy and open surgical resection.

10:36 AM

Friday, 29 May 2009

A Clinical Review of Pediatric Subglottic Stenosis

Soo-Youn An, MD*

Dong Wook Kim, MD*

Youngjin Ahn, MD*

J.Hun Hah, MD*

Tack-Kyun Kwon, MD*

Myung-Whun Sung, MD*

Kwang Hyun Kim, MD*

Seoul, Korea

Objectives/Hypothesis: To review the clinical features of pediatric subglottic stenosis (SGS) and to assess the results of surgical management, risk factors and prognosis of SGS.

Methods: 107 consecutive pediatric patients diagnosed between January 1989 and December 2007 as SGS or combined stenosis was retrospectively reviewed. Clinical features, treatment details and decannulation rates were investigated.

Results: Male to female ratio was 61:46 and the mean age was 36.8 (0~167.3) months. The most common etiology was prolonged intubation (89.7%). Myer-Cotton grade I was 47.7%, grade II 20.6%, grade III 27.1% and grade IV 4.7%. Initially, 98 cases (91.6%) were treated with endoscopic endolaryngeal managements. Among these, 70 patients (80.1%) were decannulated successfully. The procedure failed in 19 patients (19.9%) and converted to laryngotracheal reconstruction (LTR) surgeries. Late intubation ages and lower Myer-Cotton grade were factors favor decannulation success. ($p = .006, < .001$ respectively)

Among the 28 LTR patients, cricoid splitting and rib cartilage graft was performed in 26 patients and laryngotracheal resection and end-to-end anastomosis was performed in 2 patients. After LTR, post-operative endoscopic touch-up management was needed for 6.1 (2~18) times. Decannulation success rate of LTR was 82.1%.

Conclusions: Younger age at intubation and higher Myer-Cotton grade were risk factors for decannulation failure in endolaryngeal managements. Decannulation success rate of Initial endolaryngeal managements was 80.1%, that of invasive LTR was 82.1% and overall success rate was 95.3%.

10:42 AM

Friday, 29 May 2009

**Effects of Gold Laser in the Avian
Chorioallantoic Membrane**

Jacqueline Allen, MD*

Peter C. Belafsky, MD, PhD

Sacramento, CA

Catherine J. Rees, MD

Winston Salem, ND

Background: Office-based lasers have revolutionized treatment of laryngeal disease. The 980nm "Gold" laser is a new device that may offer some practical advantages over other office lasers. The chick chorioallantoic membrane (CAM) has been proposed as a model for predicting effects of photoangiolytic lasers on vocal fold microvasculature.

Purpose: To evaluate the effects of the Gold laser in the CAM model.

Study Design and Methods: Vascular reactions in third order vessels were determined for the Gold laser using both zero degree straight and 30 degree angled laser fibers. Vessels were treated at 15 W and 500 ms pulse interval, with a 1 mm working distance. Pulse widths of 300 ms and 500 ms were evaluated. All vessels were treated until selective coagulation or vessel rupture.

Results: 60 trials were performed on 30 embryos. The mean energy delivered was 33.7 Joules for the straight and 51.2 Joules for the angled fiber. The laser achieved selective vessel coagulation without rupture in 100% (30/30) of straight fiber and 100% (30/30) of angled fiber trials. Seven percent (2/30) of straight fiber and 10% (3/30) of angled fiber trials caused minor injury to the surrounding albumin as indicated by white coagulum outside the vessel.

Conclusion: The Gold laser effectively coagulates small vessels without vessel rupture at a working distance of 1 mm and settings of 15 W, 500 ms pulse interval, and 300-500 ms pulse width. The data suggests that the laser may be a safe alternative for use on vocal fold mucosa.

10:48 AM

Friday, 29 May 2009

DISCUSSION

10:54 AM

Friday, 29 May 2009

PANEL II

**INSTITUTE OF LARYNGOLOGY AND
VOICE RESTORATION PANEL**

**AERODIGESTIVE MANIFESTATIONS
OF EOSINOPHILIC ESOPHAGITIS**

Moderator: **Dana Thompson, MD**
Rochester, MN

Panelists:

Jeff Alexander, MD*
Rochester, MN

Michael Rutter, MD
Cincinnati, OH

Douglas Johnston, MD*
Philadelphia, PA

11:50 AM

Friday, 29 May 2009

Introduction of New President

**ANDREW BLITZER, MD, DDS
New York, NY**

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

12:00 PM

Friday, 29 May 2009

ADJOURN

LUNCH WITH EXHIBITORS

12:15 PM

Friday, 29 May 2009

Annual Photograph of the Membership

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

**RULES CONCERNING THE PRESENTATION
OF PAPERS AT THE ANNUAL MEETING**

1. The reading of any paper shall not extend beyond the time allotted by the Program Committee. The exact time for presentation will be allotted by the Program Committee. This shall include presentation of slides, pictures, and video demonstrations.
2. Five complete copies of the paper and illustrations must be submitted prior to the presentation. If the presenter does not comply with this rule, the paper may not be given. Three copies of the manuscript should be directed to The Annals of Otology, Rhinology & Laryngology, 2 copies to Michael Rothschild, MD, Editor of the ABEA Transactions. For those seeking awards, 1 copy must be sent to Jonathan Aviv, MD of the Awards and Thesis Committee.
3. All papers become the property of the Association.
4. The Annals Publishing Company reserves the right to publish articles in the Annals of Otology, Rhinology, and Laryngology. The author may publish a paper elsewhere only if the paper is not accepted for publication in the Annals. Written permission must be obtained from the Editor of the ABEA.
5. Only original and unpublished papers may be submitted for consideration. The same or similar abstract should not be submitted simultaneously to any other meeting or publication.

THE AMERICAN BRONCHO-ESOPHAGOLOGICAL ASSOCIATION

***COMBINED
SCIENTIFIC POSTER SESSION***

**J. W. Marriott Desert Ridge
Phoenix, Arizona**

**AMERICAN BRONCHO-ESOPHAGOLOGICAL
ASSOCIATION**

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 (91-125) of this program booklet.*

#124

Consequence of Dysphagia in the Hospitalized Patient: Impact on Prognosis and Resources

Kenneth W. Altman, MD, PhD
Gou-Pei Yu, MD, MPH*
Steven D. Schaefer MD*
New York, NY

Objective: Dysphagia is increasingly prevalent with age and comorbid medical conditions. We have previously shown that dysphagia is a bad prognostic indicator in patients with stroke. The hypothesis of this study is that comorbid dysphagia in all hospitalized patients has the potential to prolong hospital stay and increase morbidity. Study Design: Analysis of national database.

Methods: The National Hospital Discharge Survey (NHDS), 2005-2006, was evaluated for presence of dysphagia and most common comorbid medical conditions. Patient demographics, associated disease, length of hospital stay, morbidity and mortality were also evaluated.

Results: There were over 77 million estimated hospital admissions in the time period evaluated, of which 271,983 were associated with dysphagia. Dysphagia was most commonly associated with fluid or electrolyte disorder, esophageal disease, stroke, aspiration pneumonia, urinary tract infection, and congestive heart failure. The median days of hospitalization of all patients with dysphagia was 4.04, compared to 2.40 days in those patients without dysphagia. Mortality increases substantially in patients with dysphagia associated with rehabilitation, intervertebral disk disorders and heart diseases. **Conclusion:** Dysphagia has a significant impact in hospital length of stay, and is a bad prognostic indicator. Significance: Early recognition of dysphagia and intervention in the hospitalized patient is advised to reduce morbidity and length of hospital stay.

#125

**Congenital Bilateral Vocal Cord Paralysis and
Charcot-Marie-Tooth Disease**

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Objective: We present a case of a patient with Charcot-Marie-Tooth Type 1A with congenital bilateral vocal cord paralysis in order to emphasize the treatment options and long-term outcome.

Study Design: Case Report with Literature Review.
Methods: A case of congenital vocal cord paralysis is reviewed in regards to presentation, differential diagnosis, treatment, and follow-up care. The literature is also reviewed to determine the frequency of congenital and childhood presentations of vocal cord paralysis associated with Charcot-Marie-Tooth Disease, specifically type 1A. We also studied treatment options of congenital bilateral vocal cord paralysis as outlined in the literature.

Results: In the literature, there have only been fourteen children reported to have bilateral vocal paralysis associated with Charcot-Marie-Tooth Disease, and only one of these cases has been associated with Type 1. None of these patients had congenital paralysis. Our patient was diagnosed early. Due to the degenerative nature of the disease, he underwent endoscopic cordotomy to avoid tracheotomy.

Conclusion: Charcot-Marie-Tooth Disease should be included in the differential diagnosis when evaluating neonates with bilateral vocal cord paralysis. In such cases, a tracheotomy tube may be avoided if CMT is definitively diagnosed.

#126

Endoscopic Management of Esophageal Strictures after Head and Neck Cancer Therapy

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Objective: To review our experience with endoscopic management of esophageal strictures after head and neck (HN) cancer treatment.

Methods: Retrospective review of cases from an academic institution was performed. The primary outcome measure of treatment success was advancement of diet after endoscopic dilation.

Results: 30 patients with esophageal strictures were identified by in-office transnasal esophagoscopy. 3 patients were deceased and 1 was lost to follow up at the time of this study. Of the 26 patients, 25 (96%) had undergone external beam radiation, and 13 (50%) had chemoradiation. There were 18 (69%) successes, while 8 (31%) did not advance their diet. The following factors were assessed for predicting success: age, gender, number of dilations, length of stenosis, severity of stenosis, application of mitomycin-C, history of laryngectomy, and free flap reconstruction. Female gender ($p < 0.01$) and long segment stenosis ($p = 0.019$) were predictive of increased rate of failure. Severity of stenosis was not significantly predictive of outcome, while free flap reconstruction trended ($p = 0.08$) towards poor prognosis. Within the laryngectomy group, all 3 patients with continued dysphagia had biopsy proven recurrences. Therefore, all recurrence-free laryngectomees advanced their diet ($p = 0.03$).

Conclusion: Esophageal strictures related to HN cancer treatment can be treated successfully with serial dilations. Resistant post-laryngectomy strictures should heighten suspicion for recurrence. Long segment stenosis and free flap reconstruction portend poor swallowing outcomes.

#127

**Effects of a Nerve-Muscle Pedicle Implantation
on the Long-Term Denervated Thyroarytenoid
Muscle in Rats**

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Study Purpose: To evaluate the effects of nerve-muscle pedicle (NMP) implantation on the long-term denervated rat thyroarytenoid (TA) muscle.

Design and Methods: Quantitative histological and physiological assessments of long-term denervated TA muscle, following NMP implantation. Wistar rats (n=105) were divided into two groups in which the left recurrent laryngeal nerve (RLN) was transected without (DNV group) or with (NMP group) subsequent NMP implantation. Each group was divided into five subgroups, based on the period after RLN transection (immediate-48 weeks). In the DNV group, we assessed the area of muscle and the number of neuromuscular junctions histologically. In the NMP group, we performed electromyography, videolaryngoscopy, and histological assessments. For electromyography, we stimulated the transferred nerve and evaluated the muscle action potentials of the TA muscle. The entire muscle area, individual muscle fiber area, and muscle action potentials were evaluated by comparing the treated and untreated sides. The ratio of the number of nerve terminals to that of acetylcholine receptors was also assessed.

Results: In most NMP subgroups, the muscle areas were significantly larger than those in the DNV subgroups. Muscle action potentials were seen in all NMP animals. Among the five NMP subgroups, all histological and physiological assessments degraded in proportion to the denervation period.

Conclusion: NMP implantation was effective in recovering the atrophic changes of the long-term denervated TA muscle. Reinnervation occurred via the transferred nerve. However, the effectiveness of the NMP method decreased with the period of denervation.

**Successful Decannulation of T-Tube According
to the Types of Tracheal Stenosis**

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Background and Objectives: Since its introduction in 1965, T-tube has been widely used as a therapeutic method for palliative as well as definitive treatment of tracheal stenosis. The overall success rate of T-tube indwelling method is not high and predictors for successful outcome have not been studied much. We analyzed several factors according to the types of tracheal stenosis to search for a prognostic indicator for a successful decannulation.

Materials and Methods: Forty-one patients who received T-tube insertion for the past 10 year period, whose endoscopic findings and imaging studies were available, were included in this study. The medical records were reviewed retrospectively and several factors regarding the type of stenosis such as the severity, longitudinal extent, circumferential involvement of stenosis, and number of stenotic sites were evaluated.

Results: The age at the time of treatment, gender, the number of stenotic sites, and the severity of stenosis were not significantly related to successful decannulation although they were closely related to the patientsTM symptoms. The longitudinal extent of stenosis had significant influence on successful decannulation ($p=0.029$) and greater circumferential involvement tended to result in decannulation failure. ($p=0.068$)

Conclusions: The longitudinal extent of stenosis and the circumferential involvement of the granulation tissue were found to be correlated to the success rate and represented the extent of damaged mucosal area. Therefore, it was assumed that the extent of damaged mucosal area could be more important than the size of granulation tissue and patientsTM symptoms, when predicting the decannulation of T-tubes.

#129

**Comparative Study of Vocal Outcomes with
Silastic vs. Gore-Tex Thyroplasty**

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Purpose: Type I thyroplasty is a well-established surgical treatment for unilateral vocal fold paralysis. Recently Gore-Tex has become a popular material as the shim in type I thyroplasty, because of its ease of adjustment as well as its biocompatibility. However, since Gore-Tex is a relatively new material in type I thyroplasty, it is not clear whether vocal function after Gore-Tex thyroplasty is comparable to that after silastic thyroplasty.

Objectives: To examine vocal outcomes in patients with unilateral vocal fold paralysis after type I thyroplasty with silastic or Gore-Tex.

Methods: Thirty patients with unilateral vocal fold paralysis who underwent type I thyroplasty were involved in the current study. Half of the patients underwent Gore-Tex thyroplasty, and the other half underwent silastic thyroplasty. A Gore-Tex sheet or silastic block was applied randomly for each case. Vocal outcomes were evaluated by aerodynamic and acoustic measurements.

Results: A direct comparison between groups showed no significant difference in the degree of improvement of the vocal parameters, except for a significant improvement in the noise-to-harmonic ratio in Gore-Tex group. The duration of surgery was significantly less in the Gore-Tex group than in the silastic group.

Conclusions: Gore-Tex thyroplasty is considered to be comparable to silastic thyroplasty in terms of postoperative vocal outcomes. Gore-Tex thyroplasty enables a less invasive procedure with a shorter surgical duration and easier adjustment of medialization due to its flexibility.

#130

**Suspension Laryngoscopy Assisted
Percutaneous Dilatational Tracheostomy in
High Risk Patients**

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WITHDRAWN

#131

**High-Speed Digital Imaging of Neoglottis after
Supracricoid Laryngectomy with
Cricohyoidoepiglottopexy (CHEP)**

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WITHDRAWN

The Effects of Exogenous Hepatocyte Growth Factor on Vocal Fold Fibroblasts

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Objectives: We have shown therapeutic potential of hepatocyte growth factor (HGF) in the treatment of vocal fold scarring, but how exogenous HGF affects gene expression of endogenous HGF or extracellular matrix in the vocal fold fibroblasts has still been unclear. The current study aimed to clarify this aspect to better understand the effects of HGF on the vocal fold.

Study Design: In vitro

Materials and Methods: Fibroblasts were obtained from the lamina propria of the vocal folds of five Sprague-Dawley rats and were cultured with HGF at concentrations of 100, 10, 1 and 0 (control) ng/ml. The cells were collected at days 1, 3 and 7 and the expression of endogenous HGF, c-Met, procollagen type I and III and hyaluronic acid synthase (HAS) 1 and 2 messenger RNA (mRNA) were examined by quantitative reverse transcription polymerase chain reaction (qRT-PCR).

Results: The expression of endogenous HGF and HAS 1 messenger RNA increased significantly with administration of exogenous HGF at concentration of 1ng/ml. At day 1, the expression of HAS 2 messenger RNA was significantly higher at concentration of 1ng/ml than at the other concentrations.

Conclusions: Results suggest that exogenous HGF triggers the upregulation of endogenous HGF and increases the expression of HAS 1 and 2 mRNA of vocal fold fibroblasts.

#133

Endoscopic Removal of Endobronchial Stents in Post-Lung Transplant Patients

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Purpose: To demonstrate the utility of rigid bronchoscopy in the management of complications resulting from endobronchial stent placement for anastomotic stenosis and bronchomalacia in the post-transplant setting.

Methods: We present three patients with a history of lung transplantation and subsequent endobronchial stenting who presented to the pulmonary division at a tertiary care medical center with stent complications. Initial management with interventional flexible bronchoscopy failed. Stent breakdown, migration, deformation, and intraluminal clot formation were managed with rigid bronchoscopic techniques.

Results: In two cases stents were partially or completely removed, relieving airway obstruction and allowing distal examination. One distal bronchial stenosis was diagnosed. In one case, a stent completely obstructed by mature clot was removed, improving ventilation. Stents which had reached the point of failure were found to be easy to remove in selected pieces, even when some endothelial ingrowth had occurred.

Discussion: Endobronchial stenting plays an important role in the management of anastomotic stenosis and bronchomalacia following lung transplantation. While the use of nitinol stents can result in significant improvement in ventilation, the lifespan of these stents, designed for use in blood vessels, appears to be shortened dramatically in the setting of a mobile bronchus subject to repetitive respiratory movements. Stent migration, deformation, and breakdown can result in serious morbidity, and can threaten the utility of the transplanted organ.

Conclusion: Rigid bronchoscopy is a valuable tool in the management of post-transplant endobronchial stents when flexible bronchoscopic techniques fail.

#134

**The Effects of Basic Fibroblast Growth Factor
on Fibroblasts of Vocal Folds of Rat:
Gene Expression Analysis by Quantitative
Polymerase Chain Reaction**

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Background: Treatment of vocal fold scarring has not been established. We have examined several types of regenerative therapies, such as stem cell implant or growth factor therapy. Basic Fibroblast Growth Factor (bFGF) is one of the important growth factors, and it is available in clinical use, such as the treatment of intractable ulcer. Basic FGF accelerates healing of wound and recently it is suggested that bFGF has the potential to control ideal wound healing.

Objectives: To evaluate the effects of bFGF on gene expression of extracellular matrix and growth factors in the fibroblasts of rat vocal folds.

Methods: Fibroblasts harvested from vocal folds of five rats were cultured in nutrient medium. bFGF was added to each dish at three concentrations (0, 10, 100ng/ml). Cells were collected 24 hours and 72 hours after bFGF addition. Gene expressions were analyzed by real-time reverse transcript polymerase chain reaction. Six genes of extracellular matrix and two genes of growth factor were analyzed in this study.

Results: Down regulated expression of Procollagen I and upregulated expression of Hyaluronic acid synthase (HAS) 1, 2 and Fibronectin were observed. The expressions of bFGF and Hepatocyte Growth Factor (HGF) were upregulated. Significant changes were not observed in the expression of Tropoelastin and TIMP-1.

Conclusions: Downregulation of Procollagen I and upregulation of HAS 1, 2 are considered to positively affect improvement of vocal fold scar. Moreover the upregulation of HGF will accelerate the healing of scar. This study suggests that bFGF has the potential to treat vocal fold scar.

#135

**A Unique Case Report of Bilateral Mainstem
Bronchi Foreign Bodies**

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Purpose of Study/Report: Bilateral mainstem bronchi (BMB) foreign bodies (FBs) are rare and pose a significant health hazard. The proposed danger to the airway is evident and requires quick, careful planning to avoid adverse effects. We present a unique case report of BMB FBs in a child.

Case Report: A 23 month-old child was brought to an outside ER with progressively worsening, audible stridor. A chest x-ray was obtained which revealed BMB FBs. The patient was intubated and transported to the PICU at our facility. The operating room (OR) had already been adequately prepared. The patient was taken to the OR and was extubated. Apneic technique was used to perform rigid bronchoscopy. The right-mainstem FB was identified and extracted with grasping forceps. Next, the left-mainstem FB was visualized and we retrieved two additional FBs.

He remained intubated and was transported to the PICU and was subsequently extubated. The FBs were pieces of a gold necklace measuring a total of 14cm.

Discussion: BMB FBs are exceedingly rare and usually are due to inhaled food. A literature review revealed a lack of case reports describing BMB FBs that did not involve food in children. Our case report is unique and presents a metallic FB in bilateral bronchi. The single most important factor leading to the uneventful removal of the FBs was effective communication between the ER, PICU, Anesthesia, OR personnel, and Otolaryngology teams.

Conclusion: BMB FBs can create a life-threatening scenario. We feel that expeditious, effective communication and planning are key in obtaining a successful outcome.

#136

**En Bloc Endoscopic Transoral Resection of
Supraglottic and Hypopharyngeal Cancer**

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WITHDRAWN

#137

**Feasibility of Cone Beam CT for 3d Evaluation
of Vocalizing Larynx**

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WITHDRAWN

#138

**Efficacy of Autologous Fat Injection Laryngoplasty
with an Adenoviral Vector Expressing Hepatocyte
Growth Factor in Canine**

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Purpose: Autologous fat injection laryngoplasty (FIL) may cause resorption of injected fat tissue. The aim of the present study was to clarify the efficacy of FIL to reduce the resorption of injected fat tissue with a replication-defective adenoviral vector expressing hepatocyte growth factor (HGF).

Methods: Four beagles were used in this study. After sedation, a direct laryngoscope was introduced for visualization of the larynx. Harvested autologous fat containing an adenoviral vector expressing HGF was injected into the right vocal fold and harvested fat containing an adenoviral vector expressing no HGF was injected into the left vocal fold in each beagle. A total laryngectomy was done 1 year after the intracordal fat injection. Coronal sections were made and evaluated for the size of the fat area, the number of vasculoendothelial cells surrounding the adipocytes and the shape of the injected adipocytes in the vocal cord were investigated using light and electron microscopy.

Results: The size of the fat area was significantly large and the number of vasculoendothelial cells surrounding adipocytes was significantly greater in the intracordal fat injection with an adenoviral vector expressing HGF in comparison to intracordal fat injection containing the adenoviral vector expressing no HGF. The injected adipocytes were observed grafting well electron microscopically in intracordal fat injection with the adenoviral vector expressing HGF were grafted better in comparison to the intracordal fat injection with the adenoviral vector expressing no HGF.

Conclusions: FIL with an adenoviral vector expressing HGF can reduce the resorption of injected fat tissue.

#139

Unplanned Tracheostomy Following Pediatric Cardiac Surgery

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Aim: To identify factors contributing to unplanned tracheostomy following cardiac surgery in children less than 12 months of age who did not require airway support prior to surgery.

Method: Retrospective case control study.

Results: Eleven patients were identified (8 male: 3 female) over a five year period. Eight children were term, 3 were pre-term (32 - 36 weeks). Four children had a known syndrome associated with cardiac disease. Mean age at cardiac surgery was 2.2 (0.1-5.2) months. Mean time between surgery and tracheostomy was 1.2 (0-3) months. Two groups were identified. The first had tracheobronchomalacia as the primary diagnosis (n=9). Mean time post cardiac surgery for tracheostomy in this group was 1.2 (0.5-3) months. The second had bilateral vocal fold paralysis (n=2). Both children had cardiac surgical procedures that have a recognized risk to the left recurrent laryngeal nerve. In addition to this both had cannulation of the right internal jugular vein at the time of surgery. Tracheostomy occurred within hours of the cardiac procedure.

Conclusion: Investigations for tracheobronchomalacia should be performed if a child continues to fail ventilator weaning or extubation trials following cardiac surgery. The risk of right recurrent laryngeal nerve injury due to right central vascular instrumentation or dissection should be minimized during cardiac surgical procedures with a known risk to the left recurrent laryngeal nerve. This study highlights the importance of early otolaryngological assessment of these children post operatively when required.

#140

**Mucosal Bridge and Pitting of the True Vocal Fold:
An Unusual Complication of Cidofovir Injection**

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Purpose: To describe a unique complication of intralaryngeal cidofovir injection.

Study Design: Case report.

Results: We present the case of a 40-year-old male with recurrent respiratory papillomatosis who developed both a mucosal bridge and a pit of the true vocal fold after intralaryngeal cidofovir injection. Twenty-one years prior, the patient had undergone esophagectomy, jejunal reconstruction, and radiation therapy for leiomyosarcoma of the cervical esophagus. He had Teflon injection for right vocal fold paralysis. The patient developed laryngeal papillomatosis 19 years later. Over a 6-month period, he underwent 5 papillomatosis excisions combined with subepithelial injections of cidofovir to the bilateral vocal folds at a concentration of 5 mg/ml (volume: 6 to 8 ml per treatment) without complication. He subsequently received two higher-dose cidofovir treatments six weeks apart due to poor papilloma response to the 5mg/ml cidofovir treatments. Injections were 6 ml of 15 mg/ml cidofovir and 6 ml of 10 mg/ml cidofovir, respectively. Upon microlaryngoscopy 2 months later, there was evidence of a large mucosal bridge along the free edge of the right vocal fold with papilloma completely encompassing it. There was also a deep pit in the lateral aspect of the right vocal fold with papilloma surrounding this area. The mucosal bridge was surgically excised, and papilloma involving the pit was debulked. It appears that the increased concentration of cidofovir led to de-epithelization of the vocal fold, resulting in significant morphologic changes.

Conclusion: Repeated high-dose intralaryngeal cidofovir injection may result in mucosal bridge development and pitting of the vocal fold.

#141

Management of a Laryngeal Injection Needle Impacted in the Paraglottic Space

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Purpose: Describe management of a laryngeal injection needle impacted in the paraglottic space.

Method: Case report.

Summary: A 78 year old male with a history of irradiation to his neck for medullary thyroid cancer presented with gradually worsening dysphonia. Videostroboscopy demonstrated adynamic vocal folds consistent with radiation-induced fibrosis, and a small polyp. The patient underwent suspension microdirect laryngoscopy with microflap excision of the polyp and injection of fat and fascia to help restore vocal fold vibration. At the time of injection into the left vocal fold, an explosive noise erupted from the operative site. The BrÄ¼nings-type laryngeal injector (Karl Storz, Tuttlingen, Germany) was withdrawn from the laryngoscope to find that the welded-on needle tip was missing from the injector. Careful examination of the glottis, subglottis, and hypopharynx revealed no evidence of the needle. Intraoperative radiographs confirmed that the needle tip was deeply embedded in the left paraglottic space, nearly two centimeters deep to the original injection site. The microphonosurgical sickle knife, curved alligators and micro-cup forceps were used to delicately dissect down to the level of the needle and retrieve it without vocal fold injury. Postoperatively, the patient had a prolonged recovery period due to early excessive edema, but ultimately regained a strong voice result with improved vibration on videostroboscopy.

Conclusion: We describe the management of an unusual occurrence of a laryngeal needle impacted in the paraglottic space.

#142

**Presentation, Diagnosis and Treatment of Paradoxical
Vocal Fold Motion/Vocal Cord Dysfunction**

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Purpose of the Study: Paradoxical vocal fold motion/vocal cord dysfunction (PVFM/VCD) remains a poorly classified disorder encountered by multiple subspecialties including otolaryngology, pulmonology, allergy, and anesthesia. The goal of this study was to investigate common presentations and diagnoses of patients originally referred to speech pathology with PVFM/VCD.

Design and Method of Study and Analysis: Retrospective review of all patients referred for standardized evaluation by otolaryngology with speech pathology at a tertiary academic center for PVFM/VCD from 2004-2008. Variables of study included age, sex, referring diagnosis, final diagnosis, symptoms, examination findings, exacerbating events, associated medical diagnoses, and pulmonary function tests.

Summary of Results: Sixty-one patients (67% female; 33% male) were referred to speech pathology between 2004-2008 for PVFM/VCD. The average age at presentation was 36 years (range 13-65 years). 51% were referred for VCD, 21% for VCD with dyspnea on exertion, and 16% for possible VCD. Common presenting symptoms included: dyspnea on exertion (67%), wheezing (39%), stridor (18%) and shortness of breath with environmental exposure (16%). The referring service visualized PVFM in 31 patients (51%); however, these findings were confirmed in only 4 patients (7%) examined by otolaryngology with speech pathology. Alternative final diagnoses which mimicked PVFM/VCD included: reflux (41%), asthma (13%) and vocal fold pathology (7%).

Conclusions: PVFM/VCD remains a confusing diagnosis, often mimicked by other disorders. This challenging presentation underscores the importance of a multidisciplinary approach to PVFM/VCD.

#143

**Application of Composite Free Tissue Transfer
in Airway Reconstruction**

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Purpose of Report: Design a composite free radial forearm flap incorporating cartilage and soft tissue for repair of a recalcitrant laryngocutaneous fistula, and review of literature.

Design and Method of Study and Analysis: Clinical case report.

Summary of Results: A 68 year old male with history of supraglottic squamous cell carcinoma status post failed chemoradiation therapy and a supracricoid laryngectomy with cricohyoidoepiglottopexy presented with a recalcitrant laryngocutaneous fistula. The patient underwent a staged reconstructive procedure. First stage involved harvesting chonchal cartilage, and embedding it subcutaneous into the forearm donor site. The second stage occurred 4 weeks after the first procedure. This involved harvesting the composite radial forearm flap and closing the laryngocutaneous fistula. The skin paddle overlying the implanted cartilage was placed directly against a laryngeal stent. At one month postoperatively, the patient's laryngocutaneous fistula was closed, stent removed, and patient decannulated.

Conclusion: Composite free tissue transfer provides a promising, viable alternative means for airway reconstruction.

#144

**Age-Associated Changes in Matrix
Metalloproteinase Gene Expression in Aged Rat
Vocal Folds**

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Matrix metalloproteinases (MMPs) play a key role in physiological and pathological tissue remodeling. MMP-2 and MMP-9 display collagenolytic activity and are considered two of the key enzymes that participate in turnover of collagen in the extracellular space. Age-associated changes in genes coding MMPs may contribute to a greater understanding of collagen turnover in aged vocal folds. The purpose of the current study was to investigate age-associated changes in MMP-2 and MMP-9 gene expression in aged rat vocal folds and compare those changes with age-associated changes in collagen deposition. Three groups of male Sprague-Dawley rats aged 2 months, 9 months, and 18 months were studied (seven per group). Real-time polymerase chain reaction (PCR) was used to quantify MMP-2 and MMP-9 gene expression. PCR analyses were performed with 5 young (2 months), 5 adult (9 months), and 5 elderly (18 months) rats in each age group. Histological staining was performed with 2 young, 2 adult, and 2 elderly rats per group. Separate one-way analysis of variance (ANOVA) tests were used to investigate differences in gene expression across age groups. ANOVA revealed a significant main effect for MMP-2 and MMP-9 gene expression across age. Post-hoc pair wise comparisons revealed significantly downregulated MMP-2 and MMP-9 gene expression in the adult and elderly rat vocal folds, compared to young rat vocal folds. Histological staining revealed dense collagen deposition in the vocal folds of adult and elderly rats, compared to young rats. Results may contribute to a better understanding of collagen turnover in the aged vocal fold.

#145

**Positron Emission Tomography (PET)
Enhancement after Vocal Fold Injection
Medialization**

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Case reports have documented increased PET uptake of the vocal fold after injection medialization procedures, in the absence of local malignancy. A systematic retrospective review was carried out at 2 institutions of patients to identify patients with vocal fold paralysis. Charts were reviewed for patients who had an injection medialization procedure who also had a PET scan done subsequent to the procedure. Patients with head and neck cancer were excluded. Eight patients were found, and multiple variables were noted, including type of injectate, time interval of procedure to PET scan, and uptake values. Five of the patients were medialized with calcium hydroxylapatite gel (Radiesse Voice) and three with methylcellulose gel (Radiesse Voice Gel). The mean interval of time from the date of injection medialization to PET scan was 2.4 months (range, 0.4 to 6.9 months). There was no correlation between the medialization-to-PET time interval and strength of enhancement on PET as measured by Standard Uptake Value (SUV). In conclusion, vocal fold injectates were found to have highly variable PET enhancement. This study is relevant for diagnostic interpretation of PET uptake in the face of malignancy and also has implications in tissue reactivity to vocal fold injectable materials.

#146

Complications of Collagen Injection for Vocal Fold Augmentation

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Purpose: Vocal fold augmentation (VFA) through collagen injection has been shown to be a safe and effective method for temporary improvement of glottic insufficiency. Very few studies have reported complications as a result of vocal fold augmentation with collagen.

Study Design: A retrospective chart review of all patients undergoing VFA with Zyplast® or Cosmoplast® collagen from the years 2001 to 2008.

Summary of Results: A total of 55 patients were identified who underwent 65 VFA injections with collagen. Twenty-one patients underwent 25 injections under general anesthesia in the operating room (four patients had bilateral injections). Thirty-two patients underwent 40 injections in the clinic (one patient underwent two separate injections and six patients underwent bilateral injections). Overall, complications occurred in 9/65 (14%) of injections. Two patients (one operating room and one clinic) developed true vocal fold epithelial inclusion cysts as a result of the injection requiring microflap excision. Seven clinic injections resulted in subepithelial collagen deposits that showed decreased wave on stroboscopy. Two of these deposits were seen after Cosmoplast® injection, and the other five occurs after Zyplast® injection. Of these seven, only two reported worsening of their voice after the injection that later resolved after 6 months.

Conclusions: Subepithelial collagen deposition occurs in a small number of patients undergoing VFA and can lead to dampening of the vibratory parameters and worsening of the voice. In all cases, this resolves by 6 months. An unusual complication of epithelial inclusion cyst formation can be treated successfully with microflap excision.

#147

**A Perioperative Management Technique for
Patients with True Vocal Cord Immobility
Secondary to Periararytenoid Scar**

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Purpose: This study presents a novel method for perioperative management of patients with true vocal cord (TVC) immobility secondary to periararytenoid scar. This perioperative management technique consists of scheduled voice use by prescribing short periods of regular, audible reading for two weeks after suspension microlaryngoscopy.

Methods: Three patients are presented with periararytenoid scar from a variety of etiologies. In the operating room, they were found to have immobile arytenoids due to scarband extending from the interarytenoid area to the vocal process. Each patient underwent microlaryngoscopy with laser excision of scarband. With routine postoperative care (including voice rest) all patients rescarred within 6 weeks, requiring a repeat procedure. On repeat procedure, these patients were prescribed postoperative therapy consisting of five minutes of audible reading every two hours for one week, followed by five minutes of reading every four to six hours for the second week. Pre- and postoperative subjective evaluation of voice quality was measured. Acoustic parameters were also measured using the Computerized Speech Lab (KayPentax, Lincoln Park, NJ). Videostroboscopy was used to measure TVC mobility before and after surgery.

Results: All patients showed improvements in subjective voice quality and airway obstruction. Acoustic parameters supported the patients' subjective improvements. Videostroboscopy demonstrated improvement in abduction in all patients, with one patient achieving nearly full motion, and all patients being decannulated.

Conclusions: A postoperative therapy regimen consisting of scheduled voice use may improve TVC mobility in patients with TVC immobility secondary to periararytenoid scar.

#148

**Management of Traumatic Pseudodiverticula
Using an Endoscopic Stapler-Assisted
Technique**

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Purpose: Pharyngoesophageal perforations are a devastating complication of anterior cervical spine surgery. During healing, these patients may develop pseudodiverticula secondary to infection, inflammation, and scarring. We report two cases of traumatic pseudodiverticula and introduce the application of the endoscopic stapler to manage this condition.

Study Design: 2 Cases

Cases: Two patients presented to our institution with pseudodiverticulum formation after pharyngoesophageal perforation secondary to anterior cervical spine surgery. The first patient was a 78 year old male who presented with an epidural and parapharyngeal abscess with exposed hardware. He subsequently underwent hardware removal and multiple washouts with drain placement and presented with a pseudodiverticulum one year later. The second patient is a 50 year old female with a similar surgical history who also had a pharyngoesophageal perforation. She also underwent hardware removal and repair of her esophagus and subsequently healed with a large pseudodiverticulum. Both patients had significant dysphagia.

Management: In both cases, the pseudodiverticulum was easily visualized using a Weerda scope. An endoscopic GIA-30 stapler was modified by removing the tip of the metal anvil. The stapler was then inserted under direct visualization using a rigid telescope to engage the wall between the pseudodiverticulum and the esophagus and fired. There was no evidence of leakage.

Conclusions: Postoperatively, both patients had considerable improvement in their swallowing. To our knowledge, this is the first report of pseudodiverticulum formation after pharyngoesophageal perforation. The endoscopic stapler assisted technique offers a safe and minimally invasive alternative to traditional open approaches.

**Ablation of Tracheobronchial Respiratory
Papillomas with Two Types of Laser Fibers
Introduced Through a Flexible Bronchoscope**

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Purpose: Recurrent respiratory papillomatosis (RRP) is a frustrating disease, as papillomas may grow and spread throughout the airway, ultimately becoming unreachable by standard surgical means. We were faced with the challenge of tracheobronchial RRP inaccessible by a line-of-site carbon dioxide (CO₂) laser attached to a microscope. We report on and compare the use of flexible potassium-titanyl-phosphate (KTP) and CO₂ laser fibers introduced through the working channel of a flexible bronchoscope for ablation of tracheobronchial RRP.

Method: Case series and literature review.

Results: The KTP laser was used in two patients and the flexible CO₂ laser in one. Lesions as distal as the left mainstem bronchus were accessible by the flexible bronchoscope. Both lasers were effective in controlling disease. The CO₂ laser carries the advantage of precisely removing papillomas, while minimizing damage to surrounding tissue. However, the flexible CO₂ laser fibers burned out when wet, necessitating the use of several fibers during the case. Conversely, the KTP laser fiber may be trimmed intermittently when overheated, allowing the use of only one fiber per case. Both laser fibers require removal from the bronchoscope to either clean or replace them.

Conclusions: Introduction of laser fibers through the working channel of a flexible bronchoscope increases access to papillomatous disease of the tracheobronchial tree. Both the KTP and CO₂ laser fibers were found to be effective in controlling disease, but each have their own limitations. To our knowledge, the use of a flexible CO₂ laser to reach tracheobronchial disease has not been reported to date.

#150

Intratracheal Skin Tract: An Under Recognized Cause of Tracheal Obstruction and Suprastomal Collapse

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Objectives: Describe a cause of tracheal obstruction and its surgical management: 1) An intratracheal skin tract is stomal skin tract which enters the lumen of the trachea and can mimic suprastomal collapse 2) Management includes stomal revision to excise the skin tract.

Design: Retrospective review

Setting : Tertiary care referral center

Patients: Twenty eight children with intratracheal skin tract were identified between 2004-2008.

Intervention: Microlaryngoscopy and bronchoscopy, stomal revision and airway reconstruction.

Main Outcome Measures: 1) Clinical description 2) surgical management 3) recurrence rate

Results: 28 subjects were identified with data available for review. Demographics: 18 Males: 10 Females. Age range 9 months to 22.5 years (mean 4.1 years). 25 with additional airway pathology needing treatment: 1 posterior glottic stenosis, 2 tracheoesophageal fistula, 3 bilateral cord fixation, 3 tracheal stenosis, and 18 subglottic stenosis. Treatment: 5 stoma revision alone, 16 excised during open airway surgery to treat other pathology, 7 observed. None recurred following surgical treatment.

Conclusions: Intratracheal skin tract is a frequently under recognized cause of tracheal obstruction and suprastomal collapse. Stoma revision and excision of the tract is the primary modality of treatment. Patients with additional airway pathology can be managed concurrently with other airway pathology. Clinical recognition of this entity prior to surgical therapy can influence management.

#151

**Hypopharyngeal Extrusion of 2.5 Feet of
Gore-Tex: Initial Laser Assisted Office-Based
Removal and Micropharyngeal Completion**

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Extrusion of an implant after medialization laryngoplasty is unusual and warrants removal. Most commonly, it extrudes through the laryngeal introitus but rarely through the pyriform sinus. A case report in which 2.5 feet of GORE-TEX was removed from a patient is presented to evaluate factors that led to this surgical complication and strategies that solved the problem.

An 80 year old female had undergone thyroidectomy and external-beam radiation in the 1950s. In 2002, a second surgeon noted a paralyzed right vocal fold and performed a medialization laryngoplasty with Gore-Tex. In 2008, she saw a third surgeon due to odynophagia and was noted to have a mucosal irregularity (~1cm) in the right pyriform sinus. Due to multiple medical problems, a flexible laryngoscopic biopsy was planned, which revealed extruding GORE-TEX. Remarkably, after 1 foot of Gore-Tex was retrieved, it became lodged in the laryngeal parenchyma. To avoid a long strip of Gore-Tex dangling within her laryngeal introitus, an assistant grasped the Gore-Tex tape through the oropharynx and a fiber-based KTP laser was used to sever the Gore-Tex proximally. The next day, she underwent an elective microscopic-controlled removal of another 1.5 feet of GORE-TEX. She healed uneventfully with no further sequelae.

Analysis of this case illustrates a number of factors leading to a rare iatrogenic foreign-body complication. Office-based removal evolved into a unique scenario in which the rapid use of a fiber-based laser to divide the foreign body facilitated stabilizing the airway to allow for elective completion removal in a controlled fashion.

#152

**Microendoscopic Laryngeal and Pharyngeal
Reconstruction for Treatment of Chemoradiation
Induced Dysphagia and Dysphonia.**

Sunil Verma, MD*

Uttam Sinha, MD*

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WITHDRAWN

#153

**Paradoxical Vocal Fold Motion: Incidence of the
Clinical Finding within a Laryngology Practice**

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Boston, MA

Background and Aim: The term Paradoxical Vocal Fold Motion (PVFM) is used to describe a respiratory condition diagnosed by abnormal adductory motion during breathing. PVFM is also a clinical feature seen on laryngoscopy. The epidemiology of this disorder is very confusing and different studies have reported variable incidences of PVFM. Given the association of PVFM with asthma, most studies are generated from the respiratory and pulmonary literature and it is felt to be present in 3 to 40% of patients with exercise-induced asthma. The clinical feature of paradoxical adduction during breathing is seen on laryngoscopy and is used to confirm suspected cases of PVFM. Utilizing a database of over 10,000 recorded flexible laryngoscopic examinations over the past 12 years, we studied the number of times the clinical findings of paradoxical adduction during inspiration was identified and the associated clinical findings.

Method: Retrospective data was generated from a database of recorded laryngeal exams of a tertiary laryngology referral center.

Results: From 1994 to 2006, 10,273 laryngeal examinations were archived within the database. 29 patients were found to have paradoxical motion of the vocal folds during breathing. There were 25 adults and 4 children. 25 of the 29 (86%) were female. Overall prevalence of this finding was 0.28% in our population. 28 of the 29 had breathing symptoms as a reason for laryngeal examination.

Conclusion: The clinical finding of paradoxical vocal fold motion during laryngoscopy is rare within the laryngology population and the finding is highly associated with breathing symptoms.

#154

Iatrogenic Tracheobronchial Foreign Body in a Neonate

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Purpose: To review the clinical presentation and endoscopic management of an iatrogenic tracheobronchial foreign body in a neonate.

Methods: A 7-day-old 800-gram male was transferred on nasal continuous positive airway pressure to our neonatal intensive care unit for workup of esophageal obstruction. Initial chest x-ray (CXR) showed increased interstitial lung markings with an opacification at the right base. On hospital day 9, the patient was intubated for worsening respiratory distress. CXR upon extubation three days later suggested a tubular structure in the right mainstem bronchus that, in retrospect, had been present on prior studies. Computed tomographic scan confirmed the presence of a foreign body within the trachea.

Summary: In the operating room with the patient spontaneously breathing, a Parsons laryngoscope was placed in the vallecula to expose the larynx. A 4.0mm zero-degree endoscope was introduced and a tubular plastic foreign body resembling a suction catheter was visualized in the subglottis. The foreign body moved with respiration but did not rise above the level of the subglottis. Microlaryngeal cup forceps were advanced through the glottis and used to pull the foreign body out of the airway. Subsequent bronchoscopy demonstrated no airway injury.

Conclusions: Aerodigestive foreign bodies are extremely rare in neonates and can be easily overlooked, especially if iatrogenic. The compressibility and patency of the catheter lumen likely contributed to the delay in diagnosis in this patient. Given the difficulties of managing a neonatal airway foreign body, a clear and precise preoperative surgical and anesthetic plan is imperative.

#155

**Laryngeal Amyloid Misdiagnosed as Muscle
Tension Dysphonia**

Tanya Meyer, MD
Baltimore, MD

Purpose: To describe a case of laryngeal amyloid misdiagnosed as muscle tension dysphonia.

Method: Case Presentation

Summary: 41 year old female with a history of anxiety and irritable bowel syndrome suffered two to three years of hoarseness. She had an extensive work-up including multiple laryngoscopies by several otolaryngologists, upper endoscopy by a gastroenterologist with pH probe testing, treatment for two years with double dose proton pump inhibitors and promotility agents, allergy testing and treatment, and prolonged voice therapy. She was eventually diagnosed with asymmetric supraglottic hyperfunction that was felt to be functional in nature. At her insistence she was sent for a second opinion. She was never offered neck imaging. At diagnostic endoscopy she was found to have a left false vocal fold mass that caused premature closure of the false vocal folds and precluded closure of the true vocal folds. She was taken to the operating room for CO2 laser resection of the mass. In the recovery room on emergence from anesthesia her voice had normalized. Her pathology was consistent with Amyloidosis.

Conclusions: Isolated amyloidosis can present in the false vocal fold as a submucosal mass causing dysphonia.

#156

**Tracheal Non-Hodgkin's Lymphoma (NHL)
Masquerading as Benign Granulation Tissue: A
Report of Two Cases**

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Objectives: We review the clinical presentation, evaluation and treatment of two cases of tracheal NHL mimicking granulation tissue.

Study Design: Case report.

Methods: A 67 year old male with myelodysplastic syndrome underwent multiple biopsies of a tracheal lesion which returned benign granulation tissue. Workup for Wegener's granulomatosis and reflux were negative. Bronchoscopy revealed a fungating mass causing 90% stenosis of the proximal trachea. He required tracheotomy for respiratory failure.

A 47 year old male with multiple intubations during a recent hospitalization presented with dyspnea and stridor. Flexible laryngoscopy was unremarkable. Bronchoscopy confirmed tracheal narrowing seen on CT, and demonstrated granulation tissue. Repeat bronchoscopy following a course of steroids showed a mature circumferential stenosis, 4 cm long. Serial rigid dilations were performed for symptomatic relief.

Results: In both cases initial biopsies returned granulation tissue. However, after requests from the diagnostic team to rule out lymphoma, additional immunohistochemical stains and PCR confirmed NHL. XRT was initiated. The first patient responded well and remains disease-free after three years. The second patient died of airway obstruction due to severe distal tracheal stenosis.

Conclusions: Primary tracheal lymphomas are rare, with only a few reported cases, and can mimic the appearance of granulation tissue or benign tracheal stenosis. Recurrent granulation tissue should raise suspicion of malignancy and prompt further tissue evaluation for evidence of lymphoma. Steroids for airway compromise may cause progression to mature stenosis as prednisone is used in the treatment of lymphoma. Localized disease involving the central airways may be treated successfully with radiotherapy.

#157

**Long-Term Laryngeal Allograft Survival Using
Low-Dose Everolimus**

David Lott, MD*

Olivia Dan, BS*

Lina Lu, MD*

Cleveland, OH

Marshall Strome MD, MS, FACS

New York, NY

WITHDRAWN

#158

**Dysphagia and Dyspnea Secondary to Vascular
Compression in Velocardiofacial Syndrome**

Sivakumar Chinnadurai, MD*

Dana Thompson, MD

Rochester, MN

Purpose: Velocardiofacial syndrome (VCF) is a genetic disorder of particular importance to the Otolaryngologist with profound affects on the aerodigestive function of patients. As illustration, we will discuss the case of an infant presenting with both dysphagia lusoria and dyspnea resulting from a previously unreported combination of vascular anomalies in the setting of VCF.

Methods: A 12 month old male presented to the Otorhinolaryngology clinic for evaluation of dysphagia and stridor. A previous diagnosis of Cricopharyngeal achalasia had been made, and was treated unsuccessfully with cricopharyngeal Botox. On radiographic evaluation, with a barium swallow and a CT angiogram, he was found to have posterior esophageal compression due to an aberrant right subclavian artery, and anterior tracheal compression from a medial origin of the right common carotid artery. A combination of vascular anomalies that, to the best of our knowledge, has not been previously reported in the Otolaryngology literature.

Conclusion: Vascular anomalies may present with uncommon symptoms or in various permutations. Dysphagia and dyspnea are common reasons for referral to an Otolaryngologist. Symptoms should be individually recognized and addressed by a practitioner familiar with these conditions to ensure appropriate diagnostic evaluation and prompt, comprehensive treatment.

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