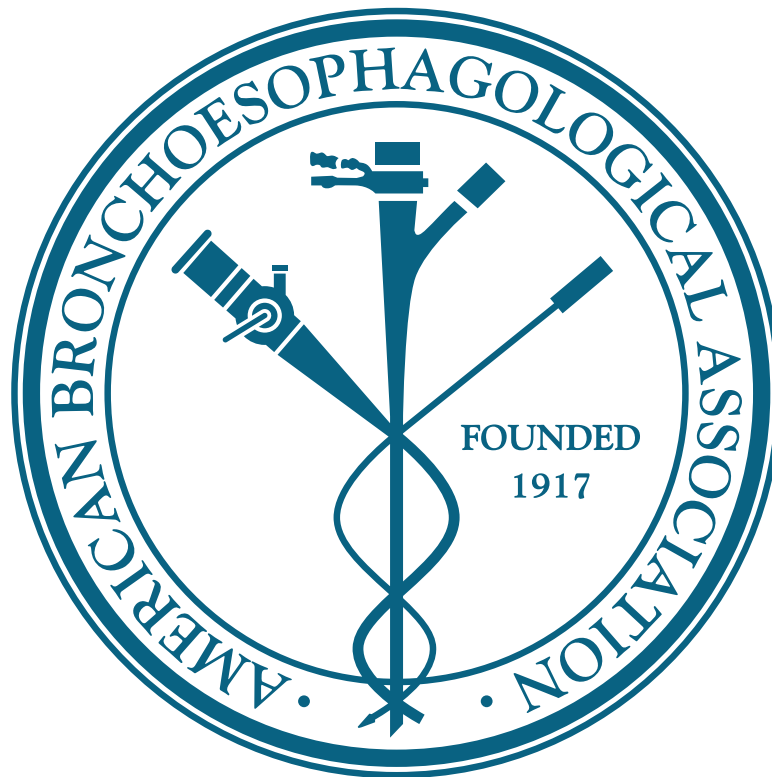


THE PROGRAM OF THE ANNUAL MEETING OF  
**THE AMERICAN BRONCHO-  
ESOPHAGOLOGICAL  
ASSOCIATION**



April 7<sup>th</sup> & April 8<sup>th</sup> 2021

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*The Laryngoscope* is the official journal of ABEA



*The Laryngoscope* has been the leading source of information on advances in the diagnosis and treatment of head and neck disorders for nearly 120 years. *The Laryngoscope* is the first choice among otolaryngologists for publication of their important findings and techniques. Each monthly issue of *The Laryngoscope* features peer-reviewed medical, clinical, and research contributions in general otolaryngology, allergy/rhinology, otology/neurotology, laryngology/bronchoesophagology, head and neck surgery, sleep medicine, pediatric otolaryngology, facial plastics and reconstructive surgery, oncology, and communicative disorders. Contributions include papers and posters presented at the Annual and Section Meetings of the Triological Society, as well as independent papers, “How I Do It”, “Triological Best Practice” articles, and contemporary reviews. Theses authored by the Triological Society’s new Fellows as well as papers presented at meetings of the American Laryngological Association and American Broncho-Esophagological Association are published in *The Laryngoscope*.

# 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.

This scientific program will provide attendees with an advanced understanding of current issues regarding the diagnosis and management of complex swallowing disorders, voice disorders, airway disorders and operative procedures used in the management of disorders of the upper aerodigestive tract.

Special focus will be placed on issues relevant to laryngology.

Attendees will also be provided with advanced knowledge and techniques enabling them to compare and refine their medical and surgical skills to include best practice performance and optimize patient outcomes. These outcomes will also introduce them to deficits in current knowledge and future research needs.

## American Broncho-Esophagological Association

# It Takes A Village



**Karen B. Zur, MD**  
**President, ABEA, 2020–2021**

I joined the Council of the ABEA in the Spring of 2010, fortunate to be selected by Dr Michael Rothschild, the President of our organization at that time, as the year's Program Chair. It was quite a year. In July of 2009 I gave birth to my twin girls (Ellie & Arielle), and the notion of taking on this additional major responsibility with infants in the household was a bit overwhelming. But I said "Yes, of course." It was the best decision of my non-clinical work-life and career.

When I was on maternity leave and trying to figure out how to continue with my personal mission of clinical excellence, productivity, and expansion of the nascent Voice Program I had started at Children's Hospital of Philadelphia (CHOP), I was faced with a more challenging dilemma: how to balance my work life with my personal responsibility to my twin babies, husband and parents (and, of course, our dog Zach). I had some difficulty finding full-time support, and my parents who were living in Miami at the time offered to help by sacrificing their own lifestyle: my mother moved in with us. Dad would commute.

I remember calling one of our colleagues and friend, Dr Nancy Snyderman, who I had met as a fellow at Cincinnati Children's Hospital when she came to lecture. We remained in touch and she became an unofficial life mentor for me. The bottom-line of the conversation was succinct: "It Takes a Village", she said. It was that simple. Do not feel guilty about asking for help, and surround yourself by great people. Eleven years later, I still appreciate her advice! I hired Crystal to be with the girls during the day, and my mother would help us overnight. We unexpectedly became a three-generational household that sometimes seemed like a subway station in NYC. Very busy.

Eleven years later, I am sitting at my 'desk' in our living room, with my ring lights attached to the makeshift work-station (aka side table) where I have spent my administrative days during the COVID-19 pandemic as the Chief of Otolaryngology at Children's Hospital of Philadelphia. I received a call at 8:00 AM on March 16, 2020 asking if I would become the interim Chief of our Division. I, of course, obliged.

This was a dream in the making. I did not for one second hesitate nor contemplate the additional workload that was coming my way. I knew that I would make it happen. It takes a village has been my motto for all these years. I knew my family would be supportive and that my colleagues at work would rally. And they all did! Of course, it took me about a week to also realize that I was about to start my ABEA Presidency year, so the remainder of 2020 would become even more packed with activities and responsibilities. My position at CHOP became official on December 1, 2020.

A reflection on what influenced me over the years and what I see as some reasons for success helped me decide that this year's Annual ABEA meeting would highlight the notion that "It Takes a Village". Not only in our own private lives, but also in our work environment and community. I will share more insights about this at the opening of our Virtual ABEA meeting on April 7, 2021. The multidisciplinary panel and keynote lectures that are planned are a testament to the importance of working together and collaborating with allied health professionals.

The ABEA has accomplished a great deal in the past year: we have fully integrated our new management team; our financial position is strong; the membership drive led by Dr Liz Guardiani was a success; the Development Committee's fundraiser led by Dr Lee Akst allowed us to maintain financial health; the Outreach Committee led by Dr Romaine Johnson had a successful webinar done jointly with the American Society of Pediatric Otolaryngology; our commitment for thoughtful leadership and ensuring Diversity, Equity & Inclusion amongst our members and leaders is displayed in our committee and leader selections and in some of the presentations highlighted at this year's Virtual Meeting.

Some other notable accomplishments by our ABEA membership include the pioneering work of Dr Ian Jacobs and Dr Kris Jatana. During Dr Peter Koltai's presidency in 2012, Dr Jacobs was asked to initiate a Button Battery Taskforce to help combat the epidemic known as button battery ingestions (some quite fatal). Dr Jacobs along with Dr Jatana and members of the American Academy of Pediatrics, American Society of Pediatric Otolaryngology and industry worked tirelessly to research and advocate for prevention of easy access to button batteries as well as management of accidental injuries. This collaborative work is coming to fruition.

It is my great honor to announce that Dr Ian Jacobs will be the recipient of the Chevalier Jackson Award 2021. I cannot think of anyone more deserving to follow in the spirit of Dr. Chevalier Jackson's mission to curb accidental airway injuries and advance the field of bronchoesophagology. Please join me during the opening session of our two half-day virtual sessions to congratulate Dr Jacobs and to also honor the following colleagues: Dr Michael Rothschild (Guest of Honor); Dr Peak Woo, Dr Mike Rutter, Dr Dana Thompson, and the Zur-Biron Family (Presidential Citations).

I want to thank every one of you, especially the members of the Board and Executive Board of the ABEA, as well as Charlotte Grill, our Executive Director from Affinity. You have made this unusual pandemic year a joy. Our monthly Zoom meetings were productive, well attended (even though they were after hours for many of us on the East Coast) and I am lucky to have been part of this Family and Village. Next month I will be passing on the baton to your next president, Dr Seth Dailey, and I am certain that he will continue to guide the ABEA out of the pandemic with some innovative ideas to promote our organization and its mission to educate our community of physicians and to pursue more advocacy in the community-at-large.

Yours Fondly,  
**Karen B. Zur, MD**

# Officers, Council Members, Committee Chairs, and Representatives 2020-2021

## ABEA Officer

**President:**

Karen Zur

**Secretary:**

Michael Pitman

**President – Elect:**

Seth Dailey

**Vice President:**

Peter Belafsky

**Treasurer:**

Gresham Richter

**Editor:**

Mark Courey

**Immediate Past President:**

Albert Merati

**Councilors-At-Large:**

Michael Hinni,  
Michael Johns

**Executive Director:**

Charlotte Grill

## Liaisons and Representatives

COSM SLC Representative: Michael Pitman

ACS Advisory Council Representative: Alexander Hillel

AAO-HNS BOG Governor Representative: Libby Smith

ABEA Resident Liaisons: Anisha Noble, Ryan Borek

## ABEA Committee Chairs

Awards and Thesis Committee: Albert Merati

Community Outreach Committee: Romaine Johnson

Clinical Practice Committee Chair: Kris Jatana

Development Committee Chair: Lee Akst

Difficult Airway and Foreign Body Accidents Committee:  
Ari Derowe

Finance and Audit Committee: Vyvy Young International

Relations Committee: Christian Sittel Liaison Oversight

Committee: David Rosow Membership Committee: Liz  
Guardiani

Nominating Committee: Albert Merati

Pharyngeal and Esophageal Committee: Maggie Kuhn

Research and Education Committee: David Francis

Scientific Program Chair: Doug Sidell

Social Media Committee: Paul Bryson

BOG/Grassroots: Libby Smith

## ABEA Representatives to the Laryngoscope

Associate Editor: Joel Blumin

Editorial Board: Jonathan Bock

Editorial Board: Julina Ongkasuwan

# ABEA Past Presidents

1917	Chevalier Q. Jackson, MD	1970	Richard W. Hanckel, MD
1918	Hubert Arrowsmith, MD	1971	John R. Ausband, MD
1919	John W. Murphy, MD	1972	John S. Knight, MD
1920	Henry L. Lynah, MD	1972	Richard A. Rassmussen, MD
1921	Harris P. Mosher, MD	1973	Gabriel F. Tucker, Jr., MD
1922	Samuel Iglauer, MD	1974	Howard A. Andersen, MD
1923	Robert C. Lynch, MD	1975	Walter H. Maloney, MD
1924	Ellen J. Patterson, MD	1976	Seymour R. Cohen, MD
1925	William B. Chamberlin, MD D.	1977	Paul H. Ward, MD
1926	Crosby Greene, MD	1978	James B. Snow, Jr., MD
1927	Sidney Yankauer, MD	1979	Joyce A. Schild, MD
1928	Charles J. Imperatori, MD	1980	Loring W. Pratt, MD
1929	Thomas E. Carmody, MD	1981	M. Stuart Strong, MD
1930	Henry B. Orton, MD	1982	Bernard R. Marsh, MD
1931	Louis H. Clerf, MD	1983	John A. Tucker, MD
1932	Richard McKinney, MD	1984	Frank N. Ritter, MD
1933	Waitmam F. Zinn, MD	1985	William R. Hudson, MD
1934	Henry Hall Forbes, MD	1986	David R. Sanderson, MD
1935	H. Marshall Taylor, MD	1987	C. Thomas Yarrington, Jr., MD
1936	Joseph C. Beck, MD	1988	Robert W. Cantrell, MD
1937	Gordon Berry, MD	1989	H. Bryan Neel, III, MD
1938	John Kernan, MD	1990	Gerald B. Healy, MD
1939	Lyman Richards, MD	1991	Charles W. Cummings, MD
1940	Gabriel Tucker, MD	1992	Lauren D. Holinger, MD
1941	W. Likely Simpson, MD	1993	Haskins K. Kashima, MD
1942	Robert L. Morehead, MD	1994	Eiji Yanagisawa, MD
1943	Robert L. Morehead, MD	1995	Robert H. Ossoff, DMD, MD
1944	Carlos E. Pitkin, MD	1996	Stanley M. Shapshay, MD
1945	Carlos E. Pitkin, MD	1997	Rodney P. Lusk, MD
1946	Robert M. Lukens, MD	1998	W. Frederick McGuirt, Sr., MD
1947	Millard F. Arbuckle, MD	1999	Paul A. Levine, MD
1948	Paul H. Holinger, MD	2000	Ellen M. Friedman, MD
1949	Leroy A. Schall, MD	2001	Robin T. Cotton, MD
1950	Chevalier L. Jackson, MD	2002	Peak Woo, MD
1951	Herman J. Moersch, MD	2003	Charles N. Ford, MD
1952	Fred W. Dixon, MD	2004	Steven M. Zeitels, MD
1953	Edwin N. Broyles, MD	2005	Jonathan E. Aviv, MD
1954	Clyde A. Heatly, MD	2006	Gady Har-El, MD
1955	Daniel S. Cuning, MD	2007	Clarence T. Sasaki, MD
1956	Clarence W. Engler, MD	2008	Jamie A. Koufman, MD
1957	Walter B. Hoover, MD	2009	Andrew Blitzer, MD, DDS
1958	Francis W. Davidson, MD	2010	Michael Rothschild, MD
1959	Verling K. Hart, MD	2011	Gregory Postma, MD
1960	F. Johnson Putney, MD	2012	Peter J. Koltai, MD
1961	Alden H. Miller, MD	2013	Ellen Deutsch, MD
1962	Joseph P. Atkins, MD	2014	Gregory A. Grillone, MD
1963	Stanton A. Friedberg, MD	2015	J. Scott McMurray, MD
1964	Charles N. Norris, MD	2016	Dana M. Thompson, MD
1965	Daniel C. Baker, Jr., MD	2017	James Burns, MD
1966	Blair W. Fearon, MD	2018	Milan Amin, MD
1967	Francis E. LeJeune, MD	2019	Albert L. Merati, MD
1968	Charles F. Ferguson, MD	2020	Karen B. Zur, MD
1969	Arthur M. Olsen, MD		

# **ABEA 2021 Program Committee**

## **Program Chair:**

Douglas Sidell, MD

## **Program Committee Members:**

Karen B. Zur, MD

Seth Dailey, MD

Albert L. Merati, MD

Julina Ongakuswan, MD

Lee Akst, MD





# **ABEA 2021 Annual Meeting Program**

**April 7<sup>th</sup> (8am–12pm CST) & April 8<sup>th</sup> (1pm–5pm CST)**

## Wednesday April 7<sup>th</sup>

8am–12pm CST

- 8:00–8:30am      **Welcome and Recognition**  
*Karen Zur, MD, ABEA President, Children's Hospital of Philadelphia, PA*
- 8:30–9:15am      **Scientific Session 1**  
**(PEDIATRIC OTOLARYNGOLOGY)**
- Moderators:**      **Karthik Balakrishnan, MD, MPH, Stanford University, CA &**  
                                 **Alanna Windsor, MD, The Children's Hospital at Montefiore, NY**
- 8:30–8:36am      **Alternative Management Strategy For Grade 4 Subglottic Stenosis**  
*Chris Mularczyk, Michael Gorelik, Carolyn Jenks, Taher Valika (Ann & Robert H. Lurie Children's Hospital of Chicago)*
- 8:36–8:42am      **An Analysis Of Tracheostomy Complications In Pediatric Patients With Scoliosis**  
*Swathi Appachi, Jessie Marcet-Gonzalez, Jennifer N Brown, Julina Ongkasuwan I, Elton M Lambert (Texas Children's Hospital/Baylor College of Medicine, TX; Texas Children's Hospital, TX)*
- 8:42–8:48am      **The Efficacy Of Two Commercially Available Devices To Relieve Acute Foreign Body Aspiration**  
*Apoorva T Ramaswamy, Aaron Done, Roberto Solis, Lisa Evangelista, Peter Belafsky (University of California Davis, CA)*
- 8:48–8:54am      **Establishing An Endoscopic Chronic Subglottic Stenosis Rabbit Model**  
*Orna Katz Kadosh, Ivanna Nebor, Matthew M Smith, Catherine K Hart, Alessandro de Alarcon, Debora I Sinner (Cincinnati Children's Hospital Medical Center, OH)*
- 8:54–9:00am      **Quantifying Upper Aerodigestive Sequelae Utilizing Procedure Interventions In Esophageal Atresia/Tracheoesophageal Fistula Neonates.**  
*Kelli Nicole Patterson, Tariku Beyene, Lindsey Asti, Abdulrahman Althubaiti, Meredith Lind, Prasanth Pattisapu (Nationwide Children's Hospital, OH)*
- 9:00–9:06am      **Systemic Bevacizumab Treatment For Recurrent Respiratory Papillomatosis: Long Term Follow-up**  
*Ryan Ruiz, Naomi Balamuth, Luv Javia, Karen B Zur (Children's Hospital of Philadelphia, PA)*
- 9:06–9:20am      **Discussion**
- 9:20–9:40am      **Presentation of Honorees**
- 9:40–10:25am      **Chevalier Jackson Lecture: The Management of Dysphagia and Dysphonia: What Have We Missed?**  
**Jacob Lieberman, DO, MA, Lewisham University Hospital, London, and The Deutsche Stimmklinik in Hamburg**
- 10:25–11:25am      **PANEL 1: Mysteries in the Bermuda Triangle: Hypopharynx-Larynx-Esophagus. Multidisciplinary Approaches.**  
*Markus Hess MD (Moderator); Paula Barson CCC-SLP, Linda Carroll PhD CCC-SLP FASHA, Jacob Lieberman, DO, MA, Ariel Weiss MALS*
- 11:25–11:30am      **Break**

11:30–12:00pm	<b>Foreign Bodies and Ellen Friedman Award</b>
<b>Moderator:</b>	<b>Ari DeRowe, MD, Tel-Aviv Sourasky Medical Center, Israel</b>
11:30–11:35am	Foreign Body Award Presentation
11:35–11:41am	<b>(Foreign Body Award Recipient) Super Absorbent Gel Polymer Toy Aspiration and Erosion Into Mediastinum</b> <i>Sriram Navuluri, James Reed Gardner, Mariah Small, Austin DeHart, Gresham T. Richter (University of Arkansas for Medical Sciences, AR; Arkansas Children's Hospital, AR)</i>
11:41–11:47am	<b>Tooth Be Told, A Carious Case Of Non-Avian Premastication</b> <i>Ryan Borek, Stephen Chorney (Children's Hospital of Philadelphia, PA)</i>
11:47–11:52am	<b>Prolonged Laryngeal Foreign Body Due To Covid-19</b> <i>Thomas Flowers, Kimsey Rodriguez Tulane/Ochsner, LA</i>
11:52–12:00pm	<b>The Sword And The Stome: Novel Bi-directional Approach To An Esophageal Foreign Body</b> <i>Torrey Louise Fourrier, Edward J Doyle, Lucas P Neff, Eleanor P Kiell (Wake Forest Baptist Health, NC)</i>
12:00pm	<b>End of Day 1</b>

**Thursday April 8<sup>th</sup>**  
**1pm–5pm CST**

1:00–1:05pm	<b>Brief Welcome</b>
1:05–1:55pm	<b>Scientific Session</b>
	<b>(ESOPHAGOLOGY)</b>
<b>Moderators:</b>	<b>Jacqueline Allen, MBChB, FRACS, University of Auckland, New Zealand &amp; Apoorva Ramaswamy, MD, University of California, Davis, CA</b>
1:05–1:11pm	<b>Clinical and Patient-reported Outcomes Of Transoral Incisionless Fundoplication With Or Without Hiatal Hernia Repair In Patients With Proven Gastroesophageal Reflux Disease And Refractory Laryngopharyngeal Reflux Symptoms</b> <i>Grace Snow, Mohamed Dbouk, Glenn Ihde, Lee Akst, Jennifer Kolb, Christy M Dunst, Peter Janu, Jon Gabrielsen, Shumon Dhar, Marcia Canto (Johns Hopkins University, MD; The Matagorda Regional Medical Group, TX; UCI Health, CA; The Oregon Clinic, OR; Fox Valley Surgical Associates, ThedaCare Regional Medical System, WI; Geisinger Medical Center, PA)</i>
1:11–1:17pm	<b>Assessing the Clinical Utility Of The Post-operative Pharyngogram In Pharyngeal Surgery For Dysphagia</b> <i>Theodore A Gobillot, David Garber, Albert L Merati, Grace M Wandell (University of Washington, WA)</i>
1:17–1:23pm	<b>Predictors Of Aspiration Pneumonia In Patients With Dysphagia</b> <i>Nogah Nativ-Zeltzer, Yuval Nachalon, Matthew W Kaufman, Indulaxmi C Seeni, Silvia Bastea, Sukhkaran S Aulakh, Sara Makkiyah, Machel D Wilson, Mustafa Sahin, Peter C Belafsky (University of California Davis, CA)</i>

- 1:23–1:29pm **Disparities In Prevalence And Treatment Of Dysphagia Among U.S. Adults** *Melissa Zheng, Sheng Zhou, Kevin Hur, Karla O’Dell, Michael Johns (University of Southern California, CA)*
- 1:29–1:35pm **Autologous Muscle Derived Cell Therapy for Swallowing Impairment In Patients Following Treatment For Head And Neck Cancer: A Phase I Prospective Open Label Clinical Trial**  
*Nogah Nativ-Zeltzer, Maggie Kuhn, Lisa Evangelista, Johanthon D Anderson, Jan A Nolta, Gregory Farwell, Peter C Belafsky (University of California Davis, CA)*
- 1:35–1:41pm **Osteophyte Effects on Swallow Efficiency**  
*Sachi Patil, Stamatela Balou, Binhuan Wang, Yan Zhang, Milan Amin (New York University, NY)*
- 1:41–1:55pm **Discussion**
- 1:55–2:00pm **Break**
- 2:00–3:00pm **Jamie Koufman Lecture: Masqueraders of Gastroesophageal Reflux and Implications for Therapies**  
**Rachel Rosen, MD, MPH, Harvard Medical School, MA / Boston Children's Hospital, MA**
- Break**
- 3:00–3:05pm **Scientific Session 3**
- 3:05–3:55pm (BASIC SCIENCE)**
- Moderators:** **Susan Thibeault, PhD, CCC-SLP, University of Wisconsin, Madison, WI & H. Steven Sims, MD, University of Illinois Chicago, IL**
- 3:05–3:11pm **Temporal Expression of Laminin 111 In the Developing Rat Larynx**  
*Ian F Caplan, Ignacio Hernandez-Morato, Michael J Pitman (Columbia University, NY)*
- 3:11–3:17pm **Repositioning the Arytenoid Cartilage with An Arytenopexy Stitch: An Anatomic Human Cadaver Larynx Study**  
*James Burns, Elizabeth Burckardt (Massachusetts General Hospital - Harvard Medical School, MA)*
- 3:17–3:23pm **Use of A Novel Hyper-Crosslinked Carbohydrate Scaffold For Vocal Fold Medialization In An Ovine Model**  
*Daniel Cates, Yuval Nachalon, Charles Lee, Peter Belafsky (University of California, Davis, CA)*
- 3:23–3:29pm **Drug-eluting Endotracheal Tubes for Preventing Bacterial Inflammation In Subglottic Stenosis**  
*Matthew R Aronson, Soheila Ali Akbari Ghavimi, Ian N Jacobs, Riccardo Gottardi (University of Pennsylvania, PA; Children’s Hospital of Philadelphia, PA)*
- 3:29–3:35pm **Effects of Corticosteroids Vs Halofuginone, A Novel Collagen Type1a Inhibitor, On Vocal Fold Wound Healing In An Ovine Model**  
*Jaqueline Allen (University of Auckland, New Zealand)*
- 3:35–3:41pm **Anti-inflammatory and Anti-oxidant Effects of Japanese Herbal Medicine Kyoseihatekigan On Vocal Fold Wound Healing**  
*Shigeyuki Mukudai, Satomi Ozawa, Mami Kaneko, Yoichiro Sugiyama, Shigeru Hirano (Kyoto Prefectural University of Medicine, Japan)*

3:41–3:55pm	<b>Discussion</b>
<b>3:55–4:00pm</b>	<b>Break</b>
<b>4:00–4:50pm</b>	<b>Scientific Session</b>
	<b>(GENERAL)</b>
<b>Moderators:</b>	<b>Nicole Maronian, MD/ Ryan Borek, MD</b>
4:00–4:06pm	<b>Early Postoperative Complications Following Tracheostomy: Does Technique Influence Outcomes</b> <i>Jennifer Silva-Nash, J. Reed Gardner, Jessica Campbell, Deanne King, Olivia Daigle, Emre Vural, Mauricio Moreno, Ozlem E. Tulunay-Ugur (University of Arkansas for Medical Sciences, AR)</i>
4:06–4:12pm	<b>Laryngeal Ultrasound for Vocal Fold Mobility Training During the Covid-19 Pandemic</b> <i>Nicole L Alexander, Brandon Tran, Huirong Zhu, Julina Ongkasuwan (Baylor College of Medicine, TX)</i>
4:12–4:18pm	<b>Stratifying the Risk of Cardiovascular Disease In Adults With Obstructive Sleep Apnea Using Machine Learning</b> <i>Saikrishna C. Gourishetti, Timothy Shaver, Rodney Taylor, Amal Isaiah (University of Maryland School of Medicine, MD)</i>
4:18–4:24pm	<b>Disparate Detection of SARS-CoV2 In Nasopharyngeal Versus Tracheal Samples For Patients With Tracheostomies</b> <i>Joshua D. Smith, Jason A. Correll, Jennifer L. Stein, Robbi A. Kupfer, Norman D. Hogikyan, Robert J. Morrison, Andrew P. Stein (University of Michigan, MI; University of Michigan Medical School MI; VA Ann Arbor Healthcare System, MI)</i>
4:24–4:30pm	<b>Postoperative Infection Rates in Endoscopic Airway Procedures: The Use Of Airway Carts Versus Sterilized Peel-packed Instruments</b> <i>Kevin J Quinn, Evan B Hughes, Pavan S Krishnan, Rajanya S Petersson (Virginia Commonwealth University, VA)</i>
4:30–4:36pm	<b>In-Clinic Diagnostic Flexible Laryngoscopy: Is It an Aerosol-Generating Procedure?</b> <i>Courtney B Tipton, Ashli K O'Rourke (Medical University of South Carolina, SC Commonwealth University, VA)</i>
4:36–4:42pm	<b>Clinical Predictors of Post-Intubation Bilateral Vocal Fold Immobility</b> <i>David Rosow, Erin R. Cohen, MD, R. Cohen, Thomas Iglesias (University of Miami Miller School of Medicine, FL)</i>
4:42–4:52pm	<b>Discussion</b>
4:52–5:00pm	<b>Presentation of the next President, Seth Dailey, MD</b>
<b>5:00pm</b>	<b>Adjourn</b>

# Broyles-Maloney Award

The Broyles-Maloney Award was established to encourage advancement of the art and science of broncho-esophagology 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 broncho-esophagology, laryngology or related science.

## RECIPIENTS OF THE BROYLES-MALONEY AWARD:

1988	Richard A. Kosarek, MD	2000	Asif Amirali, MD
1989	(no award)		Greg Tsai, MD
1990	Thomas F. Dowling, MD Jamie Koufman, MD		Nicole Schrader, MD
1991	(no award)		Donald Weisz, PhD
1992	(no award)	2001	Ira Sanders, MD
1993	Jos. van Overbeek, MD		(no award)
1994	Steven D. Gray, MD	2002	Shin-ichi Kanemaru
1995	Jonathan E. Aviv, MD John H. Martin, PhD Ralph Sacco, MD Beverly Diamond, PhD Andrew Blitzer, MD, DDS		Hisayoshi Kojima, MD
1996	(no award)		Akhmar Magrufov, MD
1997	Ira Sanders, MD Liancai Mu, PhD		Koichi Omori, MD
1998	Nancy M. Bauman, MD Degiang Wang, MD Eric S. Luschei, PhD Debra M. Jaffe, MD		Yasuyuki Hiratsuka, MD
1999	Robert Berkowitz, FRACS Qi-Jian Sun, PhD John Chalmers, PhD Paul Pilowsky, PhD		Shigeru Hirano, MD
			Juichi Ito, MD
			Yasuhiko Shimizu, MD
		2003	Ira Sanders, MD
		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
			Joseph E Kershner, MD
			Nikki Johnston, PhD

2008	Tina L. Samuels, MS Ethan Handler*, BS Michael L Syring, BS Joel H Blumin, MD Joseph E Kershner, MD	2018	Rachel Anfang, MD Kris Jatana, MD Rebecca Linn, MD Keith Rhoades, MD Jared Fry, MD
2009	Nikki Johnston, PhD Clive W. Wells Tina Samuels, MS Joel Blumin, MD	2019	Ian Jacobs, MD Seong Keun Kwon, MD Jungirl Seok, MD Minhyung Lee, MD Young Kang, MD Seulki Song, MD
2010	Sandeep Karajanagi, PhD Gerardo Lopez-Guerra, MD Hyoungshin Park, PhD James B. Kobler, PhD Daryush D. Mehta, SM Yoshihiko Kumai, MD, PhD James T. Heaton, PhD Victoria L. M. Herrera, MD Robert E. Hillman, PhD Steven M. Zeitels, MD	2020	Kiminori Sato MD Chun-ichi Chitose, MD Fumihiko Sato, MD Takeharu Ono, MD Hirohito Umeno, MD
2011	Mikhail Wadie, MD Juan Li, MD Clarence T. Sasaki, MD	2021	Jaqueline Allen ,MD
2012	Satoshi Ohno, MD Shigeru Hirano, MD, PhD Shin-ichi Kanemaru, MD, PhD Masanobu Mizuta, MD		
2013	Tina Samuels, PhD Nikki Johnston, MD Gary Stoner, MD		
2014	Steven M. Zeitels, MD James Burns, MD Stacey Halum, MD		

# Chevalier Q. Jackson Award

## Recipients

1959	Louis H. Clerf, MD	1990	David R. Sanderson, MD
1960	(no award)	1991	William W. Montgomery, MD
1961	Herman J. Moersch, MD	1992	John A. Tucker, MD
1962	Paul H. Holinger, MD	1993	Gerald B. Healy, MD
1963	Edwin N. Broyles, MD	1994	Vincent J. Hyams, MD
1964	Leroy A. Schall, MD	1995	Lauren D. Holinger, MD
1965	Herbert W. Schmidt, MD	1996	Stanley M. Shapsay, MD
1966	Paul G. Bunker, MD	1997	Robert H. Ossoff, MD
1967	Joel Pressman, MD	1998	John Frederickson, MD
1968	Verling K. Hart, MD	1999	Eiji Yanagisawa, MD
1969	Joseph P. Atkins, MD	2000	William W. Montgomery, MD
1970	Anderson C. Hilding, MD	2002	Jack L. Gluckman, MD
1971	Robert M. Lukens, MD	2003	Ellen M. Friedman, M.D.
1972	Charles M. Norris, MD	2004	Robin T. Cotton, M.D.
1973	Arthur M. Olsen, MD	2005	Charles W. Vaughn, MD
1974	Charles F. Ferguson, MD	2006	Andrew Blitzer, MD, DDS
1975	Shigeto Ikeda, MD	2007	Gayle E. Woodson, MD
1976	Blair W. Fearon, MD	2008	Robert J. Toohill, MD
1977	Francis W. Davidson, MD	2009	Peter Koltai, MD
1978	Seymour R. Cohen, MD	2010	Clarence T. Sasaki, MD
1979	M. Stuart Strong, MD	2011	Peak Woo, MD
1980	DeGraff Woodman, MD	2012	W. Frederick McGuirt, Sr., MD
1981	Albert H. Andrews Jr., MD	2013	Seth Pransky, MD
1982	Gabriel F. Tucker, Jr., MD	2014	Michael Rothschild, MD
1983	Howard A. Andersen, MD	2015	Steven Zeitels, MD
1984	Paul H. Ward, MD	2016	Charles N. Ford, Jr., MD
1985	Bruce N. Benjamin, MD	2017	Jamie Koufman, MD
1986	Loring W. Pratt, MD	2018	Ellen Deutsch, MD
1987	Robert S. Fontana, MD	2019	Gregory Postma, MD
1988	Charles W. Cummings, MD	2020	Marshall Smith, MD
1989	Bernard R. Marsh, MD	2021	Ian Jacobs, MD



# Chevalier Q. Jackson Lecturers

The ABEA established in 1964 the “Chevalier Q. Jackson Lecture” to honor the memory of the Doctors Jackson, father and son. These two physicians were uniquely gifted in the development of new information and techniques. The Doctors Jackson were dedicated and gifted in the teaching of broncho-esophagology.

## RECIPIENTS OF THE CHEVALIER Q. JACKSON LECTURERS:

1964	D.F.N. Harrison, MD	1993	Henry J. Heimlich, MD
1965	Eric Carlens, MD	1994	John A. Kirchner, MD
1966	John L. Pool, MD	1995	Minoru Hirano, MD
1967	Eelco Huzinga, MD	1996	Harold C. Pillsbury, III, MD
1968	Paul H. Holinger, MD	1997	Gerald Healy, MD
1969	Plinio deMattos Barretto, MD	1998	Robin T. Cotton, MD
1970	James R. Jude, MD	1999	Jamie Koufman, MD
1971	Jo Ono, MD	2000	Stanley Shapshay, MD
1972	G. Gordon McHardy, MD	2001	Paul A. Levine, MD
1973	Hermes C. Grillo, MD	2002	Steven D. Gray, MD
1974	John R. Gutelius	2003	Wolfgang Steiner, MD
1975	Donald O. Castell, MD	2004	Jonathan Aviv, MD
1976	Paul Moore, PhD	2005	John Ward, PhD
1977	Mary Ellen Avery, MD	2006	Steven Zeitels, MD
1978	George Berci, MD	2007	Peak Woo, MD
1979	Gabriel F. Tucker, Jr, MD	2008	Clarence Sasaki, MD
1980	Flvaio Aprigliano, MD	2009	Jamie Koufman, MD
1981	Peter Stradling, MD	2010	Marshall Strome, MD
1982	Arthur M. Olsen, MD	2011	Jeffrey Laitman, MD
1983	Bruce N. Benjamin, MD	2012	Martin Birchall, MD
1984	Ronan O’Rahilly, MD	2013	Nelson Powell, MD
1985	John A. Tucker, MD	2014	Katherine Kuchenbecker, PhD
1986	William G. Anlyan, MD	2015	Bert O’Malley, MD
1987	Tu Guy-Yi, MD	2016	Nathan V. Welham, PhD
1988	Lucius Hill, MD	2017	Nicholas LaRusso, MD
1989	Bernard R. Marsh, MD	2018	Robert Hillman, PhD
1990	David R. Sanderson, MD	2019	Ryan Branski, MD
1991	Michael E. Johns, MD	2020	Lucian Silica, MD
1992	Whitney Addington, MD	2021	Jacob Lieberman, DO, MA

# Ellen M. Friedman Foreign Body Award

The Ellen M. Friedman Foreign Body Award is given to an accepted abstract in recognition of excellence in innovation, skill and education in the management of aero-digestive foreign bodies. It is intended to encourage continued leadership in the art of endoscopic foreign body management.

## RECIPIENTS OF THE ELLEN M. FRIEDMAN FOREIGN BODY AWARD:

1997	Ellen Deutsch, MD Garth Good, MD	2012	Corbin Sullivan, MD Maria Wittkopf, MD William Clarke, MD Stephen Conley, MD
1998	Kevin McLaughlin, MD Ian Jacobs, MD	2013	David Rosow, MD Si Chen, MD
1999	James A. Stankiewicz, MD	2014	Matthew Naunheim, MD Matthew Dedmon, MD Matthew Mori, MD Ahmad Sedaghat, MD Jayme Dowdall, MD
2000	Aaron Chidekel, MD John Moore, MD Ellen Deutsch, MD	2015	Phillip Chaffin, MD Ian N. Jacobs, MD Kris R. Jatana, MD
2001	(no award)	2016	Meghan Wilson, MD Ryan Borek, MD Ian N. Jacobs, MD Luz Javia, MD
2002	Benjamin B. Cable, MD Dawn N. Boswell, MD	2017	Krista Kiyosaki, MD Varun Vendra, MD Douglas Sidell, MD
2003	Glenn Isaacson, MD	2018	David R. Lee, MD Erin A. Harvey John Paul Giliberto, MD
2004	Joseph Kerschner, MD	2019	Sarah Hodge, MD Lauren Kilpatrick MD Carlton Zdanski
2005	Matthew Bolinger, MD Stacey L. Hallum, MD Gregory N. Postma, MD	2020	Ryan Borek, MD Luv Javia, MD
2006	Thomas Andrews, MD James Quintessenza, MD Jeffrey Jacobs, MD Richard Harmel, MD	2021	Sriram Navuluri, MD
2007	Aaron D. Friedman, MD Keiko Hirose, MD Peter J. Koltai, MD		
2008	Glenn Isaacson, MD Jeffrey Bedrosian		
2009	Steven Feinberg, MD Gerardo Lopez Guerra, MD Steven M. Zeitels, MD		
2010	Vartan A. Mardirossian, MD Timothy Anderson, MD Joyce Colton-House, MD		
2011	Michael Joshua Wilhelm MD Benjamin Westbrook, MD Joseph Shvidler, MD		

# Seymour R. Cohen Award

The Seymour R. Cohen Award for Pediatric Laryngology and Broncho-Esophagology is presented to any resident, fellow or practicing physician who submits the best original paper in either basic research or clinical investigation pertaining to pediatric laryngology and broncho-esophagology.

## RECIPIENTS OF THE SEYMOUR R. COHEN AWARD:

1979	Timothy A. Lim, MD	2003	(no award)
1980	Lauren D. Holinger, MD	2004	James M. Ridgeway, MD
1981	Bruce N. Benjamin, MD	2005	Richard D. Wemer, MD
1982	John A. Tucker, MD		Robert A. Weatherly, MD
1983	John S. Supance, MD		Michael S. Detamore, PhD
1984	Judson R. Belmont, MD	2006	Kiminori Sato, MD, PhD
	Kenneth M. Grundfast, MD		Hirohito Umeno, MD
1987	Ellen M. Friedman, MD		Tadashi Nakashima, MD
1990	Glenn C. Isaacson, MD		Satoshi Nonaka, MD
1991	Eric Mair, MD		Yasuaki Harabuchi, MD
	Davis D. Parson, MD	2010	(no award)
1992	(no award)	2011	(no award)
1993	Steven C. Marks, MD	2012	(no award)
	Bernard Marsh, MD	2013	Kevin Huoh, MD
1994	(no award)		Peter Koltai, MD
1995	John P. Bent, III, MD	2014	David Horn, MD
	William Smits, MD		Kimberley DeMarre, MD
	Richard J. H. Smith, MD		Sanjay Parikh, MD
	Nancy M. Bauman, MD	2015	(no award)
	John W. Kim, MD	2016	Kris Jatana, MD
1996	(no award)		Keith Rhoades, MD
1997	Robert F. Ward, MD		Scott M. Milkovich, MD
	Max M. April, MD		Ian N. Jacobs, MD
	Dimitry Rabkin, MD	2017	Ravi W Sun, MD
1998	Brian S. Jewett, MD		Adam B Johnson, MD
	Raymond D. Cook, MD		Juliana Bonilla-Velez, MD
	Kenneth L. Johnson, MD		Robert D Pesek, MD
	Thomas C. Logan, MD		Gresham T Richter, MD
	Kristina W. Rosbe, MD	2018	Steven Coppess, JD, MBA
	Suresh K. Mukherji, MD		Jennifer Soares, MD
	William W. Shockley, MD		Bianca Frogner, PhD
1999	Ryan R. Stevens, MD		Kimberley DeMarre, MD
	Geoffrey A. Lane, MD		Amy Faherty, MD
	Scott M. Milkovich, PhD		Jennifer Hoang, MD
	Daniel Stool		Mahek Shah, MD
	Gene Rider	2019	Matthew MacKinnon, MD
	Sylvan E. Stool, MD		Kaalan Johnson, MD
2000	(no award)	2020	Charlotte Kaplan Hughes,
2001	Nancy M. Bauman, MD		Christine L. Christensen,
	Deqiang Wang, MD		Stephen Maturo,
	Erich Luschei, MD		Peter R. O'Conner,
	Robert G. Berkowitz, MD		Gregory R. Dion
2002	Ravindhra G. Elluru, MD	2021	No Award
	Jeffrey A. Whitsett, MD		

# 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 broncho-esophagology.

## RECIPIENTS OF THE STEVEN D. GRAY RESIDENT AWARD

2003 Sarah Hodges, MD  
2003 Randal Leung, MBBS  
2004 Seth Cohen, MD  
2004 Jonathan P. Lindman, MD  
2005 Grace SY Yang, MD  
2006 None  
2007 Tsunehisa Ohno, MD  
2008 J. Matthew Dickson, MD  
2009 Wataru Okano, MD  
2010 None  
2011 Richard Turley, MD  
2012 Koshi Otsuki, MD  
2013 Mitsuyoshi Imaizumi, MD  
2014 None  
2015 Yuta Nakaegawa, MD  
2016 Neel Bhatt, MD  
2017 Neel Bhatt, MD  
2018 Andrew Redmann, MD  
2019 Kathleen Sarber, MD/Lauren Tracy, MD  
2020 Yael Shapira-Galitz  
2021 Melissa Zheng

# Peter J. Koltai Award

The Koltai Award was established to encourage 1) the advancement in pediatric airway, swallowing, and/or sleep medicine studies and/or 2) international missions/outreach. The award is given for outstanding manuscripts or accomplishments related to these studies.

## **RECIPIENTS OF THE KOLTAI AWARD:**

2020 Kris Jatana, MD

2021 Orna Katz Kadosh, MD

# Presidential Citation

Peak Woo, MD, New York, NY

Mike Rutter, MD, Cincinnati, OH

Dana Thompson, MD, Chicago, IL

My Family (Zur/Biron), Philadelphia, PA

## ABEA Past Guests of Honor 1951–2021

- 1951 Fernand Eeman, MD – Ghent, Belgium  
1959 Louis Clerf, MD – Saint Petersburg, FL  
1961 W. Likely Simpson, MD – Memphis, TN  
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  
1981 Donald Proctor, MD – Baltimore, MD  
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  
1991 M. Stuart Strong, MD – Boston, MA  
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  
2003 Stanley M. Shapshay, MD – Boston, MA  
2004 Minoru Hirano, M.D. – Kurume, Japan  
2005 R. Rox Anderson, MD – Boston, MA  
2006 Hugh F. Biller, MD – Maine  
2007 Frank W. Lucente, MD – Brooklyn, NY  
2008 Marvin P. Fried, MD – Bronx, NY  
2008 Marshall Strome, MD – Cleveland, OH  
2009 James Pepa – Newark, NJ  
2010 William Lawson, MD, DDS – New York, NY  
2011 Robin Cotton, MD – Philadelphia, PA  
2012 Kiminori Sato, MD, PhD – Kurume, Japan  
2013 Byron J. Bailey, MD – Galveston, TX  
2013 Steven M. Parnes, MD – Albany, NY  
2013 Jerry C. Goldstein, MD – Wellington, FL  
2013 Leora Loy – Salt Lake City, UT  
2014 Ellen Friedman, MD, FACS - Houston, TX  
2014 Peter Koltai, MD, FACS - Stanford, CA  
2015 Stuart Strong, MD - Boston, MA  
2016 Diane Bless, PhD - Madison, WI  
2017 Robin Cotton, MD – Cincinnati, OH  
2017 Kerry Olsen, MD – Rochester, MN  
2018 Steven Zeitels, MD – Boston, MA  
2019 Jamie Koufman, MD - New York, NY  
2020 Robert Ossoff, DMD, MD - Nashville, TN  
2021 Michael Rothschild, MD – New York, NY

# 2020 -2021 Active Members

Mona Abaza  
Elliot Abemayor  
Garima Agarwal  
Lee Akst  
Milan Amin  
Timothy Anderson  
Donald Annino, Jr.  
Ellis Arjmand  
Jonathan Aviv  
Karthik Balakrishnan  
James Batti  
Nancy Bauman  
Richard Beck  
Joshua Bedwell  
Peter Belafsky  
Michael Benninger  
Brian Benson  
Neil Bhattacharya  
Steven Bielamowicz  
Martin Birchall  
Joel Blumin  
Jonathan Bock  
Joseph Bradley  
Matthew Brigger  
Paul Bryson  
James Burns  
Nicolas Busaba  
Robson Capasso  
Thomas Carroll  
Paul Castellanos  
Swapna Chandran  
Neil Chheda  
Dinesh Chhetri  
Lesley Childs  
Ajay Chitkara  
Monkia Chmielewska  
Sukgi Choi

Mark Courey  
Brianna Crawley  
James Cuyler  
Seth Dailey  
Edward Damrose  
James Daniero  
David Darrow  
Alessandro de Alarcon  
Joseph DePietro  
Craig Derkay  
Brad deSilva  
Ellen Deutsch  
Vaninder Dhillon  
Oscar Dias  
Frederik Dijkers  
Gregory Dion  
Laura Dominguez  
Donald Donovan  
Amelia Drake  
Michael Dunham  
Umamaheswar Duvvuri  
David Eibling  
Dale Ekbom  
Lisa Elden  
Ravindhra Elluru  
Sandra Ettema  
Daniel Fink  
Katie Fitzgerald  
David Francis  
Marvin Fried  
Aaron Friedman  
Ellen Friedman  
Mark Fritz  
Glendon Gardner  
Courtney Garrett  
Alexander Gelbard  
Eric Genden

Mark Gerber  
Scott Gibbs  
Denise Goode  
Nazaneed Grant John  
Greinwald, Jr.  
Elizabeth Guardiani  
Stacey Halum  
Gady Har-El  
Earl Harley Catherine  
Hart Christopher  
Hartnick Jeanne  
Hatcher Yolanda  
Heman-Ackah  
Alexander Hillel  
Michael Hinni Shigeru  
Hirano Christian  
Hochstim Henry  
Hoffman Rebecca  
Howell Jonathan Ida  
Stacey Ishman  
Ian Jacobs  
Scharukh Jalisi  
Nausheen Jamal  
Kris Jatana  
Luv Javia  
Nancy Jiang  
Michael Johns  
Jonas Johnson  
Romaine Johnson Paul  
Jones  
Jan Kasperbauer  
Katherine Kendall  
Joseph Kerschner  
Yo Kishimoto  
Adam Klein  
Karen Kost

Priya Krishna  
Maggie Kuhn  
Robbi Kupfer  
Denis Lafreniere  
Jennifer Lavin  
Claire Lawlor  
R Jun Lin  
David Lott  
Lyndsay Madden  
Prashant Malhotra  
David Mandell  
Lynette Mark  
Nicole Maronian  
Laura Matrka  
I-Fan Mau  
Steffen Maune  
Timothy McCulloch  
William McGuirt, Jr.  
James McMurray  
Andrew McWhorter  
Deepak Mehta  
Albert Merati  
Anna Messner  
Tanya Meyer  
Natasha Mirza  
Jaime Moore  
Anthony Mortelliti  
Melissa Mortensen  
Charles Myer, III  
Charles Myer, IV  
J. Pieter Noordzij  
Roger Nuss  
Karla O'Dell  
Laurie Ohlms  
Tsongju O-Lee  
Bert OMalley, Jr.  
Julina Ongkasuwan  
Ashli O'Rourke  
Laura Orvidas  
Randal Paniello  
Noah Parker

Mark Persky  
Rajanya Petersson  
Michael Pitman  
Joel Portnoy  
Seth M. Pransky  
Diego Preciado  
Reza Rahbar  
Anais Rameau  
Derrick Randall  
Elie Rebeiz  
Lindsay Reder  
Anthony Reino  
Gresham Richter  
William Richtsmeier  
Scott Rickert  
Kristina Rosbe  
Clark Rosen  
David Rosow  
Adam Rubin  
Mike Rutter  
Marisa Ryan  
Kiminori Sato  
Richard Scher  
Scott Schoem  
James Schroeder  
John Schweinfurth  
Michael Setzen  
Nina Shapiro  
Akihiro Shiotani  
Sally Shott  
Douglas Sidell  
Jeffrey Simons  
C. Blake Simpson  
Herbert (H.) Sims  
John Sinacori  
Richard Smith  
Marshall Smith  
Libby Smith  
Steven Sobol  
Ahmed Soliman  
Philip Song

Joseph Spiegel  
Robert Stachler  
Sandra Stinnett  
Lucian Sulica  
C. Kwang Sung  
Maria Suurna  
Melin Tan  
Ichiro Tateya  
Dana Thompson  
Ozlem Tulunay-Ugur  
David Tunkel  
Naren Venkatesan  
Jean Verheyden  
Sunil Verma  
Richard Vivero  
Mark Volk  
David L. Walner  
Mark Wax  
Julie Wei  
Gregory Weinstein  
Philip Weissbrod  
Barry Wenig  
Ralph Wetmore  
Brian Wiatriak  
Jay Willging  
Andre Wineland  
Daniel Wohl  
Peak Woo  
Wm. Edward Wood  
B Woodson  
Christopher Wootten  
Masaru Yamashita  
Ken Yanagisawa  
Nwanmegha Young  
VyVy Young  
Katherine Yung  
Craig Zalvan  
George Zalzal  
Karen Zur  
David Zwillenberg



# 2020 -2021 Associate Members

Robert Hillman  
Nikki Johnston  
Nogah Nativ  
Diana Orbelo  
Joseph Piccione

Matthew Ryan  
Susan Thibeault

# 2020-2021 Honorary Members

Juan Carlos Arauz  
Stephen Conley  
Daniel Hawley  
Jamie Koufman  
Mary Lekas  
Reza Shaker

# 2020-2021 International Members

Jacqueline Allen  
Theodore Athanasiadis  
Andrea Campagnolo  
Shun-ichi Chitose  
Jacob Cohen  
Ari DeRowe  
Gerhard Friedrich  
Dana Hartl  
Amanda Hu  
Mitsuyoshi Imaizumi  
Katsuhide Inagi  
Benjamin Kim  
Yoshihiko Kumai  
Gerardo Lopez-Guerra  
Wolf Mann  
Michael Nash

Nupur Nerurkar  
Richard Nicollas  
Daniel Novakovic  
Koichi Omori  
Alexey Ovchinnikov  
Paul Paddle  
Kishore Prasad  
Vyas Prasad  
Alessandra Rinaldo  
Catherine Sinclair  
Christian Sittel  
Conrad Smit  
Georg Mathias Sprinz  
Jean Michel Triglia  
Hirohito Umeno  
Jeong-Soo Woo

# 2020-2021 Post-Graduate Members

Sara Abu Ghanem  
Lacey Adkins  
Peter Baxter  
Simon Best  
Juliana Bonilla-Velez  
Simon Brisebois  
Bridget Burgess  
Daniel Cates  
Michael Cohen  
Conor Devine  
Shumon Dhar  
Lowell Gurey  
David Horn  
Anne Hseu  
Margaret Huston  
Kaalán Johnson  
Christopher Johnson  
William Karle  
Rachel Kaye

Diana Kirke  
Nikita Kohli  
Ross Mayerhoff  
Patrick McGarey  
Kara Meister  
Avraham Mendelsohn  
Robert Morrison  
Matthew Naunheim  
Babak Sadoughi  
Maya Sardesai  
Salvatore Taliercio  
Christopher Tang  
Andrew Tkaczuk  
Lauren Tracy  
Andrew Vahabzadeh-Hagh  
Ailee Wertz  
Amy Wu  
Yin Yiu

# 2020 -2021 Resident Members

Jennifer Bergeron  
Mathieu Bergeron  
Daniel Beswick  
Lauren Bohm  
Ryan Borek  
Christopher Brook  
Carrie Bush  
Rachel Cain  
Ryan Case  
Jeffrey Cheng  
Wayne Chung

Adam Coughlin  
Andrew Courson  
Ashley Darr  
Anthony Deisignore  
Karuna Dewan  
Angela Donaldson  
Todd Falcone  
Lauren Fedore  
Aaron Feinstein  
Eric Gantwerker  
Saied Ghadersohi

John Gilberto  
Sharon Gnagi  
Mingyang Gray  
Ariana Greenwell  
Jedidiah Grisel  
Steven Hamilton  
Richard Harbison  
Brian Harmych  
Matthew Hensler  
Meir Hershcovitch  
Christine Heubi  
Peter Hoekman  
Michael Holliday  
Adam Honeybrook  
Brandon Hopkins  
Jeffrey Houlton  
David Jang  
Caroline  
Jeffery Jeffrey  
Jumaily David Kim  
Andrew Kleinberger  
Jeffrey Ksiazek Paul  
Kwak Monica Lee  
Hossein Mahboubi  
Amy Manning

Kirsten Meenan  
Christie Morgan  
Namita Murthy  
Yuval Nachalon  
Marci Nedich  
Anisha Noble  
Abby Nolder  
Charles Parker  
Anthony Prince  
Hannah Qualls  
Andrew Redmann  
Marsha Reuther  
Peter Revenaugh  
Ryan Ruiz  
Breanne Schiffer  
Ojas Shah  
Matthew Smith  
Sungjin Song  
Sarah Soo  
Gordon Sun  
Taylor Teplitzky  
Nathan Vandjelovic  
Lyndy Wilcox  
Alanna Windsor  
Bharat Yarlagadda

## 2020-2021 Senior Members

Allan Abramson  
Warren Adkins, Jr.  
Vinod Anand  
Mario Andrea  
William Barton  
James Baxter  
Stephen Becker  
Thomas Belson  
George Berci  
Gerald Berke

Jeffrey Birns  
Donald Blatnik  
Stanley Blaugrund  
Andrew Blitzer  
Charles Bluestone  
Ronald Bogdasarian  
Roger Boles  
Patrick Bradley  
Michael Broniatowski  
Brian Burkey

Thomas Calcaterra  
David P. Caldarelli  
Rinaldo Canalis  
Robert Cantrell  
Francis Catlin  
Noel Cohen  
George Conner  
Robin Cotton  
Charles Cummings  
John Daly  
R. Davis  
Bernard De Berry  
Ziad Deeb  
Andres Delgado  
Edward Doolin  
James Dudley  
Arndt Duvall, III  
David Eisele  
L. Penfield Fabe  
Willard Fee Jr.  
J. Allan Fields  
Charles Ford  
Herman Froeb  
Willard Fry  
C. Gaelyn Garrett  
Edward Gaynor  
Kenneth Geller  
Carol Roberts Gerson  
Jack Gluckman  
Michael Goldman  
Jerome Goldstein  
W. Jarrard Goodwin, Jr.  
Gregory Grillone  
Charles Gross  
Thomas Grossman  
Kenneth Grundfast  
Steven Handler  
Donald Hawkins  
Leonard Hays  
Gerald Healy  
Henry Heimlich

Robert Hendrix  
Arthur Hengerer  
Raymond Hilsinger, Jr.  
Yasuo Hisa  
Lauren Holinger  
Andrew Hotaling  
Andrew Inglis, Jr.  
Bruce Jafek  
Sukhanand Jain  
Otto Jepsen  
Michael Johns  
William Keane  
James Kelly  
David Kennedy  
Charles Kimmelman  
Robert Kohut  
Peter Koltai  
Charles Koopmann, Jr.  
Dennis Kraus  
Paul Kvale  
Susan Langmore  
William Lawson  
Paul Levine  
Howard Levine  
Louis Lowry  
Rodney Lusk  
George Lyons  
Salvador Magaro  
Professor Hans Mahieu  
Nicolas Maragos  
Bernard Marsh  
Kenneth Mattucci  
Brian McCabe  
John McDougall  
Trevor McGill  
W. Frederick McGuirt, Sr.  
Harold Menger  
Robert Miller  
Rose Mohr  
Peter Moloy  
Willard Moran, Jr.

Karl Morgenstein  
Randall Morton  
Harlan Muntz  
Thomas Murry  
Eugene Myers  
H. Bryan Neel, III  
Martin Norton  
Arnold Noyek  
Moses Nussbaum  
Joan OBrien  
Nels Olson  
Robert Ossoff  
Panagiotis Pantazepoulos  
AlbertPark  
James Parkin  
Steven Parnes  
VictorPassy  
Claude Pennington  
Harold Pillsbury, III  
Gregory Postma  
William Potsic  
Robert Priest  
F. Johnson Putney  
Richard Rasmussen  
Timothy Reichert  
James S. Reilly  
Professor Marc Remacle  
Dale Rice  
Michael Rontal  
Eugene Rontal  
Michael Rothschild  
Robert Rueben  
Melvin Samuels  
David Sanderson  
Clarence Sasaki  
Robert Sataloff  
Marcel-Emile Savary  
Gary Schechter

Joyce Schild  
Roy Sessions  
Myron Shapiro  
Stanley Shapshay  
Anat Shatz  
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# Podium Presentation Abstracts

Wednesday April 7<sup>th</sup>

8am–12pm CST

Scientific Session 1

## (PEDIATRIC OTOLARYNGOLOGY)

**Moderators: Karthik Balakrishnan, MD, MPH / Alanna Windsor, MD**

### **Alternative Management Strategy For Grade 4 Subglottic Stenosis**

*Chris Mularczyk, Michael Gorelik, Carolyn Jenks, Taher Valika (Ann & Robert H. Lurie Children's Hospital of Chicago)*

**Objective:** Traditional management of grade 4 subglottic stenosis requires an open airway approach with tracheal resection and primary anastomosis. We describe two cases of grade 4 subglottic stenosis managed through an open approach, yet sparing the need for tracheal resection.

**Methods:** Retrospective case review.

**Results:** Patient 1 was a 15 month old female with trisomy 21 and tracheostomy dependency, with history of prematurity, bronchopulmonary dysplasia, and seizures. Routine airway evaluation revealed grade 4 subglottic stenosis. To maintain a safe airway, open airway approach was offered, with possible resection. Intraoperatively, a 2 cm segment of complete stenosis was identified from the subglottis to the suprastomal region. The trachea was divided anteriorly and the intraluminal stenosis was meticulously dissected free from the tracheal mucosa. This allowed preservation of the native tracheal structure. A suprastomal stent was placed and the trachea was closed primarily. Stent was removed 4 weeks later with no evidence of stenosis. Patient 2 was a 20 month old female, tracheostomy dependent, with history of prematurity and bronchopulmonary dysplasia. She was found intraoperatively to have similar tracheal stenosis and thus underwent resection of the intraluminal stenosis, preserving the native tracheal structure. Interval airway evaluation 4 weeks later revealed widely patent airway.

**Conclusion:** The treatment of laryngotracheal stenosis has evolved over the past several decades. Advances in technology, equipment and medication have increased our ability to treat some airway stenosis in a minimally invasive manner, and at times by an endoscopic method. Continued development of innovation will lead to evolutionary outcomes.

### **An Analysis Of Tracheostomy Complications In Pediatric Patients With Scoliosis**

*Swathi Appachi, Jessie Marcet-Gonzalez, Jennifer N Brown, Julina Ongkasuwan1, Elton M Lambert (Texas Children's Hospital/Baylor College of Medicine, TX; Texas Children's Hospital, TX)*

**Objective:** To analyze tracheostomy-related complications in pediatric patients with scoliosis.

**Method:** A retrospective chart review of patients with tracheostomy and scoliosis was performed at a single institution. The charts were reviewed for variables such as difficulties with tracheostomy tube changes, poor positioning of tracheostomy tube, abnormal appearance of trachea, and emergency room visits and admissions for tracheostomy complications. Decannulation rates were identified.

**Results:** 102 patients met inclusion criteria. 96 (94.12%) had scoliosis involving some portion of the thoracic spine, and 6 had scoliosis confined to the lumbar spine. 18 (17.65%) had difficulties with home tube changes, and 13 (12.75%) had documented poor positioning on tracheoscopy. 20 (19.61%) patients required at least one tracheostomy tube change due to poor positioning, with 7 (6.86%) requiring multiple

changes. Custom length tubes were required in 9 patients (8.8%). 31 patients (30.39%) had at least one emergency room visit or admission for tracheostomy complications, such as accidental decannulation or bleeding from the tracheostomy. Abnormalities of the trachea, such as tortuosity, obstructive granulomas, or tracheomalacia, were seen in 31 patients (30.39%) on bronchoscopy. Scoliosis repair was performed in 18 patients (17.65%), of which one went on to be decannulated. 10 patients (9.8%) overall were decannulated.

**Conclusion:** A portion of patients with scoliosis who are tracheostomy-dependent have anatomical abnormalities of the trachea and poor positioning of the tracheostomy tube. Decannulation rates are also lower in this population compared to those seen in the literature. Further work is required to elucidate if scoliosis pre-disposes patients towards tracheostomy-related complications.

### **The Efficacy Of Two Commercially Available Devices To Relieve Acute ForeignBody Aspiration**

*Apoorva T Ramaswamy, Aaron Done, Roberto Solis, Lisa Evangelista, Peter Belafsky (University of California Davis, CA)*

**Objective:** Evaluate the efficacy of two commercially available choking relief devices, the LifeVac (LifeVac LLC, Nesconset, NY) and the Dechoker (Dechoker LLC, Wheat Ridge, CO).

**Methods:** A fresh cadaver (5'10", Caucasian male) was utilized for all trials. Whole grapes (Columbine Vineyards red seedless), cashews (Aurora Organic) and barium-impregnated crackers (Premium Saltines) were placed at the level of the true vocal folds under visualization with a flexible endoscope (Olympus, Center Valley, PA). The choking relief devices were then used to manufacturer specifications by a PGY2 otolaryngology resident, a board eligible otolaryngologist and a novice volunteer. Each participant conducted two trials with each device and food. Extent of foreign body extrication was evaluated by flexible endoscopy and videofluoroscopy (GE Healthcare, Milwaukee, WI)

**Results:** Both the LifeVac and Dechoker failed to remove the cashews and grapes from the airway in all trials. The barium moistened cracker was moved from C2 at the level of the glottis to C1 at the level of the oropharynx. Use of the Dechoker resulted in gross injury to the tongue, and both products exerted significant pressure on the tongue and soft palate that might cause edema in the clinical setting.

**Conclusion:** Although the devices did make appreciable progress in dislodgement of moistened saltines, they were not effective in removing solid food material from the glottis and may result in injury. The results suggest these products should not replace the Heimlich maneuver as the treatment of choice for choking.

### **Establishing An Endoscopic Chronic Subglottic Stenosis Rabbit Model**

*Orna Katz Kadosh, Ivanna Nebor, Matthew M Smith, Catherine K Hart, Alessandro deAlarcon, Debora I Sinner (Cincinnati Children's Hospital Medical Center, OH)*

**Objective:** Acquired subglottic stenosis (SGS) is often linked to prolonged endotracheal intubation and scar tissue formation. The molecular and cellular mechanisms underlying the condition remain poorly understood. Our objective was to develop a reproducible and consistent chronic SGS in an endoscopic animal model. **Method:** We conducted a prospective study using New Zealand white rabbits. Chronic SGS was induced endoscopically by Bugbee electrocautery to 50%-75% of the circumference of the subglottic area followed by 4-hour endotracheal intubation. The rabbit airways were endoscopically assessed and sized with endotracheal tubes, before injury, during follow up, and at the end point. There were 2 endpoints, 6 weeks and 8 weeks, with a N=8 animals assigned to each endpoint. Animals were humanely euthanized for histopathological examination of the subglottic injury site and microscopic



measurement of the cricoid lumen. **Results:** Fourteen animals reached the endpoints and developed chronic SGS. Control median cricoid lumen measurements was 20.48 mm<sup>2</sup>, the median cricoid lumen measurement for the 8 weeks end point was 16.86 mm<sup>2</sup> (12.64-20.25) and 15.28 mm<sup>2</sup> (12.26-18.61) for the 6 weeks end point. Histopathological examination showed chronic scar tissue and new cartilage formation at the cricoid level mainly at posterior subglottic injury site at both endpoints analyzed. Collagen staining revealed collagen network abnormalities and organization in sites of injury. **Conclusion:** We developed and established an animal model for the study of chronic subglottic stenosis. This model will be utilized to compare different endoscopic treatment intervention in acute SGS versus chronic SGS and to define molecular basis of SGS.

### **Quantifying Upper Aerodigestive Sequelae Utilizing Procedure Interventions In Esophageal Atresia/Tracheoesophageal Fistula Neonates.**

*Kelli Nicole Patterson, Tariku Beyene, Lindsey Asti, Abdulrahman Althubaiti, Meredith Lind, Prasanth Pattisapu (Nationwide Children's Hospital, OH)*

**Objective:** We examined rates of upper aerodigestive tract (UADT) procedures in a multi-institutional cohort of neonates with EA/TEF in order to better quantify incidence of secondary UADT pathology.

**Method:** This study used a previously-validated cohort of patients with EA/TEF within the Pediatric Health Information System (PHIS) using a specific combination of ICD-9-CM diagnosis and procedure codes related to EA/TEF in neonates  $\leq$  30 days. This algorithm was applied within all PHIS hospitals with inpatient data between 2007-2015. ICD-9/10 codes for the following categories of aerodigestive procedures were examined on follow-up (2007-2020) as surrogate markers for aerodigestive pathology: 1) tracheostomy, 2) laryngotracheoplasty, 3) diagnostic laryngoscopy and/or bronchoscopy (DLB), 4) DLB with intervention, and 5) gastrostomy tube placement.

**Results:** We identified 2670 patients from 47 hospitals with EA/TEF using the previously-validated algorithm. The cohort was 56.3% male and 43.7% female, and the mean length of stay for the first admission was 46.1 days ranging up to 677 days. Of these patients, 2088 (78.2%) had at least one of the evaluated aerodigestive procedures within up to 14 admissions. Specifically, 191 (7.2%) underwent tracheostomy, 173 (6.5%) underwent laryngotracheoplasty, 1718 (64.3%) underwent diagnostic DLB, 88 (3.3%) underwent DLB with intervention, and 1165 (43.6%) underwent gastrostomy tube placement.

**Conclusion:** Patients with EA/TEF frequently have aerodigestive sequelae. However, given its rarity, literature on EA/TEF is limited to single-institution studies with varying results. This work helps quantify the aerodigestive needs of EA/TEF neonates and stresses the importance of early otolaryngology evaluation in their care.

## **Systemic Bevacizumab Treatment For Recurrent Respiratory Papillomatosis: Long Term Follow-up**

*Ryan Ruiz, Naomi Balamuth, Luv Javia, Karen B Zur (Children's Hospital of Philadelphia, PA)*

**Objective:** Systemic bevacizumab is a new adjuvant therapy for recurrent respiratory papillomatosis (RRP) that has shown promising preliminary results in children. There has been no long-term follow-up reported as of yet in the literature. This study aims to review our experience with systemic bevacizumab in the past 6 years.

**Method:** Retrospective review of 7 pediatric patients from a single-institution, treated with systemic bevacizumab for RRP refractory to traditional debridement.

**Results:** All seven patients had a significant reduction in disease burden after initiation of systemic bevacizumab. There have been no significant complications associated with systemic therapy so far. Median duration of bevacizumab treatment was 3.2 years with the longest duration of treatment in our first patient now at 5.5 years. The most complex case experienced significant disease recurrence on 2 occasions when therapy was temporarily discontinued for over 4 months; this was reversible with re-loading of the intravenous treatment.

**Conclusion:** Systemic bevacizumab is an effective therapy for cases of severe RRP with promising results both in short-term and long-term follow-up. Side effects are minimal. Patients must be followed closely to determine appropriate dosing intervals to control disease and prevent recurrence.

## **Foreign Bodies and Ellen Friedman Award**

**Moderator: Ari Derowe**

### **(Foreign Body Award Recipient) Super Absorbent Gel Polymer Toy Aspiration and Erosion Into Mediastinum**

*Sriram Navuluri, James Reed Gardner, Mariah Small, Austin DeHart, Gresham T. Richter (University of Arkansas for Medical Sciences, AR; Arkansas Children's Hospital, AR)*

**Objective:** Airway foreign bodies are commonly encountered in the pediatric population and present in various manners. Expeditious removal of the foreign body is necessary to prevent complications. Herein, we present a case of a peculiar foreign body with an ambiguous presentation leading to difficult retrieval and chronic complications.

**Method:** Retrospective case report from an academic, pediatric tertiary care center of a patient with a chronically aspirated foreign body.

**Results:** 3 year old male patient with incidentally found opacification of the left lung. The patient underwent diagnostic bronchoscopy for a suspected aspirated foreign body. The left mainstem bronchus ended in a blind pouch, so the patient was referred to the tertiary, pediatric hospital for management of a chronic foreign body reaction. Rigid, ventilating bronchoscopy revealed inorganic gel material eroding into the mediastinum, posterior to the pericardial sac. The foreign body was removed from the mediastinum via the communication through the left bronchus. Upon follow-up, the patient was noted to have stable atelectatic collapse of the left lung without symptomatology. The foreign body was determined to be a gel bead that was likely aspirated over a year prior.

**Conclusion:** Super absorbent gel polymer beads represent a serious potential aspiration risk. The material readily expands when in contact with bodily fluids. Chronic obstruction is common due to the inorganic nature of the gel. Rapid expansion and luminal occlusion can lead to airway fibrosis and erosion.

### **Tooth Be Told, A Carious Case Of Non-Avian Premastication**

*Ryan Borek, Stephen Chorney (Children's Hospital of Philadelphia, PA)*

**Objective:** To describe the presentation and management of a bronchial foreign body masquerading as acute respiratory failure

**Method:** Case report

**Results:** A 20-month-old female presented as a transfer from an outside emergency department for presumed pneumonia of five days duration. On arrival to our facility, the patient was noted to have increased stridor and work of breathing. Racemic epinephrine was administered, immediately after which the patient became hypoxic and cyanotic prompting emergent intubation. She was transferred to the pediatric intensive care unit where antibiotics and supportive care were initiated. Hypercarbia and increasing positive pressure requirements prompted an urgent flexible bronchoscopy by the pulmonology service, with findings of a thick cast in the right mainstem that could not be dislodged. The patient was then taken to the operating room for rigid bronchoscopy. This demonstrated copious thick secretions within the trachea, and a large firm white object obstructing the right mainstem bronchus. Optical forceps were used to remove the object, which was identified to be a carious adult molar. No further foreign bodies were identified. After discussion with the patient's parents, it was revealed that the grandfather premasticated the patient's food to avoid choking.

**Conclusion:** This case highlights the risk of premastication, a practice also known as "kiss-feeding," which can result in foreign body aspiration.

### **Prolonged Laryngeal Foreign Body Due To Covid-19**

*Thomas Flowers, Kimsey Rodriguez (Tulane/Ochsner, LA)*

**Objective:** Understand the impact of the COVID-19 pandemic on patient care through the lens of a long-standing laryngeal foreign body.

**Method:** A case report of a 9-month-old patient who had a transglottic laryngeal foreign body for approximately two months.

**Results:** A 9-month-old boy presented to the otolaryngology clinic with two months of hoarseness and intermittent stridor. He had presented to outside facilities multiple times but his symptoms persisted. An otolaryngology service had been consulted during that time, but due to the pandemic, flexible laryngoscopy was not being performed. Flexible laryngoscopy revealed a transglottic laryngeal foreign body. The object was successfully removed in the operating room with a transoral approach.

**Conclusion:** The COVID-19 pandemic caused widespread confusion in standard medical practice in the spring of 2020. This case represents an example of delayed treatment of a possibly life-threatening laryngeal foreign body secondary to the spread of COVID-19.

### **The Sword And The Stome: Novel Bi-directional Approach To An Esophageal Foreign Body**

*Torrey Louise Fourrier, Edward J Doyle, Lucas P Neff, Eleanor P Kiell (Wake Forest BaptistHealth, NC)*

**Objective:** To describe a novel approach to endoscopic esophageal foreign body management requiring cross-discipline innovation and collaboration.

**Method:** Case report of a 7-year old non-verbal female with global delay, gastrostomy tube dependence and history of spinal rod placement presenting with non-specific irritability and is found to have a 6 x 1.3 cm radio-opaque toy sword lodged in the proximal esophagus at the level of the aortic arch.

**Results:** In the operating room, esophagoscopy revealed a lodged sword with the left sword-guard impaling the esophageal mucosa. With the proximal aspect of the sword in endoscopic view, the pediatric

surgeon accessed the esophagus with a guidewire placed retrograde through the gastrostomy tube site. Serial retrograde esophageal dilation ensued via gtube site which enabled mobilization of the sword proximally. By stretching the esophageal lumen and suctioning blood from the endoscopic field of view distally, the cross-guard was freed from the mucosa and delivered proximally by the otolaryngologist. As this was delivered, an esophageal tamponade balloon was loaded onto the guidewire and passed proximally to control any subsequent hemorrhage, including from a life-threatening aortoenteric fistula. Fortunately, no bleeding occurred.

**Conclusion:** Success is attributed to collaboration across disciplines to utilize specialty-specific tools in a unique patient to retrieve the foreign body through an endoscopic approach. The novel retrograde utilization of an esophageal balloon for tamponade of potential aortoenteric fistula after using serial dilators to facilitate removal has not otherwise been described in the literature and provides a solution to a highly lethal possibility.

**Thursday April 8th 1pm–5pm CST**

### Scientific Session 2

## **(ESOPHAGOLOGY)**

**Moderators:** *Jacqueline Allen, MBChB, FRACS / Apoorva Ramaswamy, MD*

### ***Clinical and Patient-reported Outcomes Of Transoral Incisionless Fundoplication With Or Without Hiatal Hernia Repair In Patients With Proven Gastroesophageal Reflux Disease And Refractory Laryngopharyngeal Reflux Symptoms***

*Grace Snow, Mohamed Dbouk, Glenn Ihde, Lee Akst, Jennifer Kolb, Christy M Dunst, Peter Janu, Jon Gabrielsen, Shumon Dhar, Marcia Canto (Johns Hopkins University, MD; The Matagorda Regional Medical Group, TX; UCI Health, CA; The Oregon Clinic, OR; Fox Valley Surgical Associates, ThedaCare Regional Medical System, WI; Geisinger Medical Center, PA)*

**Objective:** Patients with laryngopharyngeal reflux (LPR) may not respond to proton pump inhibitors (PPI) as quickly or completely as patients with heartburn. Transoral incisionless fundoplication (TIF) or concomitant hiatal hernia repair with TIF (cTIF) is effective in decreasing symptoms of gastroesophageal reflux disease (GERD) but is not well studied in patients with LPR symptoms. This prospective multicenter study assessed the patient-reported and clinical outcomes after TIF/cTIF in patients with proven GERD and LPR symptoms.

**Method:** Patients with refractory LPR symptoms (reflux symptom index (RSI)>13) and pathologic acid reflux by distal esophageal pH testing were evaluated before and a minimum of 6 months after TIF/cTIF. The primary outcome was normalization of RSI. Secondary outcomes were improvement of GERD-HQRL >50%, normalization of acid exposure time, discontinuation of PPI, and patient satisfaction. Outcomes after TIF/cTIF were compared.

**Results:** 53 patients had TIF (n=30) or cTIF (n=23) with at least 6 months follow-up. Mean pre- and post TIF/cTIF RSI were 24.1 and 5.8 (mean difference: 19, p <0.001). Post TIF/cTIF, 94% of patients had improved GERD-HQRL score, 88% normalized RSI, 78% normalized esophageal acid exposure, and 76% discontinued PPI. Patients with hoarseness were least likely to normalize RSI score. No serious procedure-related adverse events occurred. Patient satisfaction was 74% after TIF/cTIF, improved from baseline of 3.9%, p<0.001, with higher satisfaction for cTIF than TIF (91% vs. 61%, respectively, p=0.02). **Conclusion:** TIF and cTIF are safe and highly effective treatments for refractory LPR symptoms and abnormal esophageal acid exposure in patients with GERD.

## **Assessing the Clinical Utility Of The Post-operative Pharyngogram In Pharyngeal Surgery For Dysphagia**

*Theodore A Gobillot, David Garber, Albert L Merati, Grace M Wandell (University of Washington, WA)*

**Objective:** To evaluate the clinical utility of routine post-operative contrast pharyngograms (XRP) for detecting pharyngeal-esophageal leaks following surgery for dysphagia in patients who tolerated an oral diet pre-operatively.

**Method:** Medical records from patients who underwent endoscopic Zenker's diverticulotomy (EZD, CPT:43180), open Zenker's diverticulectomy (OZD, CPT:43130), and endoscopic (ECP) or open (OCP) cricopharyngeal myotomy (CPT:43030) from 2008-2020 were reviewed. Patients who underwent repair of other pharyngo-esophageal diverticula, OCP during laryngectomy, or had enteral feeding pre-operatively were excluded. The clinical reasoning for ordering pharyngograms, and the frequency with which they identified leaks, was examined. We hypothesized that XRP would not identify clinically unsuspected leaks.

**Results:** 153 patients met the inclusion and exclusion criteria. In the cohort, 79 (52%) underwent OZD, 47 (31%) OCP, 22 (14%) EZD, and 5 (3%) ECP. An XRP was ordered in 64% of cases, 96% of them routinely prior to diet advancement. Some were ordered due to particular intra-operative concerns (n=4) or post-operative signs (n=2). Leak became clinically apparent in 4 patients, all of whom had been studied radiographically. XRP missed identification of an early leak in 3/4 patients. It detected a leak in one patient who already had clinical signs (subcutaneous emphysema, neck swelling). There were no known leaks among patients without clinical suspicion of leak.

**Conclusion:** In our population, post-operative XRP did not detect clinically silent leaks and missed leaks that were suspected and confirmed by other means. Routine, early post-operative XRPs may not beneficially support clinical decision-making on safety for diet advancement following dysphagia surgery.

## **Predictors Of Aspiration Pneumonia In Patients With Dysphagia**

*Nogah Nativ-Zeltzer, Yuval Nachalon, Matthew W Kaufman, Indulaxmi C Seeni, Silvia Bastea, Sukhkaran S Aulakh, Sara Makkiyah, Mabelle D Wilson, Mustafa Sahin, Peter C Belafsky (University of California Davis, CA)*

**Objective:** To identify risk factors for pneumonia incidence in patients with dysphagia undergoing a videofluoroscopic swallow study (VFSS) in an outpatient tertiary-care center.

**Method:** All individuals undergoing a VFSS between 10/02/13 and 07/30/15 were identified from an electronic database and followed historically for two years. Demographic information, medical history and fluoroscopic data was collected. The 2-year incidence of pneumonia was obtained from the medical records and telephone interview.

**Results:** 689 patients were followed for 2 years. The mean age (+/- SD) of the cohort was 65 (+/-15.5) years. 49% (338/689) was female. The most common causes of dysphagia were cricopharyngeal muscle dysfunction (270/689), head and neck cancer (175/689), and neurodegenerative disease (56/689). The incidence of pneumonia was 22% (153/689). Older age, presence of tracheostomy, vallecular and pyriform sinus residue, lower FOIS, history of head and neck cancer, reduced UES opening, elevated penetration-aspiration score (PAS), elevated pharyngeal constriction ratio (PCR) and specific co-morbidities were significantly associated with the incidence of pneumonia in univariate analyses ( $p < 0.05$ ). Multivariate logistic regression revealed that COPD (OR = 2.61, 95% CI: 1.49-4.55), kidney disease (OR=2.79, CI: 1.08-7.21) and PAS > 5 (OR=2.2, CI: 1.39- 3.52) were all significantly associated

with an elevated risk of pneumonia.

**Conclusion:** The incidence of aspiration pneumonia within 2-years of VFSS is 22%. Individuals with COPD and kidney disease are over 2.6 times more likely to develop pneumonia (95% CI = 1.49-4.55, 1.08-7.21 respectively) and individuals with a PAS > 5 were 2.2 times more likely to develop pneumonia (CI = 1.39-3.52).

### **Disparities In Prevalence And Treatment Of Dysphagia Among U.S. Adults**

*Melissa Zheng, Sheng Zhou, Kevin Hur, Karla O'Dell, Michael Johns (University of Southern California, CA)*

**Objective:** To assess sociodemographic differences in the prevalence and treatment of dysphagia among adults.

**Method:** The 2012 National Health Interview Survey was used to analyze adults who reported a swallowing problem in the past 12 months. Associations of sociodemographic variables with prevalence of swallowing problems and access to care were determined by multivariate logistic regression.

**Results:** Among 235 million adults in the United States,  $9.4 \pm 0.3$  million adults (mean age  $52.1 \pm 0.6$  years;  $60.2\% \pm 2.4\%$  female) report swallowing problems, only  $19.2\% \pm 2.0\%$  of whom report receiving treatment or therapy for their swallowing problem. When controlling for gender, race/ethnicity, age, education, income level, geographic region, and health insurance status, adults with lower income and public insurance were more likely to report swallowing problems and less likely to receive treatment than adults with higher income and with private insurance, respectively. Conversely, Black and Hispanic were less likely to report swallowing problems, but more likely to receive treatment than white adults. Younger adults and men were also less likely to report swallowing problems and more likely to receive treatment than older adults and women, respectively.

**Conclusion:** Overall, dysphagia is more commonly reported than treated. Lower income, older age, unemployment, female gender and public insurance status are associated with increased prevalence and decreased treatment of dysphagia. When controlling for these factors, non-white adults are less likely to report and more likely to receive dysphagia treatment than white adults.

### **Autologous Muscle Derived Cell Therapy for Swallowing Impairment In Patients Following Treatment For Head And Neck Cancer: A Phase I Prospective Open Label Clinical Trial**

*Nogah Nativ-Zeltzer, Maggie Kuhn, Lisa Evangelista, Johanthon D Anderson, Jan A Nolte, Gregory Farwell, Peter C Belafsky (University of California Davis, CA)*

**Objective:** To evaluate the safety and potential efficacy of Autologous Muscle Derived Cells for (AMDC) for the treatment of swallowing impairment following treatment for oropharynx cancer.

**Method:** Oropharynx cancer survivors disease free > 2 years post chemoradiation were recruited. All patients had swallowing impairment but were not feeding tube dependent [Functional Oral Intake Scale (FOIS) of >5]. Muscle tissue (50-250mg) was harvested from the vastus lateralis and 150x10<sup>6</sup> AMDCs were prepared by Cook Myosite (Pittsburgh, PA). The cells were injected into four sites throughout the intrinsic tongue musculature. Participants were followed for 24 months. The primary outcome measure was safety. Secondary endpoints included objective measures on swallowing fluoroscopy, oral and pharyngeal pressure and changes in patient-reported outcomes.

**Results:** Ten individuals were enrolled. 100% (10/10) was male. The mean age of the cohort was 65 (+/-8.87) years. No serious adverse event occurred. Mean tongue pressure increased from 26.3 (+/-11.1) to

31.8 (+/- 9.5) kPa ( $p < 0.05$ ). The mean PAS changed from 5.6(+/- 2.1) to 6.8(+/- 1.8) ( $p > 0.05$ ) and the mean FOIS changed from 5.44(+/- 0.53) to 4.67 (+/- 1.0) ( $p > 0.05$ ). The incidence of pneumonia was 30% (3/10) and 10% (1/10) experienced a deterioration in swallowing function throughout 2 years of follow-up. The mean EAT-10 changed from 24.1 (+/- 5.57) to 23.7(+/- 9.1).

**Conclusion:** Results of this Phase I clinical trial demonstrate that injection of  $150 \times 10^6$  autologous muscle derived cells into the tongue is safe and may improve tongue strength which is durable at 2 years. A double-blind, placebo-controlled trial is warranted.

### **Osteophyte Effects on Swallow Efficiency**

*Sachi Patil, Stamatela Balou, Binhuan Wang, Yan Zhang, Milan Amin (New York University, NY)*

**Objective:** This study aims to identify the effects of cervical spine osteophytes on swallow efficiency as measured by presence of pharyngeal residue.

**Method:** Seventy videofluoroscopic swallow studies (VF) for 35 matched patient pairs by gender, age, and comorbidities affecting swallow physiology were analyzed. One group of patients had visible cervical spine osteophytes that by length were greater than 25% of the length of the pharynx and the other group had no visible osteophytes. Variables measured included osteophyte size, pharyngeal wall bulge, pharyngeal area, and amount of pharyngeal residue.

**Results:** Most osteophytes were located at C4 bottom/C5 top ( $n = 13$ ; 37.1%) and C5 bottom/C6 top ( $n = 15$ ; 42.9%). Analysis was done with residue as a continuous variable. Wilcoxon's rank-sum test was used to check if the within pair difference in residue was shown to be significant with  $p = 0.009$ . A linear mixed effects model was fit on the three variables of interest: osteophyte size, pharyngeal wall bulge, and pharyngeal area to amount of pharyngeal residue with no significant relationships found. Analysis was done with residue as a binary variable. McNemar test was used to test the within pair agreement on the dichotomized residue, which was significant with an almost 0  $p$ -value. Binary conditional logistic regression on the three variables of interest showed no significant differences. Kruskal-Wallis showed no significant difference in residue based on osteophyte location.

**Conclusion:** Preliminary results of this study showed no significant difference in pharyngeal residue correlated to osteophyte presence. This trend remained when a sub-analysis was done by osteophyte location.

### Scientific Session 3

## (BASIC SCIENCE)

**Susan Thibeault, PhD, CCC-SLP/ H. Steven Sims, MD**

### **Temporal Expression of Laminin 111 In the Developing Rat Larynx**

*Ian F Caplan, Ignacio Hernandez-Morato, Michael J Pitman ( Columbia University, NY)*

**Objective:** Laminin-111 participates in motor innervation and reinnervation as an axon guidance cue via interaction with Netrin-1. Previous models of recurrent laryngeal nerve (RLN) transection show increased Netrin-1 and laminin-111 production after injury. This study investigates the embryologic expression of laminin-111 in intrinsic laryngeal muscles during primary innervation.

**Methods:** Pregnant and adult Sprague Dawley rats were euthanized. Four replicates per timepoint were performed: E15, E16, E18, E22, adult. Larynges were dissected and fixed in 4% paraformaldehyde in phosphate buffered saline. 14 $\mu$ m sections were stained with  $\beta$ -tubulin III, laminin subunit  $\alpha$ -1 (LAMA1),  $\alpha$ -bungarotoxin and visualized using a Zeiss Axio Imager M2 microscope. LAMA1 expression was analyzed using ImageJ and normalized to adult laryngeal LAMA1 levels. Statistics were performed using Python and associated statistical packages.

**Results:** LAMA1 expression was significantly increased among all laryngeal muscles at E22 compared to earlier embryos. Expression was constant between E15-E18 in the lateral cricoarytenoid, posterior cricoarytenoid, and cricothyroid muscles. Uniquely, expression in the lateral thyroarytenoid (LTA) was significantly increased at E18 compared to E15, but still lower than E22.

**Conclusion:** There is a consistent basal LAMA1 expression during laryngeal innervation with evidence of increase in the LTA at E18. Significantly increased expression is seen in all muscles at E22. These results suggest the embryologic expression of LAMA1 during laryngeal development is different from expression observed following RLN injury with synkinetic reinnervation.

### **Repositioning the Arytenoid Cartilage with An Arytenopexy Stitch: An Anatomic Human Cadaver Larynx Study**

*James Burns, Elizabeth Burckardt (Massachusetts General Hospital - Harvard Medical School, MA)*

**Objectives:** The purpose of this study was to better understand the effects of medialization arytenopexy stitch placement on arytenoid re-positioning by measuring normative cricoarytenoid joint anatomy and changes in arytenoid position when varying arytenopexy stitch configuration.

**Methods:** Two anatomic adult human cadaveric studies were done. First, measurements of the cricoid, arytenoid, and cricoarytenoid joint anatomy were made in 45 preserved cadaveric larynges (26 male(M), 19 female(F)) using digital calipers. Second, the arytenoid cartilages of 6 fresh larynges, 3(M) 3(F), were repositioned and measured 3 times using 3 different arytenopexy stitch configurations. The resulting arytenoid positions were compared by measuring medial displacement of the arytenoid body and change in glottal configuration from macro still images using Image J. Paired t-Test compared results.



**Results:** Cartilage and joint facet dimensions showed size differences between males and females. The cricoid facet dimensions ranged from length of 8.7-11.1mm(M), 6.1-9.3mm(F) and width of 3.6-5.8mm(M), 3.5-4.4mm(F). The arytenoid facet width was 10.5mm(M), 9.7mm(F). The mean distance between cricoarytenoid joint facets was 7.8mm for both males and females. Securing the arytenoid superiorly on the cricoid facet with medial rotation produced more medialization (1.6mm vs 0.2mm,  $t(5) = 7.1$ ,  $p < 0.001$ ) and better glottic aperture configuration ( $9.5^\circ$  vs  $-0.1^\circ$ ,  $t(5) = -9.2$ ,  $p < 0.001$ ) than securing the arytenoid on the mid or lateral facet with minimal rotation.

**Conclusions:** Anatomic consistency in cricoarytenoid anatomy provides reliable surgical landmarks for ideal placement of an arytenopexy suture to optimally reposition the arytenoid cartilage. Arytenoid medialization can be accurately reproduced with an arytenopexy suture.

### **Use of A Novel Hyper-Crosslinked Carbohydrate Scaffold For Vocal Fold Medialization In An Ovine Model**

*Daniel Cates, Yuval Nachalon, Charles Lee, Peter Belafsky University of California, Davis, CA*

**Objective:** Vocal fold medialization is commonly performed for glottic insufficiency and vocal fold immobility. Currently available materials are temporary injectables or stiff synthetic implants. Acellular scaffolds may allow vocal fold augmentation with autologous tissue via host cell migration. The purpose of this investigation was to evaluate the use of a carbohydrate scaffold as a novel medialization implant.

**Methods:** Unilateral type I medialization thyroplasty was performed in 3 Dorper cross ewes using a hyper-crosslinked carbohydrate polymer (HCCP) scaffold. Animals were monitored for 4 weeks for general well-being, dyspnea and weight loss. The animals were euthanized at 4 weeks and the larynges harvested. Histologic evaluation was performed to assess for adverse tissue reaction and biocompatibility.

**Results:** No adverse events were reported. No animals lost weight or displayed evidence of dyspnea. Histology demonstrated ingrowth of host cells and neovascularization with minimal inflammatory reaction. Cellular ingrowth into the scaffold was predominately made up of fibroblasts. Scaffold shape was grossly maintained as it underwent degradation and replacement with host tissue. Migration of the implant material was not observed.

**Conclusion:** HCCP scaffold can be inserted into the paraglottic space to achieve vocal fold medialization. In a sheep model, the scaffold facilitated host cell ingrowth suggesting durable augmentation capability. Further research is required to assess long term safety and efficacy in comparison to currently available synthetic implants.

### **Drug-eluting Endotracheal Tubes for Preventing Bacterial Inflammation In Subglottic Stenosis**

*Matthew R Aronson, Soheila Ali Akbari Ghavimi, Ian N Jacobs, Riccardo Gottardi University of Pennsylvania, PA; Children's Hospital of Philadelphia, PA*

**Objective:** Subglottic stenosis (SGS) results from the dysregulated deposition of scar tissue by laryngotracheal fibroblasts following intubation in pediatric patients. Recent work has highlighted a relationship between this dysregulated inflammatory state and imbalances in the upper airway microbiome. Herein, we engineer novel drug-eluting endotracheal tubes (ETT) to deliver an antimicrobial peptide (AMP) for the local modulation of the microbiome during intubation.

**Method:** ETTs were coated with a water in oil (w/o) emulsion of peptide (w) in PLGA (o) by dipping

thrice. Peptide release was quantified over 2 weeks via fluorometric peptide assays. Antibacterial activity was tested against oral airway pathogens (*S. epidermidis* and pooled human oral microbiome samples), by placing peptide coated tubes and controls (uncoated tubes, PLGA only, and free peptide) in 48 well plates with bacteria. Bacterial tube adhesion was tested counting the number of colonies formed after tube culture for each condition was sonicated. Cytocompatibility was tested against human laryngotracheal fibroblasts.

**Results:** We achieved a homogeneous coating of the ETTs with the AMP Lasioglossin-III in a PLGA matrix that yields a prolonged, linear release over two weeks (typical timeframe before the ETT is changed). We observed significant antibacterial activity against *S. epidermidis* and human microbiome samples, and prevention of bacterial adherence to the tube. Importantly, the released peptide did not cause any cytotoxicity on in vitro cultured laryngotracheal fibroblasts from pediatric donors.

**Conclusion:** Overall, we demonstrate the design of an AMP-eluting ETT to modulated upper-airway bacterial infections during intubation which could be deployed to help prevent SGS

### **Halofuginone, A Novel Collagen Type1a Inhibitor, On Vocal Fold Wound Healing In An Ovine Model**

*Jacqui Allen (University of Auckland, New Zealand)*

**Objectives:** Vocal fold (VF) wound healing can result in a scar which may cause permanent voice impairment. This study aimed to evaluate whether wound healing responses in an ovine laryngeal injury model are altered when exposed to corticosteroid medications used in common clinical practice or a novel type 1A collagen inhibitor, halofuginone.

**Methods:** A paired study design was employed creating a right VF injury with cup forceps and leaving the left VF uninjured. Sheep were divided into four groups - no treatment, dexamethasone 8mg twice daily for five days, triamcinolone intralesionally (40mg/mL) once at injury, or halofuginone 20mg daily three days per week for four weeks. Ex vivo larynges were examined for histological changes (collagen deposition, hyaluronic acid and elastin concentrations), immunohistochemical alterations (Smad3 staining) and rheological function.

**Results:** Halofuginone reduced collagen deposition and preserved elastin within the superficial lamina propria more effectively than dexamethasone or triamcinolone. Hyaluronic acid level remained similar to control VFs. Smad3 staining was reduced in both halofuginone- and dexamethasone-treated animals indicating moderation of the fibrotic cascade. Treated larynges demonstrated mucosal oscillation with a normalized glottal gap <3 following injury and treatment.

**Conclusion:** Halofuginone treatment modifies wound healing responses in the injured ovine vocal fold in an anti-fibrotic manner by reducing collagen deposition, preserving elastin and limiting hyaluronic acid depletion. Both halofuginone and dexamethasone appear to affect Smad3 activation, indicating down-stream alteration of the TGF- $\beta$  fibrotic pathway by both medications. Further study in warranted including human trials.

## **Anti-inflammatory and Anti-oxidant Effects of Japanese Herbal Medicine Kyoseihatekigan On Vocal Fold Wound Healing**

*Shigeyuki Mukudai, Satomi Ozawa, Mami Kaneko, Yoichiro Sugiyama, Shigeru Hirano (Kyoto Prefectural University of Medicine, Japan)*

**Objective:** Japanese herbal medicine, Kyoseihatekigan (KHG) has been known to have anti-inflammatory and anti-oxidant effects. It has been used to alleviate the symptoms of hoarseness and globus hystericus, but its effects on vocal fold injury are unknown. We sought to elucidate the effects of KHG on rat vocal fold wound healing.

**Method:** Sprague-Dawley rats were dosed with KHG (500 mg/kg/day: 1%, 1000 mg/kg/day: 2%, or none: sham-treated) by oral gavage daily from pre-injury day 4 to post-injury day 3. After vocal folds were unilaterally injured under the endoscope, larynges were harvested for histological and immunohistochemical examinations on post-injury days 3 and 56, and quantitative real-time polymerase chain reaction (qPCR) on post-injury day 1 and 5.

**Results:** Histologic analysis showed significantly diminished inflammation at day 3 and fibrosis at day 56 in the lamina propria of 1% and 2% KHG groups as compared to the sham-treated group. The expression of 4-hydroxy-2-nonenal (4-HNE), which is an oxidative stress marker, was reduced significantly in the lamina propria of 1% KHG group at day 3 compared to the sham-treated group. qPCR revealed that transforming growth factor beta-1(TGF- $\beta$ 1) mRNA was significantly downregulated in both KHG groups at day 5. KHG treatment suppressed the expression of inflammatory cytokines at day 1, although not statistically significant.

**Conclusion:** These findings suggested that KHG has anti-inflammatory and anti-oxidant effects on vocal fold injury, and the potential to prevent vocal fold fibrosis by regulating the early phase of its wound healing.

## **Scientific Session 4**

### **(GENERAL)**

**Moderators: Nicole Maronian, MD/ Ryan Borek, MD**

#### **Early Postoperative Complications Following Tracheostomy: Does Technique Influence Outcomes?**

*Jennifer Silva-Nash, J. Reed Gardner, Jessica Campbell, Deanne King, Olivia Daigle, Emre Vural, Mauricio Moreno, Ozlem E. Tulunay-Ugur (University of Arkansas for Medical Sciences, AR)*

**Objective:** Tracheotomies are one of the most commonly performed procedure by otolaryngologists, but no consensus exists on the effect of technique on postoperative complications. The use of stay sutures and Bjork flaps are utilized universally for securing the tracheal stoma to the neck skin in order to create a tract for cannulation.

**Method:** Retrospective cohort study of tracheotomies performed by 3 high volume providers (5/2010 - 5/2020) was conducted to determine the effect of surgical technique on post-operative complications and patient outcomes. Patient demographics, medical comorbidities, indication for tracheostomy, and postoperative complications were analyzed with a statistical alpha set of .05

**Results:** 395 tracheotomies, 140 secured with stay sutures and 232 with Bjork flaps, were reviewed. Mean length-of-stay was 9.1 days, mean number of days to decannulation 87.2. Anticoagulants or antiplatelet agents were implicated in 43.5% of bleeding events, which occurred primarily following

ablation/reconstruction or emergent/urgent tracheotomy (75%). Respiratory failure and ventilator dependence as indications were associated with prolonged length-of-stay, in-hospital mortality, and 30-day mortality ( $p<.001$ ,  $p<.001$ , and  $p=.002$ , respectively). History of COPD was associated with tracheocutaneous fistula and in-hospital mortality ( $p=.002$  and  $.017$ , respectively). Technique was not associated with subsequent stenosis, pneumothorax, tracheal bleeding, surgical site infection, tracheocutaneous fistula, or false passage on tracheostomy change ( $p=.187$ ,  $.715$ ,  $.744$ ,  $.848$ , and  $.293$ , respectively).

**Conclusion:** Though various techniques exist, adverse outcomes are not associated with the manner in which a new tracheostomy stoma is secured. Medical comorbidities and the indications for tracheotomy play a significant role in postoperative outcomes and complications.

### **Laryngeal Ultrasound for Vocal Fold Mobility Training During the Covid-19 Pandemic**

*Nicole L Alexander, Brandon Tran, Huirong Zhu, Julina Ongkasuwan (Baylor College of Medicine, TX)*

**Objective:** Vocal fold movement impairment (VFMI) in infants and children is most commonly evaluated by flexible nasolaryngoscopy (FNL). However, FNL in this population is challenging due to extensive movement, floppy supraglottic structures, or secretions. Laryngeal ultrasound (LUS) may be an alternative, less invasive means that also decreases aerosol generation during the COVID-19 pandemic. The objective was to determine LUS interpretation proficiency for VFMI via an educational module. Furthermore, to study whether quantitative measurements increases interpretation accuracy.

**Method:** Medical students, residents, fellows, faculty, and speech language pathologists were recruited to complete the training module, composed of a 13-minute teaching video followed by 20 cases. They watched an ultrasound video and determined both qualitatively (just by looking) and then quantitatively (through protractor measurements of the vocal fold to arytenoid angle) whether there was normal versus impaired vocal fold mobility.

**Results:** Thirty participants completed the LUS training module, and about one-third were otolaryngology residents. On average, each participant correctly identified about 18 cases. The mean percent correct for quantitative measurements was significantly higher than that of qualitative interpretations ( $p<0.0001$ ). Measurements significantly caused participants to change their answer correctly compared to incorrectly ( $p<0.0001$ ). As the module progressed, there was no significant trend of more correct interpretations ( $p=0.30$ ).

**Conclusion:** Quantitative measurements may increase LUS interpretation accuracy. There was not a specific number of cases interpreted to achieve learning proficiency. LUS is an easily learned method to evaluate for VFMI across all training levels and may help limit aerosolization related to laryngoscopy during the COVID-19 pandemic.

### ***Stratifying the Risk of Cardiovascular Disease In Adults With Obstructive Sleep Apnea Using Machine Learning***

*Saikrishna C. Gourishetti, Timothy Shaver, Rodney Taylor, Amal Isaiah (University of Maryland School of Medicine, MD)*

**Objective:** Obstructive sleep apnea (OSA) increases the risk of morbidity and mortality in cardiovascular disease (CVD). Due to overlapping clinical risk factors, identifying high-risk patients with OSA who are likely to develop CVD remains challenging. We aimed to identify baseline clinical factors associated with the future development of CVD in patients with OSA.

**Method:** We performed a retrospective analysis of 2,237 adults aged 45-84 years and enrolled in the Multi-Ethnic Study of Atherosclerosis (MESA). Six machine learning models were created using baseline clinical factors initially identified by stepwise variable selection. The performance of these models for the prediction of additional risk of CVD in OSA was calculated. Additionally, these models were evaluated for interpretability using locally interpretable model-agnostic explanations (LIME).

**Results:** Of the 2,237 adults without baseline OSA or CVD, 116 were diagnosed with OSA and CVD and 851 with OSA alone ten years after enrollment. The best performing models included random forest (sensitivity 84%, specificity 99%, balanced accuracy 91%) and bootstrap aggregation (sensitivity 84%, specificity 100%, balanced accuracy 92%). The strongest predictors of OSA and CVD versus OSA alone were fasting glucose greater than 91 mg/dL, diastolic pressure greater than 73 mmHg, and age greater than 59 years.

**Conclusion:** In adults without OSA or CVD at baseline, the strongest predictors of CVD in patients with OSA include elevated fasting glucose, higher diastolic pressure and older age. These results may shape a strategy for cardiovascular risk stratification in patients with OSA and subsequent early intervention to mitigate CVD-related morbidity.

### ***Disparate Detection of SARS-CoV2 In Nasopharyngeal Versus Tracheal Samples For Patients With Tracheostomies***

*Joshua D. Smith, Jason A. Correll, Jennifer L. Stein, Robbi A. Kupfer, Norman D. Hogikyan, Robert J. Morrison, Andrew P. Stein (University of Michigan, MI; University of Michigan Medical School MI; VA Ann Arbor Healthcare System, MI)*

**Objective:** Patients with tracheostomies and laryngectomy stomas have an anatomically altered connection between their nasopharynx and trachea that could impact tests for SARS-CoV2. Our goal was to evaluate for disparity in SARS-CoV2 detection for these patients based on the site analyzed.

**Method:** We used EMERSE to search medical records at the University of Michigan for patients with COVID-19 that had a tracheostomy or laryngectomy stoma before or during their treatment. Individual charts were reviewed to identify nasopharyngeal and tracheal samples analyzed on the same date for SARS-CoV2.

**Results:** Fifty-seven patients with COVID-19 had post-tracheostomy nasopharyngeal and tracheal samples evaluated for SARS-CoV2. No patients had a pre-existing tracheostomy or laryngectomy stoma. Nineteen patients were excluded due to invalid/insufficient data. Twenty-one patients had negative SARS-CoV2 results at both sites indicating they had cleared the virus. Seventeen patients had SARS-CoV2 detected in at least one location. Seven of these patients (41.2%) had concordant results with SARS-CoV2 identified at both sites. However, 58.8% had disparate results with eight patients (47.1%) demonstrating a negative nasopharyngeal swab but a positive tracheal result. **Conclusion:** This represents the first study to examine if disparity exists in SARS-CoV2 detection in the nasopharynx versus trachea for patients with tracheostomies. Over half of the patients with detectable virus had disparate results between the two sites. Thus, patients with tracheostomies may have a higher false negative rate if only one site is assessed for SARS-CoV2. We recommend analyzing samples from the nasopharynx and trachea for these patients until more prospective data exists.

### ***Postoperative Infection Rates in Endoscopic Airway Procedures: The Use Of Airway Carts Versus Sterilized Peel-packed Instruments***

*Kevin J Quinn, Evan B Hughes, Pavan S Krishnan, Rajanya S Petersson (Virginia Commonwealth University, VA)*

**Objective:** This study demonstrates the relative incidence of postoperative airway infections following endoscopic airway procedures with either completely sterile instruments (“sterile sets”) or sterilized instruments stored in non-sterile carts (“airway carts”).

**Method:** A retrospective chart review was performed for 1246 patients who underwent endoscopic airway procedures from December 2016 to March 2020. This incorporates periods where either “sterile sets” or “airway carts” were used. Exclusion criteria included simultaneous non-airway interventions and non-airway postoperative infections. Two-sample t-tests and Fisher exact tests were used to determine differences in means of the continuous and categorical variables, respectively, for both groups. The primary outcome measure was postoperative airway infection as indicated by prescription of antibiotics documented within 30 days of surgery. Other covariates analyzed included age, gender, procedure time in minutes, ASA status, and number of procedures during the hospitalization.

**Results:** In total, there were 708 patients that underwent procedures using an “airway cart” and 353 with “sterile sets,” leading to a total of 1061 valid patients for the study. 1.1% of “airway cart” patients had postoperative antibiotics prescribed for an airway infection as compared to 2.8% of “sterile set” patients (p-value = 0.07). There was no statistical difference between the composition of the two cohorts.

**Conclusion:** There is no significant difference in postoperative airway infection rates between the use of “sterile sets” and “airway carts” for endoscopic airway procedures, providing evidence that the use of sterilized instruments stored in clean airway carts is adequate for infection control.

### ***In-Clinic Diagnostic Flexible Laryngoscopy: Is It an Aerosol-Generating Procedure?***

*Courtney B Tipton, Ashli K O'Rourke (Medical University of South Carolina, SC Commonwealth University, VA)*

**Objective:** Recent data has suggested that diagnostic nasal laryngoscopy may not be an aerosol-generating procedure but data in actual patient settings is limited. The goal of this study is to determine if there is increased aerosol production during in-office diagnostic flexible laryngoscopy.

**Method:** The Casella CEL-712/K1 Aerosol Monitoring System was set up in one examination room and secured approximately 30cm from the head of the patient. Aerosols were measured in one second intervals (minimum 0.001 mg/m<sup>3</sup>) throughout the duration of clinic and overnight for four days. This data collection was then repeated in same size but different examination room where laryngoscopy was not performed for two additional days.

**Results:** 333,141 data points were collected for the laryngoscopy room (including overnight controls) and 117,098 data points were collected for the non-laryngoscopy room. Data collected 5 minutes before and 5 minutes after laryngoscopy were then compared against the non-laryngoscopy controls. Average aerosol levels in laryngoscopy rooms were 0.00558mg/m<sup>3</sup> compared to 0.00427mg/m<sup>3</sup>, therefore demonstrating a statistically significant difference in aerosols measured (p<0.001).

**Conclusion:** Aerosols were statistically higher in the clinic room where patients underwent nasal laryngoscopy. Increased aerosol generation is not likely due to the examination itself, but these functional examinations often involve spontaneous or cued aerosol generating behaviors such as singing, throat clearing, coughing, or gagging.

### ***Clinical Predictors of Post-Intubation Bilateral Vocal Fold Immobility***

*David Rosow, Erin R. Cohen, MD, R. Cohen, Thomas Iglesias (University of Miami Miller School of Medicine, FL)*

**Objective:** Background: Iatrogenic bilateral vocal fold immobility (BVFI) is a condition commonly caused by prolonged or traumatic intubation. Sequelae can be devastating, resulting in dyspnea, stridor, and death due to asphyxiation. We sought to review the factors associated with intubation-induced BVFI to better understand how to prevent this condition.

**Method:** Charts from January 2010 to November 2020 were retrospectively reviewed, and all patients with the diagnosis of BVFI (ICD-10 code J38.02) were included. Patients were excluded if the etiology of BVFI was unrelated to a recent intubation. Demographic and clinical data, including length of intubation, BMI, and diabetic status, were analyzed.

**Results:** A total of 69 patients met inclusion criteria, 42 men (61%) and 27 women (39%), with an average age of 53.4±15.8 years. The median duration of intubation was 14 days, mean 14.3±8.5 days. Average BMI was 29.2±6.6. 23 of 69 patients were diabetic (33%). Of 52 patients with documented length of intubation, 49 patients (94%) were intubated for at least 7 days, diabetic, or obese (BMI>30), or a combination of these factors. Of the remaining 3 patients, two were overweight (BMI>25) and had documented traumatic intubations.

**Conclusion:** In our study, an overwhelming majority of patients with post-intubation BVFI had some combination of prolonged intubation, diabetes, and/or obesity. While these data are from a single institution and subject to retrospective selection bias, they do point to the importance of meticulous endotracheal tube management and consideration of early tracheostomy in ventilated patients who are obese or diabetic. In our study, an overwhelming majority of patients with post-intubation BVFI had some combination of prolonged intubation, diabetes, and/or obesity. While these data are from a single institution and subject to retrospective selection bias, they do point to the importance of meticulous endotracheal tube management and consideration of early tracheostomy in ventilated patients who are obese or diabetic.

# Poster Presentation Abstracts

## **The Impact Of Standardized Huddle Tools On Case Duration In Pediatric Microlaryngoscopy/Bronchoscopy**

*Jennifer M Lavin, Austin Walker, Dana M Thompson, Taher Valika, Roderick C. Jones, Reba Mathew, Jonathan B Ida*

Ann & Robert H. Lurie Children's Hospital of Chicago, IL

**Objectives:** Equipment necessary to perform pediatric microlaryngoscopy/bronchoscopy (MLB) varies considerably depending on the selected interventions. In procedures with equipment variability, surgical case length may be increased due to the need to procure items intraoperatively. We hypothesized that use of standardized huddle tools listing necessary equipment would be associated with a shortened case duration in MLB.

**Methods:** As part of a quality improvement initiative at our academic, tertiary pediatric hospital, a standardized huddle sheet was created that listed options of equipment for MLB. Listed items included telescope/bronchoscope size, laryngoscope selection, interventional equipment, suspension, microscopes, and topical medications. The tool was completed by otolaryngology and shared with the circulating nurse at the beginning of the day so equipment needs could be anticipated. The tool was designed in October, 2017 and introduced to trainees in April, 2018. To assess intervention impact, monthly median surgical case duration and room turnover time were retrospectively tracked using control chart analysis from March, 2017 to June 2019.

**Results:** At baseline, the centerline case duration was 49 minutes. One month following introduction of the huddle sheet to trainees, the centerline case-length decreased to 43 minutes. This change was sustained throughout the period studied. No changes in room turnover time were observed during this period.

**Conclusions:** Standardized huddle tool use prior to MLB was associated with a median decrease of six minutes of operating room time without a change in operating room turnover time. Use of similar tools in procedures with significant equipment variability may be beneficial



## **Comparing Long-term Voice Outcomes In Patients Treated With Type I Versus Type II Cordectomy**

*Eliezer C Kinberg, Sarah K Rapoport, Sarah Brown, Peak Woo*  
Mount Sinai Hospital, NY

**Objective:** Long-term voice outcomes after cordectomy remain unclear. We compare long-term voice outcomes in patients treated with European Laryngeal Society classification Type I or II cordectomy, with or without concurrent type V cordectomy.

**Method:** A retrospective review was performed of patients treated with Type I or Type II cordectomy for early glottic carcinoma between 1999-2019. Voice Handicap Index-10 (VHI-10) scores and Cepstral Peak Prominence measures from CAPE-V sentences (CSID) were collected and analyzed utilizing A Mann-Whitney U test. Two experienced speech language pathologists blindly rated patients' voice recordings using a GRBAS scale. An average of their ratings was used for analysis.

**Results:** Sixty-two patients met the inclusion criteria: 43 Type I cordectomies, including 8 with a concurrent type V, and 19 type II cordectomies, also including 8 concurrent type V, were identified. Significant differences ( $P < 0.05$ ) in VHI and CSID were noted between the Type I cordectomy group (VHI 6.3, CSID 11.8) compared to the Type II cordectomy group (VHI 11.1, CSID 40.7). There was strong concordance between VHI and CSID scores ( $r = .048$ ). Patients who underwent Type I cordectomy demonstrated significantly better voice grading (GRBAS 1.3 versus 1.8). No significant difference in voice outcome was noted when concurrent Type Va or Vb cordectomy was performed.

**Conclusion:** Better long-term subjective, objective and computer-analyzed voice outcomes are noted for patients undergoing Type I rather than Type II cordectomy for early glottic carcinoma. Both depth and bulk of resection more critically impact voice outcome than extended resection.

## **Unilateral Versus Bilateral Injection Augmentation For Unilateral Vocal Fold Immobility: A Survey**

*Zao M Yang, Gregory N Postma*

UT Health San Antonio, TX; Medical College of Georgia at Augusta University, GA

**Objective:** Despite the commonality of injection augmentation for treatment of unilateral vocal fold immobility (UVFI), research is limited regarding whether the contralateral, mobile true vocal fold (TVF) should be simultaneously augmented. The purposes of this study are to determine practice patterns among laryngologists regarding unilateral versus bilateral injection augmentation in UVFI and to identify clinical considerations when deciding whether to augment the contralateral TVF.

**Method:** A survey was distributed via email to the mailing lists of the American Broncho-Esophagological Association and European Laryngological Society. Practice patterns were compiled and analyzed. Fisher's exact test was used to determine if clinician variables affected the propensity to perform bilateral injection augmentation in UVFI.

**Results:** 32 laryngologists completed the survey. 12.5% answered that they "nearly always" perform injection augmentation on the mobile TVF, and 15.6% answered that they "never" augment the mobile TVF. Examination findings were the most important factors when deciding whether to perform bilateral injection augmentation in UVFI. Specifically, atrophy of the mobile TVF (75%), clinic or operative laryngoscopic findings (62.5%), and size of glottic gap on stroboscopy (59.4%) were the most common considerations. There was no statistically significant difference in propensity to perform bilateral injection augmentation based on completion of fellowship training, professional society, duration of practice, or percentage of practice comprising laryngology.

**Conclusion:** There is a wide disparity in practice among laryngologists when treating UVFI with unilateral versus bilateral injection augmentation. Most laryngologists advocate for consideration of examination findings when making a decision regarding optimal treatment of the mobile TVF.

## Predictive Value Of Static Endoscopic Evaluation Of Swallowing In Adults

*Joseph Chang, Sarah K Brown, Chaewon Hwang, Diana N Kirke, Leanne Goldberg*  
Icahn School of Medicine at Mount Sinai, NY

**Objective:** Static endoscopic evaluation of swallowing (SEES) is an instrumental evaluation developed for in-office identification of patients who may benefit from modified barium swallow study (MBSS). We aim to determine the predictive value of SEES for evaluating dysphagia.

**Method:** A retrospective case series was performed on adults evaluated for dysphagia using SEES followed by MBSS at a single tertiary care center. Studies were evaluated by two blinded expert raters.

**Results:** 58 patients were included. Thin liquid penetration on SEES had a sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of 0.86 (95% CI 0.70-0.95), 0.63 (95% CI 0.24-0.91), 0.91 (95% CI 0.76-0.98), and 0.5 (0.19-0.81) respectively for predicting thin liquid penetration on MBSS, and 1.0 (95% CI 0.59-1.0), 0.29 (95% CI 0.15-0.47), 0.23 (95% CI 0.10-0.41), and 1.0 (95% CI 0.69-1.0) for predicting thin liquid aspiration on MBSS. Thin liquid aspiration on SEES had a sensitivity, specificity, PPV, and NPV of 0.67 (95% CI 0.09-0.99), 0.85 (95% CI 0.66-0.96), 0.33 (95% CI 0.04-0.78), and 0.96 (95% CI 0.79-1.0) respectively for predicting thin liquid aspiration on MBSS.

**Conclusion:** SEES may be used as an objective in-office test to screen for aspiration and penetration. Thin liquid penetration on SEES is moderately sensitive for predicting penetration on MBSS. Absence of thin liquid penetration or aspiration on SEES has a high NPV for excluding aspiration on MBSS. Abnormalities on SEES or the need to view the entire swallowing mechanism should prompt an MBSS for a more complete evaluation of dysphagia.

## **An Interdisciplinary Approach To Endoscopic Removal Of A Metallic Nail From The Esophagus Of An Infant**

*Alexander N. Goel, Krishna Gurrām, Diana N. Kirke*  
Mount Sinai Hospital, NY

**Objective:** An interdisciplinary approach between Otolaryngology and Gastroenterology can be valuable to achieving safe removal of sharp foreign bodies from the upper aerodigestive tract.

**Method:** Case report including imaging and photodocumentation.

**Results:** We report the case of a 13-month-old boy who presented to the ER one day after a witnessed ingestion of a metallic foreign body while playing outside. Examination showed a comfortably resting child without fever, drooling, or cough. A chest X-ray demonstrated a radio-opaque object in the shape of a 'U', located in the cervical esophagus. Rigid esophagoscopy identified a curved metallic nail with one end easily visualized, however the other appeared to be embedded in the esophageal wall. Significant resistance was met when attempting to extract the object using multiple standard rigid endoscopic instruments. Eventually the object was released, however it could not be safely extracted without the benefit of insufflation from flexible endoscope. As such the gastroenterology team was called to assist and they then performed endoscopic extraction using a grasping forceps and latex hood protector. Given the initial difficulties in extracting the object, an OR wate -soluble fluoroscopy study revealed outpouching of the esophageal wall but no extravasation. The patient made a full recovery.

**Conclusion:** The shape and orientation of this object made removal extremely challenging. Such cases introduce the risk of creating or worsening an esophageal perforation. By coordinating with our gastroenterology colleagues, utilizing both insufflation and fluoroscopy, we were able to avoid injury to surrounding structures and/or the need for open surgical removal.

## **Comparison Of Medicare Reimbursement Rates For Endoscopic And Open Zenker's Diverticulum Repair**

*Monica Kirollos, Nicole M De La Pena, William E Karle*

Mayo Clinic College of Medicine in Arizona, AZ; Mayo Clinic in Arizona, AZ

**Objective:** Zenker's diverticulum may be surgically treated via an open or endoscopic approach. The choice between an endoscopic diverticulotomy and open diverticulectomy often depends on surgical preference, risk stratification of the patient, and size of the diverticulum. As the endoscopic approach continues to become more prevalent, this study aimed to utilize publicly available Medicare databases to evaluate the reimbursement differences between the various surgical approaches and their change over time.

**Method:** The Centers for Medicare & Medicaid Services Physician Fee Schedule was searched for Healthcare Common Procedure Coding System (HCPCS) codes for open (43130) and endoscopic (43180) Zenker's Diverticulum repair. The national payment amount for the facility price for each HCPCS code was recorded for the years 2015-2020. The overall percent change in reimbursement amount was calculated comparing the price in 2020 to 2015 for each code, along with an R squared value, and the yearly percent change between individual years.

**Results:** The national payment amount for each HCPCS code decreased from 2015 to 2020. Over this time period the overall payment amount decreased by 9.7% for the open repair code and 11.9% for the endoscopic repair code. Each year the national payment amount for the endoscopic repair was less than the open procedure.

**Conclusion:** Reimbursements for both open and endoscopic repair of Zenker's diverticulum have decreased over the last five years in a linear fashion. Although the reimbursement for endoscopic repair has declined more steeply, the decline is similar between the two groups.

## **A Case Report Of Hypopharyngeal Fish Bone Foreign Body Stuck Into Zenker's Diverticulum: Is It Perforation Or Diverticulum?**

*Masayuki Shugyo, Tadao Okayasu, Hirokazu Uemura, Toshiaki Yamanaka, Tadashi Kitahara*

Nara Medical University

We report a rare case of a hypopharyngeal fish bone foreign body which was protruding from peri-esophageal wall. It was difficult to differentiate a formation of peri-esophageal abscess by perforation and a Zenker's diverticulum where the foreign body accidentally stuck into. An old man of 71 years felt pain and discomfort in the pharynx when he ate a puffer fish. Next day he went to local clinic of otolaryngologist. Then, he was transferred to general hospital because of difficulty to remove the fish bone. A CT scan showed a fish bone foreign body (6cm) located from hypopharyngeal to peri-esophageal. The penetration of the esophageal wall by the fish bone and the formation of abscess was suspected. The patient was transferred again to our hospital. The fish bone was orally removed by forceps under flexible laryngeal endoscopy. However, in X-ray fluoroscopy the leakage of contrast agent from esophageal wall didn't stop in spite of fasting and antimicrobial medication for ten days. An operation was performed under general anesthesia. There was no abscess formation, and the protruding esophagus wall diagnosed a Zenker's diverticulum. We resected it and closed the esophagus wall. The patient was discharged from the hospital without complication. Pathological diagnosis was consistent with a Zenker's diverticulum. We experienced an extremely rare case of a foreign body straying into a Zenker's diverticulum. If a foreign body protruding outside the esophageal wall is observed, the possibility of foreign body stuck into Zenker's diverticulum should be considered.

## **Device Failure During Injection Medialization Laryngoplasty: Results of the American Broncho-Esophagological Association Survey**

*Nicole Molin, Mursalin M Anis, Ahmed M.S. Soliman*

Lewis Katz School of Medicine at Temple University, PA; University of Miami School of Medicine, FL

**Objective:** Injection medialization laryngoplasty is a commonly performed procedure for the management of glottic insufficiency. Among complications of this procedure is device failure, for which the literature is scarce. Our goal was to determine the prevalence of needle failure during injection laryngoplasty among members of the American Broncho-Esophagological Association (ABEA).

**Method:** A questionnaire was designed and subsequently sent to members of ABEA via electronic mail. Responses were analyzed using descriptive statistics.

**Results:** Twenty-four members (6.7%) completed the survey. Eighty three percent reported experience with needle failure; 80% of these were needle clogging, 30% needle twisting and 25% of respondents experienced needle tip fracture. Seventy five percent of respondents reported needle failure during a percutaneous approach, and 70% reported using calcium hydroxyapatite during device failure. Twenty percent reported having to abort the procedure due to device failure.

**Conclusion:** Needle failure is a rare complication of injection laryngoplasty. Most commonly this was due to clogging or twisting which was managed by replacing the needle but in 25% of cases was due to a broken tip which can result in an aerodigestive tract foreign body and aborting of the procedure.

## High-resolution Magnetic Resonance And Mass Spectrometry Imaging Of The Human Larynx

*Ayami Kishimoto, Yo Kishimoto, Xudong Shi, Elizabeth Hutchinson, Hua Zhang, Yatao Shi, Lingjun Li, Nathan Welham, Ian Rowland*

**Objective:** High-resolution, noninvasive, and nondestructive imaging of the subepithelial structures of the larynx would enhance clinical decision making; similarly, in situ molecular profiling of tissue biopsies could enhance clinical and surgical pathology readout. Towards these goals, we assessed the capabilities of high-resolution magnetic resonance imaging (MRI) and matrix-assisted laser desorption/ionization-mass spectrometry (MALDI-MS) imaging in pediatric and adult human larynges.

**Method:** We conducted MRI including diffusion tensor imaging (DTI), whole-organ histology, and MALDI-MS imaging of cadaveric larynges from three human donors: a 13-month-old male, a 10-year-old female with an infraglottic mucus retention cyst, and a 74-year-old female with advanced polypoid degeneration and a mucus retention cyst.

**Results:** Our MR protocols imaged the larynges at 45-117  $\mu\text{m}^2$  in-plane resolution and capably resolved subepithelial vocal fold structures - such as the superficial lamina propria, vocal ligament, and macula flavae; age-related tissue features - such as intramuscular fat deposition and cartilage ossification; and the lesions. DTI characterized differences in water diffusivity, primary tissue fiber orientation, and fractional anisotropy between the intrinsic laryngeal muscles, mucosae, and lesions. MALDI-MS imaging revealed peptide signatures and putative protein assignments for the polypoid degeneration lesion and the N-glycan constituents of a mucus retention cyst.

**Conclusion:** These imaging techniques hold strong potential for immediate use in preclinical studies and future applications in clinical diagnostics.



## **Sarcopenia With Inflammation As A Predictor Of Survival In Patients With Head And Neck Cancer**

*Kohei Yamahara*

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**Objective:** Although both sarcopenia and systemic inflammation affect the outcomes of head and neck cancer (HNC) patients, whether sarcopenia is associated with systemic inflammation and the combined prognostic effect of these factors in HNC patients remain unknown. This study aimed to evaluate the effect of sarcopenia with systemic inflammation on survival and disease control in HNC patients

**Methods:** We retrospectively reviewed medical records of HNC patients treated between 2009 and 2016. The skeletal muscle area was measured using a single computed tomography image slice at the level of the third cervical vertebra. A prognostic score (SPLR) was developed based on sarcopenia and the platelet-lymphocyte ratio (PLR), and its prognostic value was evaluated.

**Results:** Overall, 164 patients were enrolled. In the multivariate analysis, sarcopenia was significantly associated with poor overall survival (OS) ( $p < 0.01$ ). However, neither sarcopenia nor a high PLR was an independent prognostic factor for disease-free survival (DFS) or locoregional recurrence-free survival (LRFS). A high PLR was an independent predictor for sarcopenia ( $p < 0.01$ ). A high SPLR was associated with older age, lower serum hemoglobin, and lower body mass index (all  $p < 0.05$ ). Multivariate analysis revealed that SPLR was a significant independent predictor of OS, DFS, and LRFS (all  $p < 0.05$ ).

**Conclusion:** Systemic inflammation is significantly associated with sarcopenia. The survival and oncological effects of sarcopenia were enhanced when PLR was high. Thus, the combination of these two parameters may be useful for identifying HNC patients at a risk of poor survival outcomes.

## **A Flowchart For Selecting A Surgical Airway In Pediatric Intubated Patients In Intensive Care Unit**

*Mitsuyoshi Imaizumi*

Fukushima Medical University School of Medicine

**Objective:** Medical advances have resulted in increased survival rates of children with complex anomalies who may require long-term mechanical ventilation and subsequent tracheostomy as a surgical airway. However, at present, there is no definite consensus regarding the timing and methods for placement of a surgical airway in an intubated child in the intensive care unit (ICU). We therefore created a flowchart for the selection of an appropriate surgical airway for severe pediatric cases with prolonged intubation in the ICU.

**Method:** The flowchart includes information on the patients' backgrounds, such as prognosis related to reversibility and history of aspiration pneumonia. To evaluate the appropriateness of the flowchart, satisfaction with its use among parents and pediatricians, as well as perioperative and postoperative complications associated with surgery, were investigated.

**Results:** A total of 16 patients underwent surgery. The selected surgeries were as follows: tracheostomy with temporary tracheostoma ( $n = 4$ ), tracheostomy with permanent tracheostoma ( $n = 9$ ), and subglottic laryngeal closure ( $n = 3$ ). The parents of the patients had no complaints regarding surgical decisions and outcomes. The results of the survey to investigate the feedback of the patients' pediatricians revealed that all pediatricians were satisfied with the selected surgical airway and postoperative course.

**Conclusion:** The present study demonstrated the appropriateness of our flowchart for selecting an appropriate surgical airway in pediatric cases in the ICU. Using our flowchart, we will likely be able to select a surgical airway that is agreeable to both the patient's pediatrician and parents.

## **Hoarseness Leading To New HIV Diagnosis: Isolated Laryngeal Kaposi Sarcoma And Novel Use Of KTP Laser**

*Shadi Ahmadmehrabi, Kevin Grafmiller, Paul Bryson*  
Cleveland Clinic, OH

**Objective:** To describe a rare presentation of isolated laryngeal Kaposi Sarcoma (KS) and novel use of KTP laser for treatment.

**Method:** Systematic review of laryngeal KS and treatments, retrospective chart review.

**Results:** FDA-approved treatment modalities for KS have not changed in 20 years. A review of literature on AIDS-related laryngeal KS revealed a range of attempted local treatment modalities. Prior literature on laryngeal KS suggests isolated laryngeal lesions are a rare presentation. A white non-Hispanic, non-Mediterranean male in his 50s presented with intermittent hoarseness with intermittent hemoptysis and progressive dyspnea over a four-month period. Bronchoscopy demonstrated multiple vascular, friable, pedunculated, supraglottic lesions causing a 60% glottic airway obstruction. All lesions were ablated using KTP laser in a non-contact method. Pathology specimens showed spindle cell morphology with positive HHV-8 staining.

**Conclusion:** Recognition of an isolated laryngeal KS lesion was key to establishing an HIV diagnosis for this patient, whose laryngeal lesions were efficiently ablated by KT laser. The hyper-vascular nature of KS lesions may allow for more efficient ablation by KTP laser. The use of KTP laser for KS lesion ablation has not been previously reported.

## **Esophageal Squamous Papilloma, A Case Series And Review Of The Literature**

*Yuval Nachalon, Nogah Nativ-Zeltzer, Kurt B Schaberg, Petre C Belafsky*  
UC Davis, CA

**Objective:** Esophageal squamous papilloma (ESP) is a rare benign tumor of the esophagus. It can be identified on endoscopy as a raised polypoid white-pink, usually single, lesion. The etiology is uncertain and may be related to mechanical or chemical irritation. Human Papilloma Virus (HPV) has been suggested as well. We report a case series of esophageal papilloma to date and present a review of literature.

**Method:** Retrospective case series of all individuals with ESP diagnosed at a tertiary dysphagia center.

**Results:** Four cases of ESP, 3 males and 1 female, were diagnosed during the study period. The presenting symptoms for each patient were Solid food and pill dysphagia. All papilloma were considered incidental findings unrelated to the presenting symptom. One patient had a history of CIN1 of uterine cervix and one patient had history of HPV+ SCC of the oropharynx. One patient had evidence of peptic esophagitis. No patient had evidence of respiratory papillomatosis. All papilloma were completely resected at the time of esophagoscopy. Pathology demonstrated squamous papilloma with no detection of HPV on DNA in-situ hybridization.

**Conclusion:** ESP is a rare benign esophageal tumor which can easily be resected endoscopically. It may be associated with other HPV-related disease although no HPV DNA could be isolated from the esophageal papilloma in this case series. Etiology maybe related to chronic mucosal irritation (esophagitis). This case series suggests that ESP is typically an isolated lesion unrelated to the presence of respiratory papillomatosis. Malignant transformation has been reported in the literature and surveillance endoscopy should be considered.

## **Resolution Of Zenker's Diverticulum With Endoscopic Pharyngoesophageal Balloon Dilation**

*Apoorva T Ramaswamy, Lisa Evangelista, Peter Belafsky*  
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**Introduction:** We describe the first report of reversal of a Zenker's diverticulum (ZD) with endoscopic balloon dilation of the pharyngoesophageal segment.

**Case Report:** An 84-year-old female presented with the chief complaint of dysphagia with pills. She had no known history of cough or chest infections. Flexible endoscopic evaluation of swallow demonstrated minimal vallecular residue with cracker and no esophageal backflow. The 10-item Eating Assessment Tool (EAT-10) was 4/40. A video-fluoroscopic swallow study and fluoroscopic video esophagram demonstrated a 0.5 cm ZD. Given her limited symptoms, the patient did not desire surgical management. As an alternative, she elected to undergo a series of 3 endoscopies separated by a month with dilation of the pharyngoesophageal segment under moderate sedation. A follow up esophagram a month after the final procedure demonstrated complete resolution of the ZD. The pharyngoesophageal segment on lateral fluoroscopic view increased from 0.81 to 1.02 cm, and on antero-posterior view increased from 1.01 to 1.85 cm. The pharyngeal area decreased from 7.80 cm to 7.73 cm and the pharyngeal constriction ratio, a fluoroscopic measure of pharyngeal contractility, decreased (improved) from 0.05 to 0.02. The patient achieved improvement of her dysphagia symptoms that persisted six months after her final procedure with an EAT-10 of 2/40. Discussion: This case represents the first described instance of resolution of a ZD with an advanced technique of esophageal dilation. Further prospective research is required to confirm that small ZD can be effectively managed with endoscopic series-of-3 dilations.

## **Prognostic Factors For Laryngeal Mucoepidermoid Carcinoma: A Seer Database Study**

*Zaroug Jaleel, Taha Mur, Pratima Agarwal, Lauren Tracy*

Boston University School of Medicine, MA

**Objective:** Laryngeal mucoepidermoid carcinoma (MEC) is an uncommon malignancy of the minor salivary glands that lacks literature discussing prognostic factors and treatment paradigms that influence survival

**Method:** The SEER database was used to retrospectively analyzed a cohort of patients diagnosed with laryngeal MEC from 1978-2016.

**Results:** 49 records were analyzed for the study. High histologic grade was associated with worse disease specific survival (DSS) (5-year DSS: 80% vs 55.5%,  $p=0.032$ ) compared to low histologic grade disease. Late AJCC stage disease was not associated with worse DSS than early AJCC stage disease ( $p=0.075$ ). In terms of treatment modality, no difference in DSS was noted in patients treatment with surgical monotherapy versus surgery with adjuvant radiation (5-year DSS: 71.8% vs 90%) ( $p=0.728$ ). This trend held even when stratifying for advanced AJCC stage disease ( $p=0.48$ ) or high-grade histology ( $p=0.195$ ).

**Conclusion:** Laryngeal MEC is an uncommon malignancy. High histologic grade disease may be a more significant prognostic factor than AJCC stage in terms of DSS. No significant difference in survival was noted between patients treated with surgery and adjuvant radiation compared to surgical monotherapy.

## **Implications Of Unilateral Aryepiglottic Fold Deficiency On Swallow: A Case Series**

*Evan A Jones, Joshua R Bedwell, Julina Ongkasuwan*

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**Objective:** This retrospective case series examines the effect of unilateral aryepiglottic fold deficiency on swallow and airway protection. It focuses on the longitudinal care of five pediatric patients to determine the dietary modifications required to maintain a safe functional swallow.

**Method:** Retrospective chart review of patients with a diagnosis of unilateral aryepiglottic fold deficiency was performed. Cases were clinically identified at a single quaternary care pediatric hospital.

**Results:** Average age at diagnosis was 10 months with mean follow-up of 30 months. Eighty percent of patients were female. All patients had right-sided aryepiglottic fold injuries. Four patients were intubated for an average of 3 months and one patient had a traumatic intubation event. All currently take nutrition by mouth, albeit to varying degrees. Four patients adequately protect their airway from aspiration with all oral consistencies. Optimized delivery of thin liquids yielded an average Rosenbeck penetration aspiration scale (PAS) score of 1.6. Four patients required gastric tube placement during severe illness, and three remain partially dependent. Surgical correction was attempted for one patient without improvement.

**Conclusion:** Based on a limited case series, unilateral aryepiglottic fold deficiency does not definitively limit swallow function. While the PAS score under optimized conditions is impressive, there remain implications for a safely tolerated diet. It should be noted that comorbidities, such as oral aversion and ventilator dependence, do impact diet in this series. There is limited literature upon this topic, and the longitudinal data sheds light on the consequences of the airway injury.

## State Of The Science In Tracheal Stents: A Scoping Review

*Alex Luke, Christopher Johnson, Christian Jacobsen, Nicholas Novak, Gregory Dion*

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**Objective:** Advances in material science has led to an expansion in tracheal stent development. We sought to assess the state of the science regarding materials and preclinical/clinical outcomes for tracheal stents.

**Method:** A comprehensive literature search in October 2019 identified 481 articles related to tracheal stents. One-hundred and twelve full-text articles were reviewed and 62 were included in the final analysis. Datapoints examined were stent materials, drug eluting materials, preclinical findings, and clinical application and outcomes

**Results:** In the 62 included studies, stent materials were metals (n=41), polymers (n=24), coated stents (n=17), drug eluting (n=5), and other (n=1). Metallic stents included nitinol, steel, and magnesium alloys. Polymer stents included polydioxanone, poly-L-lactic acid, poly(lactic-co-glycolic acid), poly-L-lactic acid-polyglycolic acid (PLGP), polypropylene, polycaprolactone (PCL), poly(diethyl siloxane) (PDMS), carbon fiber enforced silicone, polyvinylchloride (PVC), and silicone polyme . Coated stents used a metal or polymer framework and were coated with polyurethane, silicone, polytetrafluoroethylene (PTFE), expandable PTFE, or polyeste . Drug eluting stents utilized Mitomycin C, basic fibroblastic growth factor (bFGF), paclitaxel, rapamycin, and doxycycline. Of the 62 studies, 20 were human and 42 animal studies (Rabbit = 17, Dog = 11, Pig = 6, Rat = 4, Ovine = 3, Cat =1). Noted complications included granulation tissue and/or stenosis, stent migration, death, infection, and fragmentation.

**Conclusion:** An increasing diversity of materials and coatings are employed for tracheal stents, growing more pronounced over the past decade. Though most studies are still preclinical, awareness of developments in tracheal stents is important in contextualizing novel stent concepts and clinical trials.



## **Trends In Postoperative Zenker's Diverticulum Management: Results Of The American Broncho-Esophagological Association Survey**

*Nigel Wang, Nicole Molin, Ahmed M. S. Soliman*  
Temple University, PA

**Objective:** Although treatment of Zenker's diverticulum (ZD) is commonly performed by otolaryngologists using a variety of surgical techniques, there is little published data on the postoperative management of patients. We sought to determine practice patterns among members of the American Broncho-Esophagological Association (ABEA) after surgery for ZD.

**Method:** An online questionnaire was designed via JotForm™ and subsequently sent to members of ABEA. Responses were analyzed using descriptive statistics.

**Results:** Twenty-three members (6.6%) completed the survey. Most (73.9%) were fellowship trained in laryngology and perform >5 procedures per year. Multiple techniques are employed by most respondents including transcervical (TC) (73.9%), endoscopic stapling (ES)(65.2%), endoscopic CO2 laser (EL) (56.5%), and endoscopic harmonic scalpel (EH) (4.3%). Postoperatively, 52.3% of respondents placed patients in 23-hour observation after TC, 66.7% after ES, 69.2% after EL, and 100% after EH. 47.1% of respondents used standard overnight admission after TC, as compared to 13.3% after ES, 23.1% after EL and 0% after EH. Postoperative esophagography was utilized by 70.6% of respondents after TC, 20.0% after ES, 38.5% after EL, and 100% after EH. A peroral diet was started postoperatively on the day of surgery by 26.7% respondents after ES but not after any of the other techniques.

**Conclusion:** Most respondents use multiple techniques for the treatment of ZD with the majority admitting patients for 23-hour observation after surgery. Postoperative esophagography was utilized in most patients after TC and EH but not after the ES or EL. Most respondents start a peroral diet on postoperative day 1.

## Tongue Edema And Injury In Patients Intubated For Covid-19

*Amanda Walsh*

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**Background:** Prone positioning has been used in patients intubated for COVID-19 related lung injury to improve oxygenation. At our institution, we have observed severe tongue edema develop in some of these patients. Hence, we sought to determine the incidence of tongue edema in this cohort and whether prone positioning was a risk factor for this complication.

**Method:** A single-system retrospective cohort study of patients intubated for respiratory failure secondary to COVID-19 that subsequently developed clinically notable tongue edema from March 13-July 5, 2020.

**Results:** 263 total patients were intubated for COVID-19 related respiratory failure, 12 of which developed tongue edema (4.6%). Prone positioning was associated with development of tongue edema (OR 8.86, CI 1.12 - 69.70,  $p < 0.03$ ). Tongue edema was identified a mean of 14 days after intubation (range 5-32 days) and 1.2 days after supination (range 0-4 days) in those prone. 10 patients (83%) also developed other pressure related injuries of the head and neck. Only 1 patient was on an ACE-inhibitor. Tongue edema was primarily managed with conservative measures including bite blocks, occlusive dressings, oral care, and head of bed elevation. One patient required tracheostomy for definitive treatment of their tongue edema

**Conclusion:** Tongue edema appears to develop in a subset of patients with COVID-19 who are intubated. It appears to be associated with prone positioning but is likely of multifactorial nature. Our study is the first to highlight this clinical entity and its relationship with proning. Further investigation into its incidence and pathophysiology is warranted.

## Correlations Of Radiologic And Endoscopic Observations In Subglottic Stenosis

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**Objective:** Subglottic stenosis (SGS) is a progressive and potentially life-threatening condition characterized by inflammation, fibrosis and narrowing of the subglottic regio and proximal trachea. Severity of circumferential stenosis can be classified using the Cotton-Meyer (CM) system and is commonly evaluated endoscopically and may be supplemented with CT imaging. Concordance of grading between these techniques has not been characterized and validated, to date.

**Method:** Patients seen at our institution from August 2013 to August 2020 who were diagnosed with SGS were retrospectively included in our study. Clinical and operative notes were reviewed for CM grading. Head and neck radiographs prior to intervention were read by a trained radiologist for subglottic measurements. Length of stenosis was not assessed.

**Results:** Altogether 47 instances of SGS visits with clinical CM scores and available radiographic imaging within 6 months of an endoscopic intervention were extracted. 3 of 44 patients were included twice for discrete instances that met criteria. 22/47 (46.8%) instances were concordant, with the majority of those being grade 3 (14, 64%), followed by grade 2 (6, 27%) and grade 4 (2, 9%). Of the 25 discordant instances, 7 cases (28%) were discordant by at least 2 grades. Pearson correlation between endoscopic and radiographic CM scores did not reveal a statistically significant correlation (95% CI: [-0.296, 0.278],  $p = 0.9486$ ).

**Conclusion:** Clinical and radiographic CM grading of SGS appears to be poorly reliable. Improved techniques to infer clinically meaningful gradations of stenosis should be developed and employed to enhance the management of SGS.

## **Transoral Laser Microsurgical Excision Of Laryngeal Schwannoma Located In The Paraglottic Space**

*Babak Sadoughi*

Weill Cornell Medical College/NewYork-Presbyterian Hospital, NY

**Objective:** To report the first case of successful transoral excision of a laryngeal schwannoma located in the paraglottic space.

**Method:** Case report.

**Results:** Laryngeal schwannomas are extremely rare tumors, with a total of approximately 70 cases reported to date worldwide. The vast majority of reported cases involved superficial submucosal tumors of the glottis, typically excised transorally. A small subset of laryngeal schwannomas has been found in deeper laryngeal compartments, and uniformly treated using transcervical surgical approaches with various minimally invasive technique modifications. The present report describes the first successful transoral excision of a laryngeal schwannoma located in the paraglottic space via endoscopic laryngotomy with carbon dioxide laser and microlaryngoscopic exploration of the paraglottic compartment. Minimal postoperative morbidity characterized by transient endolaryngeal granuloma formation at the site of resection was observed, with otherwise timely return to normal voice and airway functions without further complications. No recurrence of the lesion or the patient's symptoms were noted within 8 months of the procedure, after which the patient was lost to follow-up.

**Conclusion:** Complete excision of benign paraglottic laryngeal tumors is feasible via a minimally invasive transoral approach, with acceptable morbidity and restoration of normal gross laryngeal functions.

## **Subglottic Stenosis And Airway Foreign Body In A Covid-19 Survivor**

*Jose Alonso, Jennifer Long*  
UCLA, CA

**Objective:** To describe a unique case involving a COVID-19 survivor who developed intubation-related early subglottic stenosis and a simultaneous bronchial foreign body.

**Method:** Case Report.

**Results:** The patient developed grade 3 subglottic stenosis (SGS) 10 days following extubation for COVID-19 (coronavirus disease 2019) pneumonia. A preoperative CT (computed tomography) chest scan revealed a simultaneous calcified, bronchial foreign body. The patient was urgently taken to the operating room for endoscopic management. The airway was managed with a laryngeal mask airway. Total intravenous anesthesia was administered and the patient was kept spontaneously breathing. SGS was managed with endoscopic CRE (continuous radial expansion) balloon dilation. Following adequate improvement in the subglottic airway caliber, the bronchial foreign body was removed using grasping forceps via the bronchoscope's side channel. The patient was extubated in the operating room without complication and taken to the intensive care unit for airway monitoring. Postoperatively, the patient's work of breathing improved, stridor resolved, and oxygen was weaned to baseline parameters.

**Conclusion:** Increased attention to COVID-19 survivors will enable early detection of laryngotracheal stenosis and improved risk stratification. Further research is needed to investigate the microenvironment of subglottic stenosis lesions in COVID-19 survivors with a history of intubation to determine whether a hyperinflammatory response contributes to the early development of airway lesions.

## **Epiglottis Phenotype Effects On Pharyngeal Residue**

*Sachi Patil, Stamatela Balou, Gregory Dion, Ashley Logan, Binhuan Wang, Yan Zhang, Milan Amin*

New York University, NY; University of Texas at San Antonio, TX

**Objective:** This study aims to correlate epiglottis anatomical characteristics and pharyngeal efficiency as measured by pharyngeal residue

**Method:** Chart reviews were conducted on outpatients (mixed etiology) seen between August 2019 and September 2020 who underwent laryngoscopy and videofluoroscopy (VF). Laryngoscopy images and 2x IDDSI 0 boluses were compiled (n=100). Epiglottis shape, distance from tip to posterior pharyngeal wall, distance from base to pharyngeal wall, and resting epiglottic angle were measured using ImageJ. Amount of pharyngeal residue was collected from modified barium swallow impairment profile (MBSImp

**Results:** Residue was studied both as a binary and continuous variable. In this pilot cohort of 75 patients, 69 had a residue score of 0-2 and 6 had larger residue scores of 3-4. Wilcoxon rank sum test revealed a smaller epiglottis area was linked to more residue (M: 1462, SD: 968 and M: 594 SD: 328,  $p=0.014$ ). Larger distance from epiglottis base to posterior pharyngeal wall was linked to more residue (M: 68.2, SD: 25.9 and M: 44.1, SD: 8.8  $p=0.018$ ). On continuous variable analysis, epiglottis angle was found to be correlated to pharyngeal residue ( $p=0.016$ ). Multivariate linear regression analysis demonstrated a relationship between steeper angle and increased residue ( $p=0.079$ , at a significance of  $p < 0.1$ ) with a  $r = 0.019$ . Ordinal logit regression analysis concluded angle was at the borderline of significance,  $p=0.047$

**Conclusion:** This preliminary study suggests that the length and angle of the epiglottis are anatomic characteristics that are associated with pharyngeal residue. These data may have implications for potential novel future treatments.

## **Development Of Cushing Syndrome After Serial In-office Subglottic Steroid Injections**

*Einav Silverstein, Yael Bensoussan, Karla O'Dell*

University of Southern California, CA

**Objective:** Subglottic stenosis remains a challenge for the otolaryngologist due to its recurring nature. Subglottic serial In-office steroid injections (SSI) have gained popularity in the last few years as an adjunct to operating room dilation to prevent rapid recurrence of the stenosis. Although these local injections are generally thought to have minimal systemic absorption, recent literature suggests the possibility of systemic absorption and side effects such as elevated cortisol levels. We present a case of Cushing syndrome that developed in a patient receiving SSI for subglottic stenosis.

**Method:** Case Report

**Results:** A 55-year-old woman was diagnosed with idiopathic subglottic stenosis obstructing about 40% of her airway. Over the course of 8 months, she underwent 2 surgeries in the operating room with CO2 laser, balloon dilation and injection of triamcinolone as well as a total of 6 in-office steroid injections. For each injection, 2cc of Kenalog 40 (triamcinolone 40mg/ml) was injected in the subglottic region. The interval between the injections ranged from 1 to 2 months. After the last injection, she developed symptoms of Cushing syndrome including a 20 pounds weight gain, striae on her arms and legs, a dorsal hump and alopecia. She denied taking any additional source of exogenous steroids including systemic or inhaled steroids. Her symptoms spontaneously resolved 3 months after the end of the SSI treatments.

**Conclusion:** Though considered to be generally safe, this case report illustrates the potential systemic side effects of localized subglottic steroid injections.

## **Bilateral Perisylvian Polymicrogyria: An Unusual Cause Of Nasal Fricatives And Dysphagia**

*Thomas Valente, Julina Ongksuwan*  
Baylor College of Medicine, TX

**Objective:** Bilateral perisylvian polymicrogyria (BPP) is a neurologic condition characterized by a cortical developmental malformation resulting in microscopic gyration of the Sylvian fissures and surrounding cerebral cortex. 1,3 Patients often suffer from faciopharyngomasticatory diplegia, which is a pseudobulbar symptom complex including feeding difficulties, drooling, mild to severe dysarthria, and restricted tongue movements. 3 This Case highlights the role that Otolaryngologists play in diagnosing this pathology.

**Method and Results:** We report a case of an otherwise healthy 10-year-old male who presented with concern for hypernasal resonance, dysphagia, and gagging. On the advice of a previous speech language pathologist, the patient's family was concerned about ankyloglossia restricting tongue mobility. Physical exam was consistent with dysarthria, and inability to lift or lateralize the tongue without significant ankyloglossia. Evaluation by speech language pathology demonstrated nasal fricatives, velopharyngeal mislearning without velopharyngeal insufficiency, and oral phase dysphagia. An MRI was ordered which revealed bilateral perisylvian polymicrogyria along the inferior frontal, inferior parietal, and superior temporal lobes.

**Conclusion:** Oral and palatal functional impairments have been well described in BPP. 1 This case reinforces the importance of neurological evaluation in patients presenting to the otolaryngologist with speech and feeding complaints and exam findings consistent with cranial neuropathies.



## **Impact Of Immunosuppression On The Clinical Course Of Recurrent Respiratory Papillomatosis (RRP) In Non-diabetic Patients**

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**Objective:** Recurrent respiratory papillomatosis (RRP) is a benign manifestation of Human Papilloma Virus (HPV) types 6 and 11 in the respiratory tract that can lead to significant morbidity. RRP can have varying effects on voicing and breathing, and frequent surgeries are often necessary. Recurrences are common and can be difficult to predict; immunosuppression is one factor that has been incompletely studied. Identifying patients at higher risk for a worsening RRP disease course could improve patient counseling and surveillance. This retrospective cohort study aims to determine the effect of immunosuppression on RRP recurrence.

**Method:** We conducted a retrospective cohort analysis of documented cases of RRP treated at an academic tertiary referral center that included 83 patients between 2005 and 2020. Inclusion criteria were (1) diagnosis of RRP and (2) surveillance for a minimum of 18 months at our institution. Exclusion criteria was (1) diagnosis of diabetes mellitus. Recurrence was defined as presence of new papillary growth on flexible laryngoscopy. Immunosuppression included active chemoradiation, autoimmune disease managed with immunosuppressants, or history of transplant. Variables were compared using t-tests and Wilcoxon-Mann tests.

**Results:** Immunosuppressed patients had fewer days to recurrence than immunocompetent patients (129d v. 490d,  $p < 0.05$ ) and decreased average inter-surgical interval (248d v. 648d,  $p < 0.05$ ). Additionally, immunocompetent patients experienced greater average improvement in Voice Handicap Index with each surgery than immunosuppressed patients (-13 v. -3,  $p < 0.05$ ).

**Conclusion:** In the non-diabetic population, immunosuppressed patients with RRP could recur faster and have less voice improvement with each surgery than immunocompetent patients.

## Managing The Hoarse Voice In The Covid-19 Era

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**Objective:** Covid-19 has presented new challenges to the diagnosis and treatment of voice disorders in the UK. Whilst national guidance reserves in-person appointments with flexible nasendoscopy (FNE) for those deemed high risk, how can we best treat the majority of dysphonic patients who have no red flags, whilst reducing FNE use, in a timely manner? Multiple studies suggest an equivalence between teleconferencing technology and face to face consultations for voice disorders - can this translate to our service?

**Method:** 10 Speech and Language Therapists (SALT) were played audio recordings of 10 patients with voice disorders, with and without a detailed history. Accuracy of diagnosis and reliability of GRBAS scores were observed.

**Results:** Certain diagnoses were easier to identify than others; spasmodic dysphonia and presbyphonia had 100% and 95% diagnostic accuracy respectively compared to 45% for chronic laryngitis. Correct diagnosis was weakly correlated to therapist's experience. Inter- and intra-rater GRBAS scores showed moderate reliability (ICC 0.514, weighted Kappa 0.656); again weighted Kappa scores improved slightly with experience.

**Conclusion:** This preliminary study introduces alternative frameworks and protocols for managing dysphonia in the era of Covid-19. Many patients could be diagnosed via telehealth and referred for SALT teleconferencing initially, with re-referral for scope if they do not improve, although a larger, multi-centre study would be required to optimise this. We suggest increased emphasis on benign laryngeal pathology in training to aid telephone triage, and recordings for review by more senior colleagues. GRBAS is valuable however is best utilised alongside the Voice Handicap Index.

## Evaluation Of Esophageal Motility In Patients With Cricopharyngeal Dysfunction

*Lindsey Shehee, Flora Yan, Sydney Moseley, Ashli K O'Rourke*  
Medical University of South Carolina, SC

**Objective:** Cricopharyngeal dysfunction (CPD) is a common condition seen by otolaryngologists and can arise for multiple reasons. The aim of this study is to determine if patients with CPD have a higher incidence of esophageal or lower esophageal sphincter dysfunction.

**Method:** A retrospective review was completed of adult patients who had undergone esophageal high-resolution manometry (HRM) at our Institution from 2008 - 2019. For these patients, information on esophagram findings, pH-impedance testing and endoscopy were collected. CPD on HRM examination (CPD-HRM) was defined as relaxation duration of  $< 480\text{ms}$  and/or relaxation pressure  $>12\text{ mmHg}$ . CPD on esophagram (CPD-Eso) was defined as a cricopharyngeal bar or hypertrophy noted by the radiologist.

**Results:** 120 patients were included in the study. There were 25 CPD-HRM and 20 CPD-Eso patients. CPD-HRM patients were not more likely to have esophageal dysmotility (56.0% versus 52.7%;  $p=0.768$ ), GER (21.1% versus 29.2%;  $p=0.780$ ), or abnormal endoscopy findings (16% versus 25.8%;  $p=0.504$ ) than those with normal C function. However, 56.0% (14/25) of CPD-HRM patients did have abnormal esophageal motility. CPD-Eso was significantly associated with abnormal motility (75% versus 49%;  $p=0.047$ ). CPD-Eso was not associated with increased rate of gastroesophageal reflux or endoscopy abnormalities

**Conclusion:** A majority of patients with cricopharyngeal dysfunction exhibited abnormal motility. However, the diagnostic criteria for manometric versus radiographic cricopharyngeal dysfunction has not been well delineated and resulted in differing findings for this study. The appropriate pre-operative work-up prior to CP intervention remains controversial and deserves further study.

## **Endoscopic Management Of Metallic Pin Stuck Into The Segmental Bronchus**

*Young Chul Kim, Seong Keun Kwon*  
Seoul National University Hospital

**Objective:** This is a challenging case review of sharp and deep located metallic sewing pin stuck into the segmental bronchus.

**Method:** Case report and literature review.

**Results:** A 10-year-old female accidentally swallowed a 3.3cm sewing pin with pearl head while making hairpin to her dolls. She came to ER 4 hours after swallowing and it was found at left lower lung on Chest PA. She didn't have any symptoms such as fever, cough, pain or dyspnea. Ventilating bronchoscope was performed, and the pin was identified at left lateral basal segmental bronchus. The pearl head of the pin was located at the bottom while the sharp tip of the pin, which was located at the top, was stuck into the mucosa. During the removal procedure, tip of bronchoscope was located at the left main bronchus, and the optical forceps with telescopes were advanced to segmental bronchus. After grasping the midportion of pin, it was pushed to distal direction for mobilization of the sharp tip which was stuck into the bronchus. After the tip was exposed, it was grasped and pulled into the bronchoscope with giving minimal damage to nearby mucosa. Eventually, the foreign body and the bronchoscope were removed together. The intraoperative bleeding was minimal and there was no acute postoperative complications. **Conclusion:** The pointed end of a pin may be stuck into the bronchus. It should be mobilized, grasped and extracted through the bronchoscope to minimize the damage to the bronchial wall.

## **A Case Of The Laryngeal Tumor With Suspected Recurrence Of Laryngeal Hemangiopericytoma**

*Ryohei Yuki, Tsuyoshi Kojima, Yusuke Okanoue, Syuya Otsuki, Hirotaka Yamamoto, Koki Hasebe, Ryusuke Hori*  
Tenri Hospital

**Objective:** Hemangiopericytomas (HPCs) are vascular tumors with a similar pathological feature to Hemangiopericytoma-like tumors (HPCLs). HPCs are considered to be on the same spectrum as HPCLs, and there are many overlapping findings without clear differentiation criteria. Both tumors are uncommonly found in the head and neck area, especially in the larynx.

**Method:** A 45-year-old male visited the hospital due to hoarseness. Fiberoptic laryngoscopy examination revealed a submucosal supraglottic mass. Magnetic resonance imaging described the tumor as isointense on T1-weighted image, hyperintense on T2-weighted image, with a slight enhancement. Tumor biopsy showed no evidence of malignancy. When he was 26 years old, he had undergone transoral tumor resection at another hospital and had been diagnosed with HPC. Recurrence of supraglottic HPC was suspected, and transoral video-assisted laryngeal surgery was performed. Preoperative tumor embolization made it possible to resect the tumor with an appropriate margin under little bleeding, and neither dysphonia nor dysphagia occurred. Pathologically, the tumor consisted of uniform, ovoid, or spindled cells, which were immunoreactive with Vimentin while non-reactive with CD34, actin, and STAT6; it was finally diagnosed HPCL.

**Results:** It is difficult to distinguish HPCs from HPCLs. Although HPCLs are considered benign, some cases of HPCs with distant metastasis were reported.

**Conclusion:** We reported a laryngeal tumor that was initially diagnosed as HPC and recurred 20 years later. Although we struggled with the diagnosis, the patient had only local recurrence, and the tumor was orally resected for quality of life. Careful follow-up for recurrence is required.

## Comparison Of Esophagram And Ph Testing For The Diagnosis Of Reflu

*Courtney B Tipton, Sydney Moseley, Ashli K O'Rourke*  
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**Objective:** Although 24-hour esophageal pH testing is considered gold standard for reflux diagnosis, findings of spontaneous or provoked reflux on esophagram may prompt further esophageal testing. The objective of this study was to determine how well the finding of reflux on esophagram correlates with esophageal pH testin

**Method:** Retrospective review of patients undergoing both pH and esophagram testing at a single tertiary care center from January 2010 to September 2020. Possible subjects were identified using CP codes for pH testing (91034/91038). Inclusion criteria: age  $\geq 18$ , pH testing and esophagram within 1 year. Exclusion criteria: incomplete or inaccurate pH testing (i.e. catheter malfunction), no comment on reflux within the esophagram report.

**Results:** 2379 records were screened, and 499 patients met criteria: 145 males and 354 females with an average age of 57.3 years (range 19-92). On average, esophagram and pH testing were completed 59.2 days apart (range 0-361). 315 (63.1%) esophagrams revealed reflux, whereas only 244 (48.9%) pH tests were abnormal. Only 279 (56.0%) patients had correlated studies. Average DeMeester score significantly differed between the correlated group and the group without correlation, 11.6 and 5.5, respectively ( $p=0.0007$ ). Similarly, total number of reflux episodes averaged 45.1 in the correlated group compared to 30.1 in the group without correlation ( $p=0.0002$ ). There was not a statically significant difference in time between testing ( $p=0.09$ ).

**Conclusion:** Although reflux on esophagram may correlate with abnormal pH testing in patients with more severe disease, it does not appear to be a reliable study to assess for reflux

## Effect Of Vocal Fold Medialization On Dyspnea Index In Unilateral Vocal Fold Paralysis

*Matthew R Hoffman, Edie R Hapner, C. Blake Simpson*  
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**Objective:** Patients with unilateral vocal fold paralysis (UVFP) commonly report dysphonia and dysphagia. Dyspnea can also occur, with studies on change in dyspnea after medialization producing mixed results. Those studies including patient-reported outcome measures have focused on single-question global scales (e.g., modified Bo g dyspnea scale). The dyspnea index (DI) includes ten questions, is more specific to upper airway-related dyspnea, and may better capture the symptoms experienced by these patients. We evaluated change in DI after medialization for UVFP. **Methods:** Twenty patients with UVFP underwent injection augmentation (n=15) or framework surgery (n=5). DI was recorded 2-4 weeks pre-procedure and 2-4 weeks afterward. Voice handicap index-10 (VHI-10), glottal function index (GFI), cough severity index (CSI), and eating assessment tool-10 (EAT-10) were also recorded. Change in each parameter as well as correlations were assessed.

**Results:** Nine patients had pre-procedural DI scores above the cutoff of 10 used to specify abnormality. DI decreased from  $12 \pm 14$  to  $6 \pm 10$  after medialization ( $t=2.966$ ,  $p=0.0079$ , 95% CI: -10.7, -1.8). Twelve patient scores decreased, five remained unchanged, and three increased after treatment. Preprocedural DI was correlated with GFI ( $r=0.465$ ,  $p=0.039$ ), CSI ( $r=0.837$ ,  $p<0.001$ ), and EAT-10 ( $r=0.710$ ,  $p<0.001$ ). Percent change in DI was not correlated with the other patient-reported outcomes.

**Conclusion:** Symptoms of upper airway-related dyspnea are common in patients with UVFP, occurring in approximately half of patients in this small cohort. Medialization may alleviate these symptoms. Treatment decision-making should consider post-procedural change in dyspnea, especially in patients for whom dyspnea is a motivating factor for seeking treatment.

## Chronic Cough As A Predictor Of Poor Responsiveness In Asthma Patients

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**Objective:** In this study we aim to establish correlation between chronic cough (CC) and asthma diagnosis and severity. We hypothesize that patients with diagnosis of chronic cough may have more severe asthma diagnosis and thus poor responsiveness to treatment.

**Method:** Retrospective review performed on 603 charts that had a positive IgE allergy class blood test between 2014 and 2018. Patient demographics and asthma severity parameters such as clinic and ED visits, asthma treatment and number of medications were recorded as well as CC diagnosis. Logistic regression was used to analyze the likelihood of severe asthma diagnosis in patients with chronic cough.

**Results:** We found that CC group had more asthma diagnosis when compared to those without CC 71.8% vs 45.4%  $p < 0.05$ . There was no difference between the number of allergen classes by allergen between groups. A subgroup analysis of the asthmatic cohort showed patients with asthma and CC had more mean clinic visits 7.70 (6.53) vs 5.74 (5.10)  $p < 0.05$  than those without CC. There was no difference in diagnosis of allergic rhinitis between patients with and without CC. Further, patients with CC showed a decreased likelihood of being allergic to cat dander 0.85 95%CI (0.75, 0.96,  $p < 0.01$ ). For the non-asthmatic cohort males had a higher diagnosis of CC (40% vs 58%  $p < 0.05$ ), this difference was not present in the asthmatic cohort ( $n=352$ ).

**Conclusion:** Chronic cough is related with an asthma diagnosis. Asthmatic patients with chronic cough can have poorly responsive asthma evidenced by the increased clinic visits in this population.



## **Laryngotracheal Amyloidosis: Surgical Intervention And Longterm Follow-up**

*David O'Neil Danis*

Boston University School of Medicine, MA

**Objective:** Localized laryngotracheal amyloidosis (LA) is a rare disease that can significantly impact phonation and respiration. Given the disease rarity, information about patients' presentation, surgical treatment, and outcomes is limited.

**Method:** Retrospective review of patients with LA presenting to an urban tertiary hospital amyloid center 2002-2020.

**Results:** 53 individuals were diagnosed with LA (21M:32F) at median age 48 years (range:25-85). 37 presented with dysphonia, 2 with dyspnea, 11 with both dysphonia and dyspnea. A median 2 subsites were involved; most commonly TVCs (N=25), FVCs (n=25), subglottis (n=23), epiglottis/AE folds (n=14), trachea (n=10), 4 had pharyngeal amyloid. Seventeen underwent surgery at BMC, 19 had surgery at outside institution, 17 chose non-operative management. During a median 8-year follow-up, patients underwent an average of 2 surgeries (range 1-32, not including diagnostic biopsy) for symptom treatment; 22 had CO2 laser excision, 3 cold steel excision; KTP and PDL lasers were less effective in excision. Removal of involved FVCs and superficial excision of medial TVCs resulted in subjective voice improvements. Sequential quadrant excision of subglottic/tracheal LA improved breathing and allowed decannulation of 6/7 patients with tracheostomy dependence. Nine patients underwent 20Gy of radiotherapy for progressive symptoms and/or tracheal disease.

**Conclusion:** Laryngotracheal amyloidosis causes significant symptoms and is a challenging disease to treat. CO2 laser excision of involved subsites is often effective in improving patient symptoms, though patients should be counseled that multiple surgeries may be required to optimize function. For recalcitrant disease, and that which is not amenable to surgical resection, radiotherapy can alleviate symptoms.

## **Hyo-mental Angle And Distance: A Diagnostic Tool In Airway Assessment Of Adult Patients Affected With Mucopolysaccharidosis**

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Salford Royal NHS Foundation Trust

**Objective:** Mucopolysaccharidosis (MPS) are inborn errors of metabolism characterised by the progressive accumulation of glycosaminoglycans in tissues throughout the body. MPS vary in their prevalence and presentation, although most include somatic involvement affecting airway and other systems. Anterior larynx makes in MPS access difficult, usually assessed by thyromental distance (TMD) and video nasendoscopy (VE). We describe a novel method to assess anterior larynx using the hyoid bone as a landmark. Distance between the hyoid and symphysis of mandible (hyo-mental distance; HMD) and inclination of this line to the horizontal (hyo-mental angle; HMA) when the patient is in the neutral position can be assessed using existing cross-sectional imaging.

**Method:** HMA and HMD in MPS and non-MPS groups were calculated. Pearson's correlation between the HMA, HMD versus height, weight was performed.

**Results:** 50 MPS (type I, II, III, IV, VI) (32M/18F; age range=19-66 years; mean BMI=26.8kg/m<sup>2</sup>) and 50 non-MPS patients (25M/25F; age range=22-84 years; mean BMI=26.5kg/m<sup>2</sup>) were included. Mean HMA was 25.72 (10 to +50) degrees in MPS and 2.42 (-35 to +28) degrees in non-MPS group. Mean HMD was 46.5 (25.7-66) mm in MPS and 41.8 (27-60.3) mm in non-MPS group. HMA versus height, weight showed moderate correlation ( $r=-0.4$ ,  $p<0.05$ ) only in MPS group. HMD versus height, weight showed no correlation in both groups ( $r<0.4$ ,  $p>0.05$ ).

**Conclusion:** Acute HMA is a new finding in adult MPS and it is a better indicator of difficult airway than HMD or TMD. It can be a useful parameter in assessment of complex airways.

## **Awake In-office Closure Of Tracheoesophageal Fistula Using KTP Laser Thermoablation**

*Hayley Born, Babak Sadoughi*  
Weill Cornell Medicine, NY

**Objective:** To report a case of closure of an acquired tracheoesophageal fistula (TEF) using in-office KTP laser via an existing tracheal stoma.

**Method:** Case Report.

**Results:** A 78-year-old male with a history of functional total laryngectomy with free tissue reconstruction after chemoradiation for stage IV hypopharyngeal cancer presented with recurrent complete esophageal obliteration causing gastrostomy dependence. He underwent esophageal recanalization and stenting, complicated by the formation of a tracheoesophageal fistula distal to the tracheostoma. The fistula persisted despite timely removal of the stent. In-office KTP laser thermoablation of the fistula tract was then performed via awake, flexible tracheoscopic approach with topical anesthesia. Sustained closure of the TEF was observed after a single treatment session. Follow-up interval was 3 months at the time of this report.

**Conclusion:** TEF is a known complication after esophageal stenting and can result in chronic cough, aspiration and recurrent pulmonary infections. TEF closure using an endoscopic laser technique has been described in the pediatric population under general anesthesia. However, to our knowledge it has not been attempted in adult cases of acquired TEF, particularly in the office setting. We describe the first such case of successful TEF closure performed awake. Further study of this novel method's safety and effectiveness is warranted before its adoption as a standard modality of TEF management.

## **Validated Tools For Diagnosis Of Sarcopenic Dysphagia In The Elderly: A Systematic Review**

*Jigar Govind, Sara Abu Ghanem*  
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**Objective:** Sarcopenic dysphagia is difficulty swallowing due to sarcopenia in both generalized skeletal muscles (muscles of the whole body) and swallowing-related muscles. The objective of this review is to critically evaluate the bedside tools used to diagnose sarcopenic dysphagia in the elderly.

**Method:** A comprehensive review of PubMed, Embase, and Cochrane was performed. These studies were qualitatively evaluated for use of the available diagnostic criteria and predictors used to make a diagnosis of “sarcopenic dysphagia”.

**Results:** A total of 21 reports were selected from a search yield of 454 studies. Various tools are used to assess sarcopenia including Skeletal Muscle Mass Index (SMI), handgrip strength (HGS), gait speed, calf circumference, and tongue pressure, of which SMI, HGS, and tongue pressure have been validated with swallowing function tests as videofluorographic swallowing study (VFSS) or fiberoptic endoscopic evaluation of swallowing (FEES). Tools used to assess dysphagia and/or swallowing dysfunction were diverse and not standardized including VFSS, FEES, Functional Oral Intake Scale (FOIS), Food Intake Level Scale (FILS), EAT-10 questionnaire, Standardized Swallowing Assessment (SSA), and 100mL Water Swallow Test (WST).

**Conclusion:** Gait speed and calf circumference cut-offs popularly used to diagnose sarcopenic dysphagia have not been directly validated against objective swallowing measures in assessing sarcopenia of swallowing-related muscles. The diagnostic criteria for sarcopenic dysphagia should be used with caution, and future studies better defining bedside measure cut-off scores based on subjective and objective data are recommended.

## **Delayed Tracheal Perforation Following Total Thyroidectomy**

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**Objective:** Tracheal perforation from total thyroidectomy (TT) is a rare occurrence, with intraoperative identification and immediate repair the mainstay of treatment. Delayed tracheal rupture is rarely reported in the literature and represents a potential airway emergency. Here, we describe a case of a woman who presented 10 days following TT with tracheal necrosis and subsequent tracheal perforation requiring operative repair.

**Method:** Single case review at a tertiary academic center.

**Results:** 34-year-old female with Felty Syndrome, including rheumatoid arthritis, on immunosuppressant medications and Hashimoto's thyroiditis underwent planned total thyroidectomy. No intraoperative complications were described. On post-operative day (POD) 2 she developed a presumed seroma at the incision site and underwent in-office needle aspiration. On POD10 she presented to the emergency department with swelling of her anterior neck that worsened with voicing and valsalva. CT neck demonstrated subcutaneous emphysema and a 3 mm anterolateral tracheal perforation. Urgent operative exploration with otolaryngology demonstrated necrosis along tracheal rings 2-4 with perforation. The perforation was primarily closed with non-absorbable suture, and a muscle flap attached to the defect to promote healing. The patient was left intubated for 72 hours to promote tension-free healing. Direct laryngoscopy revealed healing fibrinous tracheal rings with resolution of the perforation and the patient was extubated successfully.

**Conclusion:** It is unclear what precipitated this delayed patient presentation; however, the patient's immunosuppressed state and post-operative seroma certainly could have contributed to tracheal devascularization. Tracheal necrosis and perforation following TT constitutes a potential airway emergency and should be promptly explored and repaired.

## **Acquired Velopharyngeal Incompetence And Treatment Of Velopharyngeal Insufficiency In Adults With Dysphagia**

*Rebecca J Howell, Caroline Lynch, Liran Oren, Aaron Friedman, Sid Khosla, David Rule*

University of Cincinnati, OH

**Objective:** Velopharyngeal insufficiency is due to structural abnormality. Velopharyngeal incompetence (VPI) describes a disorder caused by abnormal neurophysiology as a result of congenital or acquired brain injury. Classically VPI causes hypernasality, poor intelligibility, or nasal emissions. While the importance of soft palate elevation during the oropharyngeal phase of swallow is a widely accepted metric, dysphagia has been understudied in the multi-disciplinary evaluation in the adult population (acquired type).

**Method:** In the current study, we identified 15 patients from a voice and swallow database that presented over a period of five years to a multi-disciplinary clinic and underwent intervention for VPI. Perceptual, endoscopic, radiographic imaging, and patient reported outcomes were collected pre- and post-intervention.

**Results:** Common etiologies of VPI in adults included stroke (n=2), head and neck cancer (n=4), brainstem tumor (n=3), and complication of a previous surgery (n=3). Patients were categorized as having unilateral (n= 12) and circumferential (n= 5) palatal paralysis on endoscopy and 13:15 underwent modified barium swallow (MBS), reviewed by an MBS-Imp certified speech language pathologist. The most common procedures performed were endoscopic injection palatoplasty (n=7) and open palatopharyngoplasty (n=3). At the time of presentation, patient reported outcome measures (PROM) voice handicap index (VHI10) (20.6 +/- 8.4), reflux symptom index (RSI) (23.3 +/- 8.1), glottal function index (GFI) (7.8 +/- 4.7), and eating assessment tool (EAT-10) (19.8 +/- 10.7), and dyspnea index (11.5 +/- 11.3) scores.

**Conclusion:** Treatment of VPI should be considered in the otolaryngologist algorithm for swallowing disorders.

## **Incidence And Management Of Upper Airway Hemorrhage Among Intubated Patients Requiring Extracorporeal Membrane Oxygenation For COVID-19**

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**Objective:** Extracorporeal membrane oxygenation (ECMO) is often used in patients with severe lung injury due to COVID-19 when mechanical ventilation is not sufficient for maintaining oxygenation. ECMO requires continuous anticoagulation, with consequently increased risk of bleeding. Therefore, our objective was to determine the incidence of upper airway hemorrhage among patients requiring ECMO for COVID-19 and to review management strategies.

**Methods:** A single-system retrospective cohort study was performed on patients with COVID-19 who were intubated and placed on ECMO from March 13th to July 5th 2020.

**Results:** 263 total patients required intubation for COVID-19, and 24 were placed on ECMO (9.1%). 9 of 24 patients on ECMO developed upper airway bleeds including epistaxis and oropharyngeal hemorrhage (37.5%). 3 patients required blood transfusions. Most cases were managed conservatively with pressure, packing, and/or pause of anticoagulation therapy. Patients on ECMO with episodes of upper airway hemorrhage had a high mortality rate (55.6%), as well as those without bleeding (33.3%).

**Conclusion:** Upper airway hemorrhage is a common complication that can occur in patients with COVID-19 on ECMO. While conservative treatment is generally successful, blood transfusion may be necessary in some and cessation of anticoagulation therapy increases the risk of thrombosis. Hence, this highlights a potential role for prophylactic protocols such as hydrating therapies and rigorous oral care in this patient population.

## **Utilization Of Healthcare For Benign Laryngeal Diseases: A Population-based Cohort Study In Taiwan**

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**Objective:** To examine the utilization of healthcare services by using a Taiwanese national healthcare database for outpatients with benign laryngeal diseases.

**Method:** This study analyzed patients (20 to 90 years old) with benign laryngeal diseases among adults in Taiwan from January 1, 2007 to December 31, 2013. The codes for benign laryngeal diseases were defined by International Classification of Diseases Ninth Revision, Clinical Modification (ICD-9-CM). Claims data in the Taiwan National Health Insurance Research Database were used. Healthcare services (including surgery, voice therapy, evaluation), medical institutions, and area were analyzed.

**Results:** Patients with benign laryngeal diseases were divided into four groups: infectious voice, non-infectious voice, swallow, and airway. The average rate of undergoing surgery was: 3.0%, 6.6%, 0.1%, 8.5% respectively. The most performed surgeries for infectious voice group and non-infectious group were direct microlaryngoscopy and laser surgery. Diagnoses were mostly from clinics and northern Taiwan. Non-infectious group had the most number of patients and swallow group had a relatively elder age (50 years old).

**Conclusion:** Patients with benign laryngeal diseases in Taiwan tended not to undergo surgery or SLP evaluation. These patients were diagnosed mostly in clinics and in urban areas. Further study is needed to assess the impact of surgery and SLP services on the healthcare utilization of patients with benign laryngeal disorders.



## **Preoperative Culture Guided Antibiotic Therapy And Outcomes Of Laryngotracheal Reconstruction**

*Craig Cameron Brawley, Taher Valika*

McGaw Medical Center of Northwestern University, IL; Ann & Robert H. Lurie Children's Hospital of Chicago, IL

**Objective:** In patients undergoing laryngotracheal reconstruction (LTR), is there any benefit to preoperative tracheal culture guided antibiotic therapy compared to perioperative treatment only.

**Method:** Retrospective review of all laryngotracheal reconstruction cases from January 2010 to January 2019. Two groups were compared: those treated with antibiotics preoperatively vs. treated perioperatively. Subgroups were also compared for those testing positive for pseudomonas on preoperative culture. Decannulation within one year of surgery was primary outcome. Patients who did not have tracheostomy at time of LTR were excluded.

**Results:** 60 patients were identified. 23 were excluded due to absence of tracheostomy at time of LTR. Of the 37 patients, 8 were treated preoperatively with culture guided antibiotics until a negative culture resulted, while 29 were treated perioperatively, based on prior culture. 87.5% of the pretreated patients were decannulated, while 75.9% of the perioperatively treated patients were decannulated ( $p=0.65$ ). 16 patients were identified as having a positive preoperative pseudomonas culture, with 6 being pretreated till negative culture and 10 being treated only perioperatively. 60% of the patients treated perioperatively were decannulated, while 83.3% of the pretreated patients were decannulated ( $p=0.58$ ).

**Conclusion:** Tracheal cultures are routinely performed preoperatively due to the risk of negative outcomes with bacterial infections. We failed to find a significant relationship between the timing of culture treatment and decannulation. Further multi-institutional research will be vital to understanding the role and timing of antibiotic therapy in the complex airway patient undergoing surgery.

## **Actinomycosis Presenting As Foreign Body Of The Larynx**

*Brian A Walker, Mark E Gerber*  
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**Objective:** To present a rare case of an autologous “foreign body” in an immunocompromised patient.

**Method:** Case report and review of laryngeal actinomycosis.

**Results:** A 23 year old male with trisomy 21, ALL on CAR-T, disseminated TB, and pulmonary cocci presented with acute onset of intermittent severe respiratory distress. His caregiver reported a brief self-resolving episode of choking while eating bone-in chicken approximately 2 weeks prior to presentation. He had noted mild pharyngitis until the day of admission when he developed acute onset of stridor/increased work of breathing with respiratory distress and tripodding refractory to medical therapy. He was admitted to the PICU and ENT was consulted. Flexible laryngoscopy showed a ball-valving, solid-appearing, white lesion at the level of the left laryngeal ventricle. The patient was transferred to the operating room where significant traction was required to dislodge the foreign body which appeared to be pieces of cartilage consistent with possible chicken cartilage aspiration. Pathology demonstrated hyaline cartilage rimmed with bacterial colonies consistent with actinomycosis. 3D CT neck demonstrated a cartilaginous defect at the posteroinferior aspect of the left inferior thyroid cartilage. The patient's respiratory distress was alleviated and his pharyngitis improved with prolonged penicillin treatment. At 11 months post-op, scope demonstrated an area concerning for exposed cartilage. Repeat biopsy is planned prior to discontinuation of the penicillin therapy.

**Conclusion:** This case presents a unique diagnostic challenge of actinomycosis of the larynx causing intermittent acute respiratory distress. Autologous material should be included in the differential when evaluating foreign bodies.

## **Post-operative Videofluoscopic Swallow Evaluation In Infants Undergoing Congenital Heart Surgery**

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Baylor College of Medicine, TX; Texas Children's Hospital, TX

**Objective:** Infants who undergo congenital heart surgery are at risk of developing vocal cord paralysis and swallowing difficulties. This study aims to describe dysphagia in this population.

**Method:** This is a retrospective chart review of infants (age <12 months) who underwent congenital heart surgery between 7/2008 and 7/2018 and received a subsequent videofluoroscopic swallow study (VFSS). Demographic information, surgery data, and VFSS findings were collected and analyzed

**Results:** 375 patients were included in the study. 54% of patients were male, 25% were premature, and the average age at the time of VFSS was 2 months (range: 0.2 to 12 months). 61% of patients had oral dysphagia and 65% of patients had pharyngeal dysphagia. 51% of patients had laryngeal penetration and 46% had tracheal aspiration. 72% of these aspirations were silent. The most common surgeries performed were aortic arch repair, atrial septal defect repair, ventricular septal defect repair, patent ductus arteriosus ligation, and the Norwood procedure. The highest odds ratio of presenting with silent aspiration was 1.54 in patients who underwent aortic arch repair (95% CI: 0.99-2.39). 39% of patients had vocal cord paralysis. Patients with vocal cord paralysis had a statistically higher rate of silent aspiration ( $p < 0.05$ ) with an odds ratio of 1.88 (95% CI: 1.22-2.92).

**Conclusion:** Infants who undergo congenital heart surgery are at high risk for vocal cord paralysis and dysphagia. This study demonstrates the high prevalence of silent aspiration in this population and the need for thorough post-operative swallow evaluation.

## **Elective Perioperative Venovenous Extracorporeal Membrane Oxygenation (VV-ECMO) For The Management Of Severe Tracheal Stenosis**

*Christopher G Lui, Yael Bensoussan, Karla O'Dell, Diana H Yu*

Keck School of Medicine of the University of Southern California, CA

**Objective:** Venovenous extracorporeal membrane oxygenation (VV-ECMO) is a form of advanced respiratory support traditionally used in the management of patients with severe respiratory failure or undergoing cardiothoracic procedures. Here we report a case of elective VV-ECMO use during tracheal stent exchange for severe tracheal obstruction in a patient at significant risk for cardiopulmonary complications

**Method:** Case Report.

**Results:** An 80-year-old female with extensive medical history including coronary artery bypass graft (CABG) complicated by endocarditis with aortic root abscess requiring revision CABG one year prior and tracheal stenosis requiring tracheal stent placement presented with worsening respiratory status and chronic productive cough. On computed tomography imaging (CT), the patient was found to have significant granulation tissue in the proximal trachea with tracheal stent fractures in multiple places causing airway obstruction. She was brought to the operating room for granulation tissue debridement and tracheal stent exchange. Due to her increased risk of perioperative cardiac complications and inability to tolerate hypoxemia, VV-ECMO was pre-operatively established via bifemoral access under local anesthesia. During the procedure, the patient's oxygenation status was adequately maintained, her tracheal stent was successfully replaced, and she was extubated at the conclusion of the case without complications.

**Conclusion:** Airway management during surgical procedures under general anesthesia can prove challenging in patients with tenuous respiratory status. This case report adds to the growing body of evidence that elective peri-operative usage of VV-ECMO for respiratory support is an effective approach for safely performing airway procedures in select patients at significant risk for respiratory compromise

## **Tongue Base Augmentation With Calcium Hydroxylapatite For Dysphagia**

*Apoorva T Ramaswamy, Aaron Done, Daniel Cates, Lisa Evangelista, Peter Belafsky*  
UC Davis, CA

**Objective:** To evaluate the feasibility of using Calcium Hydroxylapatite (CaHA) to augment the tongue base for patients with swallowing impairment due to tongue base atrophy.

**Method:** A fresh human cadaver was obtained through the institution's body donation program. Baseline fluoroscopy was obtained with the tongue in a standardized lateral position. A fellowship-trained laryngologist injected 2 mL of CaHA (Prolaryn Plus, Merz North America, Raleigh, NC) into 3 sites of the base of tongue under flexible endoscopic guidance with a 22G, 1.5 inch needle (Monoject, Cardinal Health, Dublin, OH). A post-injection lateral fluoroscopic image was then obtained. Pharyngeal area (cm<sup>2</sup>) and tongue base to pharyngeal wall distance (cm) was measured pre- and post- injection using SwallowTail (Beldev Medical, Saint Charles, IL) fluoroscopic measurement software (company, city, state).

**Results:** The procedure was easily performed and the CaHA flowed well into the cadaveric tongue without evidence of extrusion. The pre-procedural pharyngeal area decreased from 24.36cm to 23.14cm after augmentation. The base of tongue to pharyngeal wall distance decreased from 2.21 cm to 1.32 cm after augmentation. This suggests the potential to improve apposition of the tongue base with the pharynx, resulting in improved deglutitive pharyngeal pressure.

**Conclusion:** Tongue base augmentation may be a feasible adjuvant therapy for the management of swallowing impairment secondary to tongue base atrophy. Further investigation is necessary to evaluate the potential clinical safety and efficacy .

## **Delayed Cricoid Chondroradionecrosis 20 Years After Radiation Therapy: Case Report And Review Of The Literature**

*Tiffany Chen, Corina Din-Lovinescu, Brian Benson*

Hackensack Meridian School of Medicine, NJ; Rutgers New Jersey Medical School, NJ

**Objective:** To describe an unusual case of delayed isolated cricoid chondroradionecrosis (CRN) presenting 20 years after narrow field external beam radiation treatment ( T) of early glottic cancer and provide a review of the relevant literature.

**Method:** Case report and literature review using PubMed database.

**Results:** A 53-year-old female with a past medical history of T1N0M0 glottic cancer treated with primary single modality RT 20 years prior presented with hoarseness, pain, fevers, dysphagia and difficulty breathing. Flexible fiberoptic laryngoscopy revealed bilateral vocal fold hypomobility and narrowed glottic aperture. An emergent tracheostomy was placed due to worsening dyspnea. CT neck and MRI neck imaging demonstrated a 1 cm enhancing subglottic lesion with destructive changes of the inferior cricoid cartilage. The patient underwent direct laryngoscopy and biopsy, which identified a right posterior cricoid ulceration with exposed necrotic cartilage, as well as, subglottic endolaryngeal granulation tissue at the posterior cricoid cartilage. Pathology was consistent with acute inflammation, ulceration and calcification, consistent with CRN. The patient underwent 6 weeks of hyperbaric oxygen treatment and intravenous antibiotics with improvement in the pain, fever, and dysphagia, but vocal fold immobility and tracheostomy dependence persisted. Fifteen other cases of CRN of the larynx occurring over 10 years after RT were identified through a PubMed literature review and are summarized.

**Conclusion:** CRN of the larynx can occur many years after radiotherapy treatment. As such, it is important to keep a wide differential diagnosis for patients presenting with hoarseness, dysphagia or dyspnea after RT.

## **Normative Values For The Laryngopharyngeal Measure Of Perceived Sensation**

*Brian O Hernandez, Gregory B Russell, Kathryn W. Ruckart, Lyndsay L Madden*  
Wake Forest School of Medicine, NC

**Objective:** The Laryngopharyngeal Measure of Perceived Sensation (LUMP) is a recently validated patient reported outcome measure (PROM) aimed to evaluate the symptom severity of patients with globus pharyngeus. The objective of this study was to define the normative values for the LUM questionnaire.

**Method:** The LUMP was completed by eighty-eight subjects. Individuals without throat related symptoms, such as dysphagia, dysphonia, or cough were provided LUMP. The results of the eight-item questionnaire were analyzed for standard error of the mean (SEM), mean and standard deviation (SD).

**Results:** Review of the eighty-eight LUMP questionnaires elucidated a mean of 0.42 (SEM = 0.10, SD = 0.96) in the normative population. By gender, the female (n=50) mean was 0.24, SD = 0.66, SEM = 0.09; for males (n=38), the mean was 0.66, SD = 1.21, SEM = 0.20.

**Conclusion:** This study provides normative data for the LUMP, a recently establish PROM useful in patients with globus pharyngeus. A LUMP score greater than, or equal to 3 should be considered abnormal, and warrants additional attention.

## **Will Hybrid Scientific Meetings Be The Way Forward As A Covid Pandemic Fallout?**

*Nupur Kapoor Nerurkar, Gauri Kapre Vaidya, Frederik G Dijkers*  
Bombay Hospital and Medical Research Center;<sup>2</sup>Amsterdam UMC

**Objective:** The Covid-19 Pandemic has changed lives and caused great loss and hardship to many people around the world. Not wanting to break the chain of our annual Phonosurgery workshop, the decision was taken to plunge into the virtual world. The aim of this article is to share the challenges faced by the organizing committee and the advantages (some unexpected) and limitations of this academic venture, which may encourage and possibly guide our ENT colleagues in hosting their own meetings.

**Method:** Several major decisions were taken: 1) create a one-day event instead of the usual three days; 2) include a maximum number of invited faculty from abroad; 3) select very specific areas of interest; 4) employ a professional online communications group; 5) broadcast prerecorded presentations; 6) include a live Q and A session in real time immediately following each lecture; 7) incorporating audience polling, e posters, e crossword, e stalls and live chat communication.

**Results:** The average number of delegates increased from 197 to 1071 delegates. The number of international delegates was much higher. Since no “physical” space for the delegates was needed, the number of registrations did not need to be restricted.

**Conclusion:** The experience of hosting this webinar has encouraged the organizing committee to consider a hybrid meeting in the year 2021 with both physical and virtual attendance.



## Meta-analysis Of Posterior Tracheopexy Outcomes

*Ariel Azhdam, Sarah Maurrasse, Jill D'Souza, Taher Valika*

IL; Yale University Hospital, CT; New Orleans Children's Hospital, LA; Ann & Robert H. Lurie Children's Hospital of Chicago, IL

**Objective:** The management of severe tracheomalacia has evolved over the years. Management via tracheostomy or aortopexy are no longer the only options. Recently developed surgical techniques to manage posterior tracheomalacia have shown promising results. Unfortunately, variable published data exist regarding treatment approach and factors leading to successful outcomes. We sought to perform a meta-analysis of the current literature describing outcomes of posterior tracheopexy.

**Method:** A database search with the terms "posterior tracheopexy" was performed between 1986-2020. Among inclusion criteria were descriptive analyses of patient comorbidity, approach, mortality, and outcome.

**Results:** In total, 19 manuscripts were reviewed with 5 meeting inclusion criteria. A total of 246 patients underwent posterior tracheopexy. Overall, 232 patients were deemed to have a successful outcome: improvement in cough, decrease in respiratory infections, or no longer require supportive ventilation. Patients with posteriorly-based tracheomalacia and esophageal atresia required only a single procedure, compared to those with anterior tracheomalacia requiring an aortopexy, for successful outcome. Complications included the need for tracheostomy placement (n=2), failure of tracheostomy decannulation (n=2), and mortality (n=1). The procedure was mostly performed through a posterior thorascopic approach, though the robot was also utilized for guidance.

**Conclusion:** The treatment of tracheomalacia has evolved over the past several decades. Advances in technology and equipment have increased our ability to treat posterior tracheomalacia in a minimally invasive, endoscopic manner. Identification and discussion of patient factors preoperatively can provide families with evidence-based expectations for surgery.

## **Percutaneous Tracheostomy Device-related Adverse Events: A Maude Database Cross-sectional Analysis**

*Vishal Narwani, David Kasle, Richard P Manes, Michael Z Lerner*  
Yale University, CT

**Objective:** The current COVID-19 pandemic has led to an unprecedented need for invasive ventilation, with 10-15% of intubated patients subsequently requiring a tracheotomy. With some national guidelines favouring percutaneous tracheotomies to reduce aerosolization of the virus, the objective of this study was to analyze device-related, complications associated with percutaneous tracheostomy utilizing the Manufacturer and User Facility Device Experience (MAUDE) database.

**Method:** The Food and Drug Administration's (FDA) MAUDE database was queried for all reports on adverse events related to percutaneous tracheostomy from January 1, 2015 to October 31, 2020.

**Results:** A total of 52 adverse events related to percutaneous tracheostomy were identified. Of these, 38 (73%) events were related to device-malfunction, and 14 (27%) adverse events were related to patient-injury. The most frequently reported device-related malfunction was balloon malfunction (15 [39%]), safety ridge malfunction (9 [24%]), and tracheostomy flange detachment (4 [ 1%]). Patient-related injuries included bleeding, false passage creation, and tracheostomy obstruction. Three patients (6%), required conversion to a surgical tracheotomy as a result of an adverse event and three different periprocedural adverse events resulted in patient death.

**Conclusion:** Although reports show that percutaneous tracheotomy may have comparable morbidity rates to open, surgical tracheotomy, these procedures can lead to serious adverse complications. The most common adverse events in our study were related to device malfunction, particularly balloon-related malfunction. Three patients in our cohort required conversion to a surgical tracheotomy.

## **The Airway Pocket: Endoscopic Submucosal Placement Of A Posterior Costal Cartilage Graft**

*Michael Gorelik, Carolyn Jenks, Taher Valika*

Ann & Robert H. Lurie Children's Hospital of Chicago, IL

**Objective:** Endoscopic placement of a posterior graft is well described for bilateral vocal fold immobility. These grafts require time to mucosalize and are at risk for dislodgement. Previous descriptions of the method have relied on division of the tracheal mucosa in order to divide the posterior cricoid cartilage. We describe a modification of this technique by placing the graft in a submucosal pocket thereby reducing the time of mucosalization and risk of graft dislodgement.

**Method:** Case review.

**Results:** A 10-year-old child with history of autism, prematurity and biphasic stridor was found to have bilateral vocal fold paresis. Given significant exertional dyspnea, the decision was made to proceed with endoscopic posterior graft placement. Intraoperatively, an incision was made in the interarytenoid region and a supra-perichondrial flap was elevated over the cricoid cartilage, avoiding the need to divide the posterior tracheal mucosa. Within this submucosal pocket, the cricoid cartilage was divided, allowing for endoscopic placement of the graft. The flap was then draped down, providing complete mucosal coverage to the graft. The child was intubated for 10 days and upon extubation, the airway was widely patent with complete healing of the graft.

**Conclusion:** Advances in technology and equipment have increased our ability to treat airway stenosis in a minimally invasive manner. Placement of the posterior graft submucosally prevents the need for mucosalization, as the tracheal lumen remains intact, and supports the graft from dislodgement. Further research to determine the added benefits of submucosal graft placement are in development

## **The Demographics And Socioeconomic Status Of Patients Presenting For Laryngological Care At An Academic Medical Center**

*Lyndsay L Madden, Brian O Hernandez, Stephen C Wright, Eleanor P Kiell*  
Wake Forest School of Medicine, NC

**Objective:** Few studies address the demographics/epidemiology/socioeconomic status of patients seeking laryngological care. It was the aim of this study to analyze these data for patients presenting to a laryngology clinic at an academic medical center in hopes of identifying disparities in laryngological care.

**Method:** This was a retrospective study of prospectively collected data from an institutional database of 4,623 adults presenting as new patients for laryngological care at an academic medical center from 2015-2020. Demographic data were analyzed.

**Results:** Of 4,623 patients 62.8% were female and 37.2% were male with ages ranging from 19-99 years (mean: 59.51, SD: 15.83). Patients were 81.8% white, 13% black, and 5.2% other, compared with 56.3% white, 34.8% black, 20% other in the local municipality from US Census Data. Payer mix included 46.98% Medicare, 42.59% commercial insurance, 3.22% Medicaid, 5.19% other, and 2.01% uninsured/self-insured. Patient demographics based on primary diagnosis codes were also examined. A majority of patients presented with voice related complaints.

**Conclusion:** Understanding the demographics of those with laryngological complaints will help to develop targeted interventions and effective outreach programs for underrepresented patient populations. Future multi-center studies could provide further insight into healthcare disparities in laryngology.

## **Laryngeal Juvenile Xanthogranuloma: Case Report And Literature Review**

*Vasiliki Triantafyllou, Ivy W Maina, Grace L Banik, Conor M Devine*  
University of Pennsylvania, Perelman School of Medicine, PA

**Objective:** Juvenile xanthogranuloma is a benign non-Langerhans cell histiocytosis most commonly characterized by a solitary subcutaneous lesion arising in early childhood. Extracutaneous juvenile xanthogranulomas are exceedingly rare. We present a case report of a solitary juvenile xanthogranuloma presenting as a glottic mass.

**Method:** We report an atypical, extracutaneous presentation of isolated juvenile xanthogranuloma of the larynx and brief review of the literature.

**Results:** A 3-year-old male with history of asthma presented with one month of worsening stridor, hoarseness, and respiratory distress. A smooth, exophytic mass was noted on flexible fiberoptic laryngoscopy to be nearly completely obstructing the glottis. The patient was taken to the operating room where he was found to have a soft, smooth, yellow-hued mass pedicled at the inferior aspect of the left true vocal fold with 80% obstruction of the glottis and 1 cm extension into the subglottis. The mass was biopsied and debulked with a microdebrider, which resulted in complete resolution of symptoms. The final histopathologic diagnosis was consistent with juvenile xanthogranuloma.

**Conclusion:** Juvenile xanthogranulomas typically present as solitary subcutaneous masses that regress spontaneously. Laryngeal manifestations are extremely rare and often require urgent airway management, with some reported cases even requiring tracheostomy. Endoscopic debulking can provide symptomatic relief and avoid tracheostomy. Close follow up for airway surveillance is recommended and referral to oncology may be considered.

## **A Review Of Tracheostomy Outcomes: A Quality Improvement Process**

*Cindy Moore, Gina Jefferson, Christopher Spankovich, Alexandra Rose, William Bryant*  
University of Mississippi Medical Center, MS

**Objective:** To determine specific practices and metrics associated with increased length of stay and complications following tracheostomy placement with a goal of developing a targeted quality improvement process for tracheostomy care.

**Method:** Retrospective chart review, quality improvement process at a tertiary care center. 318 consecutive patients who underwent percutaneous tracheostomy (n=141) or open tracheostomy (n=177) from January-December 2019 were reviewed for factors influencing complications and hospital length of stay. Analyses included descriptive analysis, analysis of variance, linear regression, and logistic regression. In multivariate analysis, we controlled for severity of disease at admission using the Acute Physiology And Chronic Health Evaluation II (APACHE II) score.

**Results:** We found a statistically significant difference in length of stay and complications among departments performing tracheostomy. Overall complication rate was 21.7%. A larger size tracheostomy tube was significantly associated with increased complications ( $p=0.007$ ) and length of stay ( $p=0.003$ ). For patients with a tracheostomy for prolonged mechanical ventilation, the length of time off mechanical ventilation to decannulation was positively correlated with length of stay ( $p<0.01$ ). For patients with tracheostomy for upper airway obstruction, there was positive correlation between length of stay and the days with the cuff inflated off mechanical ventilation ( $p<0.001$ ) and days to decannulation ( $p<0.001$ ). This data was used to develop standardized education and protocols institution wide.

**Conclusion:** Systematic analysis of outcomes from care delivered by multiple departments across a care center can lead to the development of targeted education and standardized protocols to improve patient care.

## **Open Bedside Tracheostomy: Safe, Cost Saving But Underutilized Nationally**

*Liyang Tang, Jonathan West, Esther Lee, Kharidia Khush, Tamara Chambers, Niels Kokot, Mark Swanson, Karla O'Dell*  
Keck USC, CA

**Objective:** To evaluate open bedside tracheostomy and compare it to open operating room (OR) tracheostomy and bedside percutaneous tracheostomy in complications and cost. To determine the tracheostomy practice patterns of academic Otolaryngology programs.

**Method:** A retrospective chart review of tracheostomies performed for prolonged mechanical ventilation from 2009 - 2019 was done. Complications, length of intubation, co-morbidities, body mass index, demographics, mortality rates and decannulation rates were recorded. A cost analysis between bedside open and percutaneous techniques was performed. Otolaryngology program directors were surveyed to determine their institution's tracheostomy practice patterns.

**Results:** Data from 805 patients were analyzed and included 422 open bedside tracheostomies, 207 percutaneous bedside tracheostomies, and 176 open OR tracheostomies. Complication rates were low for all techniques. Percutaneous tracheostomies were more likely to have perioperative incisional or wound site bleeding ( $p < 0.0001$ ) and mucus plugging ( $p < 0.009$ ). Two percutaneous and three bedside open tracheostomies were converted to the OR. Bedside open tracheostomies also had a higher Charlson co-morbidity index than both percutaneous and OR tracheostomies ( $p < 0.0001$ ). The cost of bedside open trach varied at our institution depending on utilization of OR nursing staff but was comparable or less than percutaneous tracheostomy. Survey response rate was 46%. All responding programs performed OR tracheostomy, 52.7% open bedside tracheostomy, and 30.9% percutaneous tracheostomy.

**Conclusion:** Bedside open tracheostomy can be performed safely in patients with multiple co-morbidities and has a cost comparable or less than percutaneous tracheostomy. Despite these benefits only 50% of academic institutions routinely performed bedside open tracheostomy.

## Quality And Readability Of Online Information On Idiopathic Subglottic Stenosis

*Austin Heffernan*

University of British Columbia, BC

**Objective:** Idiopathic subglottic stenosis is a chronic condition that affects well educated Caucasian women who often utilize the internet to learn more about their condition. The aim of this study was to determine the quality and readability of these online resources on idiopathic subglottic stenosis.

**Method:** Idiopathic subglottic stenosis was entered into the Google search engine. The first 50 websites that met the inclusion criteria were extracted. The DISCERN instrument, Flesch Reading Ease Score (FRES), and Flesch-Kincaid Grade Level (FKGL) were used to assess the quality and readability respectively. The means, standard deviations, Pearson correlation coefficients, and two-tailed Student's T-test were then calculated.

**Results:** The 50 articles consisted of 17 patient-targeted and 33 professional-targeted websites, plus 29 major and 21 minor websites. The overall DISCERN, FRES, and FKGL scores were  $2.78 \pm 0.99$ ,  $28.31 \pm 15.07$  and  $13.51 \pm 2.82$  respectively (mean  $\pm$  standard deviation). Patient-targeted websites had significantly lower quality (DISCERN ( $p < 0.00$ )) but higher readability (FKGL and FRSS (both  $p < 0.00$ )) than professional-targeted websites. Similarly, minor websites had a significantly lower quality (DISCERN ( $p < 0.00$ )) but higher readability (FKGL and FRSS (both  $p < 0.00$ )) than major websites. There was also a positive correlation between overall quality and readability.

**Conclusion:** The quality of online resources on idiopathic subglottic stenosis was suboptimal and had readability scores that were above the American Medical Association and National Institutes of Health recommendations. Improved online resources are required to properly educate this inquisitive group of patients.



## **Conservative Management Of Large Traumatic Tracheal Laceration**

*Jose R. Sanchez-Perez, Gabriel Rivera Rivera, Mario Gonzalez-Carbonell, Shayanne Lajud-Guerrero, Mario Corona-Ruiz, Antonio Riera March*  
University Of Puerto Rico; University Of Puerto Rico, PR

**Objective:** The objective of this case report is to describe the evaluation and management of an uncommon large tracheal laceration following blunt trauma and discuss current guidelines for conservative and surgical airway management following TBI.

**Method:** Case report and literature review.

**Results:** A 15-year-old male who suffered a motor vehicle accident as a restrained backseat passenger was transferred to a local trauma center due to bilateral neck crepitus and chest pain. The patient presented without shortness of breath, hoarseness, respiratory failure, stridor, or hemoptysis. As per clinical signs and neck computed tomography tracheal injury was suspected. Flexible bronchoscopy was performed bedside demonstrating a large longitudinal through-and-through 3.5 cm right distal posterior tracheal tear located 0.5 cm from carina that expanded with dynamic inspiration. The decision to manage the patient conservatively was based on a stable respiratory and neurological state. Reevaluation at one week revealed healing by secondary intention without evidence of granulation tissue or respiratory deterioration.

**Conclusion:** Large tracheobronchial injuries have historically been managed with primary surgical correction. Our case report demonstrates that conservative management proved to be a safe and effective management for a large tracheal laceration with advanced classification in a hemodynamically stable patient without signs of acute complication.

## **Airway Evaluation In Newborns With Tracheoesophageal Fistula And Esophageal Atresias**

*Ivanna Nebor, Meera Kotagal, Orna Katz Kadosh, Jareen K. Meinzen-Derr, Aaron P. Garrison, Meredith E. Tabangin, Dan T. Benscoter, Alessandro de Alarcon*  
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**Objective:** Tracheoesophageal fistula and esophageal atresia (TEF/EA) are life threatening congenital disorders that are reported to have a high incidence of co-existing airway anomalies. The timing of airway evaluation relative to the TEF/EA repair has not been well described. The aim of the study is to describe the practice of airway evaluation in TEF/EA patients at our institution and the identified airway anomalies

**Method:** A retrospective review was conducted of newborn patients who underwent TEF/EA repair in December 2009 and March 2018. Data collected and analyzed included demographics, TEF/EA type, the timing of repair, airway evaluation microlaryngoscopy, and bronchoscopy (MLB) reports.

**Results:** Sixty-one patients who met the criteria were included in the study. Median [IQR] age at the time of repair was 2 [1,13] days. 56 patients (92%) had at least 1 MLB: 18 (32.7%) - before the repair, 30 (54.6%) - during the repair, 7 (12.7%) - after the repair. The median time between the first and follow-up MLB was 1.69 [0.82, 8.13] months. The total number of patients with airway anomalies was 26 (42.6%): tracheomalacia (n=23), laryngeal cleft (n=1), subglottic stenosis (n=1), and complete trachea rings (n=1). A follow-up MLB was performed in all patients with airway anomalies.

**Conclusion:** Most of the patients had their initial airway evaluation performed prior or during TEF/EA repair (88.5%). In our study, 42% of newborn TEF/EA patients had an airway anomaly. Tracheomalacia was the most common identified airway anomaly. The initial and follow-up airway evaluation should be included in routine practice in the TEF/EA patient management.

## **Etiology And Management Of Bilateral Vocal Fold Paralysis: A Case Series**

*Neel K Bhatt, Eric Bauer, Randal C Paniello*

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**Objective:** Bilateral vocal fold paralysis (BVFP) can cause acute airway obstruction and is associated with significant morbidity. Treatment options include tracheotomy, cordotomy, and arytenoidectomy which are designed to re-establish a patent upper airway. These procedures, however, can negatively affect voice and swallowing. We set out to review cases of BVFP to characterize the etiology of paralysis and subsequent surgical interventions.

**Method:** A review of patients with BVFP over a 17-year period within a single institution was performed. Bilateral vocal fold immobility secondary to causes other than paralysis were excluded. The etiology of nerve injury was reviewed, and logistic regression was performed to determine which factors were associated with undergoing specific surgical interventions.

**Results:** Overall, 237 patients with BVFP were reviewed. The majority of patients (81.4%) presented with simultaneous paralysis of bilateral vocal folds, while the remaining presented with unilateral paralysis followed by a subsequent contralateral paralysis. The most common etiology of BVFP was thyroidectomy (17.7%) followed by intubation (16.9%). The majority of patients (67.0%) underwent tracheotomy, and 31.1% of those patients ultimately were decannulated. Simultaneous paralysis of bilateral vocal folds was associated with a higher probability of tracheotomy compared to step-wise paralysis (OR=2.56 95%CI 1.17-5.66). Increasing age was significantly associated with a greater likelihood of undergoing tracheotomy (OR: 1.21 95%CI 1.11-1.31).

**Conclusion:** Thyroidectomy was the most common etiology of BVFP. The majority of patients required tracheotomy tube placement for some time period following paralysis. Increasing age and simultaneous paralysis of bilateral vocal folds were associated with higher probability of tracheotomy.

## **Impact Of Montgomery T-tubes On Treatment Of Laryngotracheal Stenosis And Voice Outcomes**

*Rachel Hahn, Donn LaTour, Priya Krishna, Brianna Crawley*

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University Department of Otolaryngology Head and Neck Surgery, CA

**Objective:** Placement of a Montgomery T-tube is indicated for patients as a stent to maintain airway patency in those presenting with laryngotracheal stenosis with intention to treat dysphonic symptoms. The objective of this paper is to identify the indications, complications, and airway and voice outcomes of patients that were managed with Montgomery T-tube stenting.

**Method:** A retrospective chart review was done on patients treated with Montgomery T-tubes for laryngotracheal stenosis due to iatrogenic causes or other etiologies. Patient demographics were analyzed along with their indication for T-tube placement and duration of T-tube placement. Voice Handicap Index-10, VHI-10, scores before and after T-tube placement, complications, and time since the definitive procedure were recorded

**Results:** 13 patients were included, of which more than half were aphonic prior to tube placement. The most common indication for T-tube placement was management of secondary subglottic stenosis. The data presented statistically significant improvements in VHI-10 scores after T-tube placement. Four patients were successfully decannulated, six patients are still being treated, and two were lost to follow-up. The most common complication related to T-tube placement was the accumulation of granulation tissue. There was one death related to a T-tube complication in this study.

**Conclusion:** Treatment with Montgomery T-tubes can show improvement in voice quality in patients with severe dysphonia secondary to laryngotracheal stenosis and traditional tracheostomies. Complication rate and contraindications should be taken into consideration. More research regarding the treatment course and care are necessary to understand the role of T-tubes in treating laryngotracheal stenosis.

## **Cervical Spine Lordosis Is Not Associated With Swallow Impairment**

*Sierra Edelsohn, Apoorva T Ramaswamy, John Wuellner, Eric Klineberg, Peter Belafsky*  
UC Davis, CA

**Objective:** Cervical kyphosis is associated with a dilated pharynx, delayed hypopharyngeal transit time, and worse penetration aspiration scores. The association between cervical lordosis and swallowing impairment is uncertain. The objective of this study was to evaluate the association between cervical lordosis and swallowing impairment.

**Method:** A convenience sample of video-fluoroscopic swallow studies (VFSS) of individuals undergoing swallowing fluoroscopy for dysphagia between 6/29/2020 and 9/8/2020 were evaluated from an electronic database. Patients with a history of head and neck cancer, neuromuscular disease, and spine surgery were excluded. Cobb angles were calculated by an orthopedic surgeon based on the lateral fluoroscopic view. Cervical lordosis was defined as a Cobb angle  $> 12$  degrees. E T-10 scores and objective fluoroscopic parameters were abstracted from the medical record. Fluoroscopic data was assessed using SwallowTail (Belldev Medical, Saint Charles, IL) and included upper esophageal sphincter opening in the lateral view, the pharyngeal constriction ratio, and hypopharyngeal transit time. The nonparametric Mann-Whitney U test was utilized to compare data between patients with and without lordosis.

**Results:** The VFSS of 55 patients were reviewed. The mean age of the cohort was 65.1(+/- 15.6) years. 50.1% (28/55) was female. There was no association between cervical lordosis and self-reported dysphagia ( $p=0.56$ ). Similarly, there was no association between cervical lordosis and pharyngeal area ( $p=0.97$ ), pharyngeal constriction ratio ( $p=0.15$ ), hypopharyngeal transit time ( $p=0.84$ ), and upper esophageal sphincter opening ( $p=0.71$ ).

**Conclusion:** Although there is a significant association between kyphosis and swallowing impairment, cervical lordosis does not appear to be associated with disordered swallowing.

## **Dysphagia As A Predictor Of Voice Handicap And Voice Restoration In Patients With Unilateral Vocal Fold Immobility**

*Dominique Bohorquez, Shahm Raslan, Stefanie Pena, Michelle Bretl, Jennylee Diaz, Adam Lloyd, David Rosow, Mursalin Anis*  
University of Miami Miller School of Medicine, FL

**Objective:** Patients with unilateral vocal fold immobility (UVFI) are at increased risk of dysphagia due to decreased laryngeal sensation and impaired glottic closure. To date, no study has examined the association of dysphagia on presentation with laryngoscopic findings, voice handicap and surgical voice restoration in UVFI patients.

**Method:** This is a retrospective chart review performed at a single-institution tertiary care university hospital. Patients with UVFI with and without presenting dysphagia were compared. Measures of voice handicap included voice handicap index (VHI), noise to harmonic ratio (NHR) and maximum phonation time (MPT). The study's secondary outcome was to determine proportion of UVFI patients requiring surgical intervention. Groups were compared using logistic regression.

**Results:** Eighty patients met selection criteria out of 478 patients with UVFI. Dysphagia on presentation was associated with need for surgical voice restoration ( $p = 0.01$ ). Duration of hoarseness before presentation and duration of care at our institution were also associated with surgical voice restoration,  $p = 0.03$  and  $p = 0.01$ , respectively. There were no associations between glottic gap ( $p = 0.50$ ), VHI ( $p = 0.81$ ), NHR ( $p = 0.26$ ), or MPT ( $p = 0.16$ ) with dysphagia in patients with UVFI.

**Conclusion:** In this pilot study, dysphagia on presentation predicts a need for surgical voice restoration in UVFI patients. A detailed history of dysphagia should be obtained from patients presenting with UVFI.

## **Validation Of An Endotracheal Tube Selection Tool Based On Ventilation-Perfusion Demand During The Procedure**

*Bshair A Aldriweesh*

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**Objective:** The aim of this study was to validate an endotracheal tube selection tool in adult patients. We also aimed to evaluate the failure rate of using this tool and the underlying factors behind it.

**Method:** A prospective study on adult patients who were scheduled for a routine procedure under general anesthesia in a tertiary referral center. Patients with altered airway anatomy or who are tracheostomy-dependent were excluded. The choice of endotracheal tube size was adopted from the proposed selection tool by multivariate analysis of airway imaging based on gender and height of the patient. Patients' demographics, ventilation parameters and procedure types were analyzed.

**Results:** Thirty-three patients were enrolled in this ongoing study. Patients' height ranged from 140 to 181 centimeters (mean=163.1, SD=10) with 51.5% being female. The procedures were grouped into: rhinology (N=17), otology (N=9), ophthalmology (N=4) and others (N=3). Endotracheal tube size 6 was the most frequent size used and it was selected for all female patients who were less than 159 centimeters in height (33.3%). The tidal volume was maintained at 7 ml/kg of ideal body weight and end-tidal carbon dioxide levels ranged from 31 to 40 mmHg. At 25 cm H<sub>2</sub>O balloon pressure, sufficient air seal was obtained in all patients. No change in the size of endotracheal tube selected was required in any patient.

**Conclusion:** The preliminary results support the validity of this tool in endotracheal tube size selection in adult patients thus providing potential impact on the incidence of intubation-related laryngeal injury.

## **Prognostic Factors in the Management of Subglottic Stenosis**

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**Objective:** We report outcomes of conservative and invasive interventions in the management of pediatric subglottic stenosis (SGS).

**Method:** A retrospective chart review of all pediatric patients with SGS, treated by a single surgeon, at a tertiary academic medical center from 2012 to 2020 was conducted. Variables recorded included patient demographics, initial grade of stenosis, gestational age, length of intubation, comorbidities as well as total number of interventions.

**Results:** A total of 47 patients were included in the study, of which 51% (24) were female. Laryngotracheal reconstruction (LTR) was performed in 48.9% (23) of patients. Fifteen patients did not have tracheostomy. Decannulation was achieved in 25 of 32 tracheostomized patients, including the 23 patients who underwent LTR. When the patients were stratified based on TR, there was a significant difference in gestational age ( $28.7 \pm 5.36$  vs  $33.2 \pm 6.13$ ), initial grade of stenosis ( $2.3 \pm 0.82$  vs  $1.6 \pm 0.88$ ), and total number of interventions ( $5.7 \pm 2.8$  vs  $2.3 \pm 1.5$ ) between the two groups ( $p < 0.05$ ). There was no difference, however, in the length of intubation. Of the comorbidities recorded, only bronchopulmonary dysplasia was found to have a significant impact on the outcome.

**Conclusion:** SGS is a difficult condition to treat, often requiring multiple interventions including LTR. We propose an algorithm that may assist in the treatment of SGS patients with certain comorbidities to minimize interventions and maximize outcomes.



## **Correlation Of Airway Ultrasound And Laryngoscopy In Adults With Subglottic Stenosis: A Pilot Study**

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**Objective:** To compare the ultrasound-based and laryngoscopy-based subglottic stenosis assessment in adult patients.

**Method:** A prospective blinded study in a tertiary referral center that started July 2020, including a consensus sample of adult patients with subglottic stenosis. Patients who had prior airway reconstruction were excluded. All patients were evaluated by an airway ultrasound 1 day prior to their planned laryngoscopy. The radiologist was blinded to the preoperative endoscopic findings and the primary surgeon was also blinded to the ultrasonographic measurements. Intraoperative subglottic diameter was obtained from the outer diameter of the endotracheal tube size that passed through the subglottis without producing air leak at a ventilation peak pressure of 25 cm H<sub>2</sub>O.

**Results:** A pilot sample of 6 consecutive adult patients with subglottic stenosis (5 females and 1 male patient) was included. Their age ranged from 17 to 66 year-old (mean=46 years, SD=16). The ultrasonographic subglottic diameter ranged from 5.2 mm to 6.6 mm (mean=5.6, SD=0.4). In 5 out of 6 patients, the diameter difference between ultrasonography and intraoperative measurement ranged from 0.1 mm to 0.6 mm (mean=0.3 mm, SD=0.2). Patient number 6, however, had a 2.1 mm difference that was attributed to thick laryngotracheal secretions interfering with the ultrasonographic air shadow. Analysis of correlation of all 6 patients' data showed a statistically significant correlation between the readings of both techniques (Pearson correlation= 0.93, P value= 0.006).

**Conclusion:** This study provides a basis for an alternative, non-invasive and feasible objective method to monitor subglottic stenosis patients in an outpatient setting.

## **QuSystematic Review Of Masticatory Function Evaluation Following Treatment In Head And Neck Cancer Patients**

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**Objective:** To summarize, assess and compare existing literature describing measurement approaches for mastication in adults who were previously treated for head and neck cancer.

**Method:** Electronic databases were searched for primary publications in the English language. Main search terms included head and neck cancer, mastication, chewing, measure, and tool. Methodological quality and risk of bias assessment was conducted using the Newcastle-Ottawa scale. Two blinded raters conducted all assessments. Discrepancies were resolved by consensus.

**Results:** The search retrieved 2336 unique citations. 32 studies met our inclusion criteria, representing 12 objective and 15 subjective tools respectively. Newcastle-Ottawa assessment revealed that all studies were at risk for bias.

**Conclusion:** To date, there are no valid and reliable techniques for measuring mastication function following treatment of head and neck cancer.

## **Post-operative Laryngeal Hypersensitivity Treated With Superior Laryngeal Nerve Block: A Case Series**

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**Objective:** We review a series of patients with iatrogenic laryngeal hypersensitivity and cough treated with a superior laryngeal nerve (SLN) block.

**Method:** We discuss the pertinent clinical and operative findings and review the relevant literature regarding laryngeal sensory neuropathy managed with a SLN block.

**Results:** Three patients presented with dry cough shortly after a head and neck surgery or procedure. Patient A noticed a tickle in her throat and increased cough sensitivity following an increase in the output from her vagal nerve stimulator. Patient B incurred a vocal cord paralysis after excision of a paraganglioma. She had no voice complaints but reported a dry cough in response to vocalizations. Patient C suffered a vocal cord paralysis after excision of a medullary hemangioma. Patient C's voice was perceptibly normal, but he developed a dry cough post-operatively that was responsive to gabapentin. After excluding other pathology and lack of response to medialization and therapy (patients B and C), patients were offered a trial of SLN block with a mixture of 1 mL 1% lidocaine with 1:100,000 epinephrine and 1 mL (40 mg) triamcinolone. Patient A's symptoms resolved after a single injection (at three and six months). Patient B's symptoms resolved after two injections (stable at 3 months). Patient C was able to reduce the dose of gabapentin and returns periodically for repeat injection when symptoms recur.

**Conclusion:** To our knowledge, this is the first case series in which iatrogenic laryngeal sensory neuropathy was managed with a SLN block.

## **Novel method in assessment of tortuous airway using virtual reality: A case report**

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**Objective:** We report a 19 years old patient male with mucopolysaccharidosis type II with multilevel airway obstruction due to tortuous trachea. Traditional endoscopy carries high risk due to general anaesthesia and virtual endoscopy may not quantify the calibre of the airway. We describe a novel method to assess airway calibre and obstruction in the trachea at multiple levels using virtual reality (VR).

**Method:** Segmentation of Images from Computer tomography (CT) scan of neck and thorax were obtained and 3-dimensional (3D) reconstruction of the airway was created. The Stereolithography (STL) file created from the segmented CT scans were exported to a VR headset. Simulated ball bearings of various diameters can be passed inside the hollow trachea by the clinician wearing the VR headset. A ball bearing smaller than the calibre of the airway can pass through the tortuous trachea, but at the site of tracheal narrowing the bearing gets stuck.

**Results:** VR helped not only to identify the site of tracheal narrowing but also quantified the degree of narrowing by the ball bearing test. VR has an additional advantage of assessing the airway in planning towards intubation and treatment of airway distress.

**Conclusion:** VR assessment of airway is a useful non-invasive tool, which can be built using existing CT scan imaging. Our method of using a ball bearing simulation in VR not only helps in detailed airway assessment in 3D but also quantifies multiple sites of narrowing in a tortuous trachea seen in mucopolysaccharidosis.

## **Assessing Macrophage Infiltration In Mouse Models Of Orthotopic Segmental Tracheal Replacement**

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**Objective:** Pursuit of the ideal tracheal replacement has been hindered due to chronic inflammation and macrophage-mediated foreign body reaction. Chronic inflammation can delay epithelialization and promote graft stenosis. Decellularized tracheal grafts (DTG) are derived from native extracellular matrix and can serve as a biocompatible solution that regenerates in the absence of chronic inflammation. We applied a mouse model of tracheal implantation to quantify macrophage infiltration of DTG and syngeneic trachea grafts (STG) (control) *in vivo*.

**Method:** C57BL/6J female mice underwent tracheal replacement with a 4 mm segmental DTG, STG (N=3/group) and were euthanized at 1 month and 3 months post-implantation. Macrophage infiltration and phenotype were quantified using immunohistochemistry (CD68: pan-macrophage, iNOS: M1 macrophage marker), and CD206: M2 macrophage marker) and protein expression of macrophage-related proteins using mass spectrometry.

**Results:** Macrophage infiltration was localized to the epithelial submucosa and was elevated at 1 month in both DTG and STG compared to native unoperated controls. STG maintained an epithelium and DTG restored an epithelium by 1 month. Macrophage phenotype and quantity were no different between STG and DTG at 1 month. Mass spectrometric analysis demonstrated identical expression of the macrophage-related proteins between DTG and STG at the 3-month time point.

**Conclusion:** Decellularized tracheal graft implantation did not result in elevated macrophage infiltration compared to syngeneic controls. Macrophage phenotypes in DTGs was found to be similar to STGs at all time points. Future directions should be devoted to assessing the role in tracheal graft repair and regeneration.

