TRANSACTIONS

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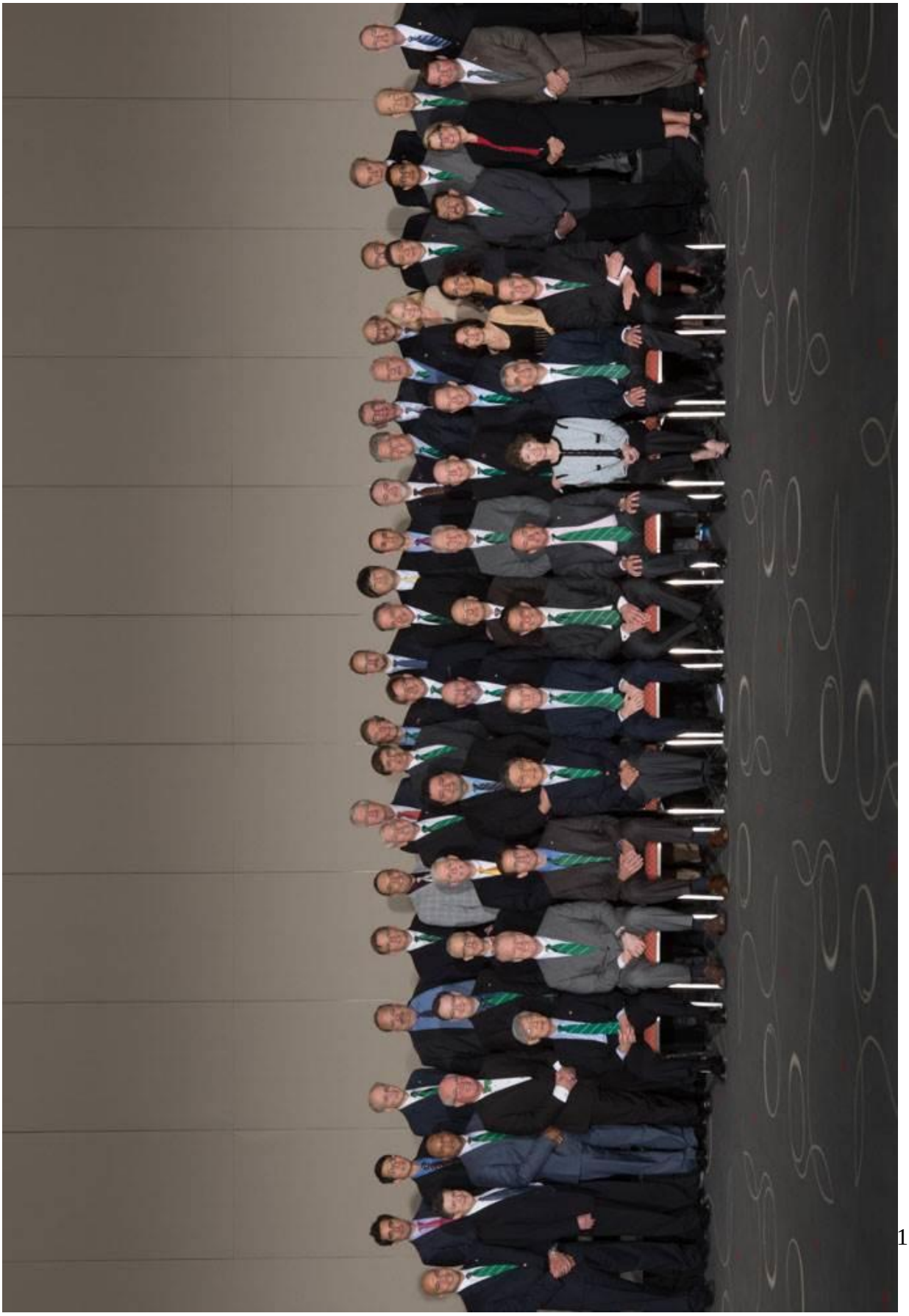

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MAUNE, Stefen
SATO, Kiminori
VOKES, David

Emeritus

MARAGOS, Nicholas
NEEL, Jr., H. Bryan

Associate

BRANSKI, Ryan
CLEVELAND, Thomas
HAPNER, Edie
HILLMAN, Robert
JIANG, Jack
MURRY, Thomas
THIBEAULT, Susan

Post-Graduate

Allen, Clint
BENSON, Brian
BEST, Stephen
BRADLEY, Joseph
BRYSON, Paul
CHILDS, Lesley F.
CLARY, Matthew
CRAWLEY, Brianna
DANIERO, James
DE ALARCON, Alesandro
DOMINQUEZ, Laura
EKBOM, Dale
ELLER, Robert
FRIEDMAN, Aaron
GELBARD, Alexander
GRANT, Nazaneen
GUARDIANI, Elizabeth
GUSS, Joel
HATCHER, Jeanne
HILLEL, Alexander
HOWELL, Rebecca
HUSAIN, Inna
JAMAL, Nausheen
KAYE, Rachel
KENDALL, Katherine
KHOSLA, Sid
KUHN, Maggie
KUFPER, Robbi
LERNER, Michael
LIN, R. Jun

LOTT, David
MADDEN, Lyndsay
MALLUR, Pavan
MATRKA, Laura
MAYERHOFF, Ross
MCWHORTER, Andrew
MISONO, Stephanie
MOORE, Jaime
MORTENSEN, Melissa
O'DELL, Karla
PATEL, Amit
RAFII, Benjamin
REES, Catherine
RICKERT, Scott
ROSOW, David
SADOUGHI, Babak
SHAH, Rupali
SILVERMAN, Joshua
SINCLAIR, Catherine
SMITH, Libby
SONG, Phillip
SRIDHARAN, Shaum
TAN, Melin
VERMA, Sunil
VILLARI Craig
WOOD, Megan
YILMAZ, Taner
WRIGHT, Carter
YOUNG, VyVy
ZALVAN, Craig

MINUTES OF THE EXECUTIVE SESSIONS

REPORT OF THE SECRETARY

The membership prior to the April 2018 election included 125 Active members, 75 Emeriti members, 38 Corresponding members,2 Honorary members, 10 Associate members and 96 Post-Graduate Members for a total membership of 346 Fellows and members.

Drs. Lee Askt, Jonathan Bock, Thomas Carroll, David Francis, Gregory Grillone and Jennifer Long were elected to Active Fellowship; Dr. Edie Hapner was elected to Associate Fellowship; and Drs. Robert Ruben, Vanessa Schweitzer and Robert Weisman were elevated to Emeritus status.

This year, six Post-Graduate Members were approved for membership. They were Drs. Ahmad Al Omori, Rebecca Howell, Rachel Kaye, Robbi Kupfer, Benjamin Rafii, Hagit Shoffel-Havakuk, and Craig Villari.

After election of the nominees, the 2018 roster reflects 122 Active members, 69 Emeriti members, 38 Corresponding members, 2 Honorary members, 11 Associate and 94 Post-Gradaute members, for a total membership of 336 Fellows and members.

These totals also reflect that we were notified that 6 members who passed away prior to this report.

Dr. Sulica a total of 200 ballots were mailed to all eligible fellows for receipt 30 days prior to the 139th Annual Meeting. Sixty-four (64) Fellows voted which was an increase of 19 from the 2017 balloting. Among the voting, there was only one abstain vote cast.

Dr. Sulica reported that the ALA's footprint starting in 2019 will include a third half-day session. This allows for additional podium presentations, panel and guest lecturers. In working with the COSM meeting planners and other society secretaries, and Dr. Har-El who initiated the request, he expressed his appreciation.

Dr. Sulica concluded his report by thanking the Fellowship and Council for the assistance he has received as secretary.

Respectfully submitted,
Lucian Sulica, MD
Secretary

REPORT OF THE TREASURER

Dr. Rosen reported to the Fellowship that this transition from the American College of Surgeons (ACS) financial management team to Association Management Executives has been smooth. He acknowledged that the assistance of the Administrator, Ms. Cunningham, was very vital in insuring AME received the financial documents from ACS.

Dr. Rosen reported that the finances of the Association continues to show great improvement especially in the areas of payment of dues and the growth of the Sustainers' Fund. This year, we continued to reach out to those members who were delinquent and were able to reduce the delinquency amount substantially.

Revenues from the Laryngoscope provide opportunities for future research akthough the major source of income is members' dues.
We continue to encourage our Fellows to contribute to the Sustainers Fund. Later this year, there will be a donors' campaign with all funds being earmarked for education and research.

The Council continues to practice good money management as we review practices that will result in reduced expenditures at meetings and operational expense.

Respectfully submitted,
Clark A. Rosen MD
Treasurer

REPORT OF THE EDITOR

Transactions

Dr. Chhetri reported that the 2017 Transactions were compiled and uploaded on the website and positive feedback pertaining to the accessibility of the electronic copies continues to be received from Fellows. Hard copies may be printed by members or you may contact the Administrator if you experience difficult in printing a copy.

ALA Website

Last year, the website underwent modification and was completed in time to launch prior to the annual meeting. The ultimate goal was to provide easier access for both members and visitors. New links (email blast, contact the ALA, and find a member) are now available. Additional links or pages will be added in the near future. Since the site has only been online for approximately, one month, we were unable to collect data on the number of visits.

Publication

Dr. Chhetri reported the ALA received 103 abstracts for presentation consideration at the 2017 annual meeting. Thirty-five percent (35%) of the manuscripts were accepted for publication in the Laryngoscope with 14% being transferred to Open Access.

Respectfully submitted,
Dinesh Chhetri, MD
Editor

REPORT OF THE HISTORIAN

Since the Winter Meeting, we received notification of the passing of three Emeritus Fellows.

Dr. Bobby Alford, who passed away on February 20, 2018. He was inducted an Active Fellow in 1974 and elevated to Emeritus status at last years' meeting.

Dr. James Kelly passed away on April 8, 2018. Inducted as an Active Fellow in 1998, he was elevated to Emeritus status in 2012.

Dr. William Saunders, inducted as an Active Fellow in 1964, with elevation to Emeritus status in 1989, passed away on March 5, 2018. Dr. Saunders served as a First-Vice President in 1973 during the period when there was two vice-presidents of the Association.

Dr. Minoru Hirano, a Corresponding Emeritus, was inducted into the ALA in 1984. In 2015, he was elevated to emeritus status. Dr. Hirano, of Kyoto, Japan, passed away on December 9, 2017.

A moment of silence in memory of our deceased fellows was observed.

Respectfully submitted,
Michael S. Benninger, MD
Historian

RECIPIENTS OF THE DE ROALDES AWARD

1928 Chevalier L. Jackson
1931 D. Bryson Delavan
1934 Harris P. Mosher
1937 Lee Wallace Dean
1943 Ralph A. Fenton
1949 George M. Coates
1951 Arthur W. Proetz
1954 Louis H. Clerf
1959 Albert C. Furstenberg
1960 Dean M. Lierle
1961 Frederick T. Hill
1966 Paul H. Holinger
1970 Francis E. LeJeune
1973 Lawrence R. Boies
1976 Anderson E. Hilding
1979 Joseph H. Ogura
1982 John J. Conley
1985 John A. Kirchner
1985 Charles M. Norris

1987 Walter P. Work
1988 DeGraaf Woodman
1989 John F. Daly
1990 Joseph L. Goldman
1991 William W. Montgomery
1992 M. Stuart Strong
1993 Douglas P. Bryce
1994 Paul H. Ward
1995 Hugh F. Biller

1996 Byron J. Bailey
1997 George A. Sisson, Sr.
1998 Stanley M. Blaugrund
1999 Jerome C. Goldstein
2000 Thomas C. Calcaterra
2001 Eugene N. Myers
2002 Robin T. Cotton
2003 Gayle E. Woodson
2004 Robert H. Ossoff
2006 Stanley M. Shapshay
2007 W. Frederick McGuirt, Sr.
2008 Robert T. Sataloff
2009 Andrew Blitzer
2010 Marshall Strome
2011 Gerald Healy
2012 Robert T. Sataloff
2013 Michael S. Benninger

RECIPIENTS OF THE CASSELBERRY AWARD

1923 George Fetterolf and Herbert Fox
1928 Ralph A. Fenton and O. Larsell
1929 Richard A. Kern and Harry P. Schenck
1929 Edward H. Campbell
1931 Arthur W. Proetz
1934 Anderson C. Hilding
1936 Francis E. LeJeune and Joel J. Pressman
1939 H. Marshall Taylor and Brien T. King

1940 French K. Hansel
1941 Noah D. Fabricant
1946 Paul H. Holinger
1949 Henry B. Orton
1962 Hans von Leden
1966 John A. Kirchner and Barry D. Wyke
1968 Joseph H. Ogura
1985 H. Bryan Neel III
1987 Joseph J. Fata
1991 James L. Koufman
1993 Frank E. Lucente
1994 Ira Sanders

1998 Steven M. Zeitels
1999 Clarence T. Sasaki
2006 Kiminori Sato
2009 Randal C. Paniello
2010 Priya Krishna
2017 Ted Mau
2018 Seong Keun Kwon

RECIPIENTS OF THE NEWCOMB AWARD

1941 Burt R. Shurly
1942 Francis R. Packard
1943 George M. Coates
1944 Charles J. Imperatori
1947 Harris P. Mosher
1948 Gordon Berry
1949 Gordon B. New
1950 H. Marshall Taylor
1951 John D. Kernan
1952 William J. McNally
1953 Frederick T. Hill
1954 Henry B. Orton
1955 Thomas C. Galloway
1956 Dean M. Lierle
1957 Gordon F. Harkness

1958 Albert C. Furstenberg
1959 Harry P. Schenck
1960 Joel J. Pressman
1961 Chevalier L. Jackson
1962 Paul H. Holinger
1963 Francis E. LeJeune
1964 Fred W. Dixon
1965 Edwin N. Broyles
1966 Lyman G. Richards
1967 Joseph H. Ogura
1968 Walter P. Work
1969 John A. Kirchner
1970 Louis H. Clerf
1971 Daniel C. Baker, Jr
1972 Alden H. Miller

1973 DeGraaf Woodman
1974 John J. Conley
1975 Francis W. Davison
1976 Joseph L. Goldman
1977 F. Johnson Putney
1978 John F. Daly
1979 Charles F. Ferguson
1980 Charles M. Norris
1981 Stanton A. Friedberg
1982 William M. Trible
1983 Harold G. Tabb
1984 Daniel Miller
1985 M. Stuart Strong
1986 George A. Sisson
1987 John S. Lewis

1988 Douglas P. Bryce
1989 Loring W. Pratt
1990 William W. Montgomery
1991 Seymour R. Cohen
1992 Paul H. Ward
1993 Eugene N. Myers
1994 Richard R. Gacek
1995 Mark I. Singer
1996 H. Bryan Neel III
1997 Haskins K. Kashima
1998 Andrew Blitzer
1999 Hugh F. Biller
2000 Robert W. Cantrell
2001 Byron J. Bailey
2002 Gerald B. Healy
2003 Steven D. Gray
2004 Charles W. Cummings
2005 Roger L. Crumley
2006 Charles N. Ford
2007 Robert H. Ossoff
2008 Gayle E. Woodson
2009 Marvin P Fried
2010 Diane Bless
2011 Jamie A. Koufman
2012 Steven M. Zeitels
2013 Lauren Holinger
2014 Marvin P. Fried
2015 Robert T. Sataloff
2016 Nicholas Maragos
2017 Gerald Berke
2018 Peak Woo

RECIPIENTS OF THE GABRIEL F. TUCKER AWARD

1987 Seymour R. Cohen
1988 Charles F. Ferguson
1989 Blair Fearon
1990 Gerald B. Healy
1991 John A. Tucker
1992 Bruce Benjamin
1993 John N. G. Evans
1994 Joyce A. Schild
1995 Robin T. Cotton
1996 Haskins K. Kashima
1997 Lauren D. Holinger
1998 Philippe Narcy
1999 Bernard R. Marsh
2000 Trevor J. I. McGill
2001 Donald B. Hawkins
2002 James S. Reilly
2003 Ellen M. Friedman
2004 C. Martin Bailey
2005 William P. Potsic
2006 Amelia F. Drake
2007 Colin Barber
2008 Seth Pransky
2009 William Crysdale
2010 Charles M Myer, III
2011 Mark Richardson
2012 George Zalzal
2013 Andrew Inglis
2014 Linda Brodsky
2015 Dana Thompson
2016 Michael Rutter
2017 Paolo Campisi
2018 Noel Garabedian

RECIPIENTS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION AWARD

1988 Frank Netter
1989 Shigeto Ikeda
1990 Hans Littmann
1991 Arnold E. Aronson
1992 Michael Ter-Pogossian
1993 C. Everett Koop
1994 John C. Polanyi
1995 John G. Batsakis
1996 Ingo Titze
1997 Matina Horner
1998 Paul A. Ebert
1999 Bruce Benjamin
2000 M. Stuart Strong and Geza J. Jako
2001 Eugene N. Myers
2002 Catherine D. DeAngelis
2003 William W. Montgomery
2004 David Bradley
2005 Herbert Dedo
2006 Christy L. Ludlow
2007 John A. Kirchner
2008 Gerald B. Healy
2009 Stanley M. Shapshay
2010 Clarence T Sasaki
2011 Lawrence DeSanto
2012 Minoru Hirano
2013 Harvey Tucker
2014 Robert T. Sataloff
2015 Robert H. Ossoff
2016 Gerald Berke
2017 Roger Crumley
2018 Eiji Yanagisawa

RECIPIENTS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION RESIDENT RESEARCH AWARD

1990 David C. Green
1991 Timothy M. McCulloch
1991 Ramon M. Esclamado
1992 David H. Henick
1993 Gregory K. Hartig
1994 Sina Nasri
1995 Saman Naficy
1996 Manish K. Wani
1997 J. Pieter Noordzij
1998 Michael E. Jones
1999 Alex J. Correa
2000 James C. L. Li
2001 Andrew Verneuil
2002 Dinesh Chhetri
2003 Andrew Karpenko
2004 Ichiro Tateya
2005 Samir Khariwala
2007 Idranil Debnath
2008 Tara Shipchander
2009 David O. Francis
2010 David O. Francis
2011 Jeffreey Houlton
2012 Lowell Gurey
2013 Yaniv Hamzany, MD
2014 Boris Paskhover, MD
2015 Andrea Park
2016 Andrew M. Vahabzadeh-Hagh, MD
2017 Ian-James Malm, MD
2018 Molly Naunheim

RECIPIENTS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION YOUNG FACULTY RESEARCH AWARD

1991 Paul W. Flint
1992 Yasuo Hisa
1993 Jay F. Piccirillo
1994 Hans J. Welkoborsky
1995 Nancy M. Bauman
1997 Ira Sanders
1998 Kiminori Sato
2000 Steven Bielamowicz
2001 John Schweinfurth
2005 Dinesh Chhetri
2006 Suzy Duflo
2007 Tack-kyun Kwon
2008 Bernard Rousseau
2009 Tsunehisa Ohno
2010 I-Fan Theodore Mau
2011 David Francis
2012 Mika Nomoto
2013 Seung Won Lee
2014 Jennifer Long
2015 Nao Hiwatashi
2016 Ryo Suzuki
2017 Astha Malhotra
2018 Catherine Sinclair

THE MEMORIAL AND LARYNGOLOGICAL RESEARCH FUNDS

The Council earnestly requests that Fellows of the Association give consideration to making a special bequest to these important funds, or to becoming a Benefactor.

MEMORIAL FUND DONORS

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John F. Barnhill
August L. Beck
Gordon Berry
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Cornelius G. Coakley
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Fred W. Dixon
Charles F. Ferguson
George Fetterolf
Joseph L. Goodale
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Gordon F. Harkness
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George E. Hourn
Samuel Johnston
John S. Lewis
H. Bryan Neel III
James E. Newcomb
Henry B. Orton
Lyman G. Richards
Myron J. Shapiro
Burt R. Shurly
Mark I. Singer
Lester T. Sunderland
H. Marshall Taylor
Walter H. Theobald
John A. Tucker
Francis L. Weille
Eiji Yanagisawa

BENEFACTORS

Sally Sample Aall
Mrs Daniel C. Baker, Jr
Edwin N. Broyles
Louis H. Clerf
Seymour R. Cohen
John J. Conley
John F. Daly
Francis W. and Mrs Davison
Stanton A. Friedberg
Thomas C. Galloway
Joseph L. Goldman
Robert L. Goodale
Edley H. Jones
A. P. Marchessini
Francis H. McGovern
Charles M. Norris
Samuel Salinger
Sam H. Sanders
Harry P. Schenck
Oliver W. Suehs
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DeGraaf Woodman
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PRESIDENTIAL ADDRESS

"From Laryngeal Oncology to Oncologic Laryngology – The ALA and Laryngeal Cancer"

Gady Har-El, MD
New York, New York

If you wish to view the 2018 Presidential Address as presented by Dr. Har-El, please access the "2018 Presidential Address".

Presidential Citations

Dinesh Chhetri, MD
Los Angeles, California

Dr. Chhetri currently is a Professor of Head and Neck Surgery at University of California, Los Angeles (UCLA). A graduate of Brown University, he received his medial degree from the UCLA School of Medicine where he also completed his residency in otolaryngology and fellowship in laryngology. Dr. Chhetri serves as director of the Swallowing Disorders Program and co-director of the Laryngology Fellowship.

He is a prominent NIH funded researcher who has contributed to our understanding of the role of laryngeal neuromuscular control and its effects on stiffness, posture, and voice production. He had led many medical missions to underserved areas around the world. Dinesh is devoted to improving the educational mission and member participation in his role as the Editor of our organization.

Dr. Chhetri's main focus in the Laryngeal Physiology Laboratory is evaluation and treatment of voice problems related to laryngeal posture and vibration, including study of laryngeal asymmetries such as vocal fold paresis and paralysis, as well as vocal fold vibratory abnormalities related to scar, tissue loss, vocal fold neoplasms, and tension asymmetry. His current research focus in the Swallowing Disorders Center is

prevention dysphagia in patients undergoing chemoradiation therapy for head and neck cancer.

Dr. Chhetri was the 2006 recipient of the Full Time Faculty Teaching Award in UCLA's Division of Head and Neck Surgery. In 2005, he was presented the ALA's Young Faculty or Practitioner Award.

He currently serves as the ALA Editor and was the 2017 Program Chairperson. Additionally, Dr. Chhetri is a fellow of the AAO-HNS, ABEA, AHNS, and the Triological Society.

I am deeply honored to present this Presidential Citation to Dr. Dinesh Chhetri.

Maxine Cunningham, MBA

Antioch, Tennessee

Maxine, a native of Knoxville, Tennessee, is the youngest of three children and the only daughter in her immediate family. Prior to completing her undergraduate degree in Human Resource Management (cum laude) from Trevecca Nazarene University, she studied Criminal Justice and Psychology. She returned to Trevecca and recently earned her Master of Business Administration degree (cum laude) in Management and Organizational Development.

Prior to her employment at Vanderbilt University Medical Center, Maxine was an account executive in the telecommunications industry where she was honored as the top sales representative for nine consecutive months. She would later join the Department of Otolaryngology staff at Vanderbilt Medical Center working with Dr. Robert Ossoff.

During Dr. Ossoff's term as the ALA Secretary, he utilized Maxine's skills and experience in planning and implementing the 2003 Annual Meeting. Since that year, Maxine has been an invaluable resource to the ALA by providing day-to-day management for almost 15 years. She credits Drs. Ossoff and Sataloff for convincing her to remain a part of the ALA. After retiring from Vanderbilt in 2013, Maxine continued to provide service to our 300+ members and other individuals interested in the Association.

Since 2007, she has served as chairperson of her family's Board of Directors, with more than 600 descendants, by providing direction for its business interests in the states of Georgia and Illinois. Maxine is a certified genealogist who has written and produced two videos based on her family genealogical history dating back to the 1700s. She is an avid sports fan (collegiate and professional) of football, basketball, and soccer as her favorites.

When asked which achievements she is most proud of, Maxine immediately mentions her family and the completion of her graduate degree. She credits her parents and other senior family members with instilling in her the "can do anything attitude" along with a strong dose of her faith and the solid support of family and friends. She is actively involved with organizations that support Armed Services for Active and Veteran military. Maxine attributes her "calm" demeanor, in most cases , to her two children, three granddaughters and one great grand-daughter for keeping her grounded in the old-fashioned manner throughout the last quarter of a century.

Maxine states, "Running a very close second are the hundreds of ALA Fellows, whom I've met and am proud to have served 15 ALA Presidents and five Secretaries, including our current President. Dr. Har-El, over the past one and a half decades."

I am pleased to present this Presidential Citation to our Administrator, Maxine Cunningham.

The New York Laryngological Society
New York, New York

President Har-El honored the New York Laryngological Society with a Presidential Citation. Accepting this award was Michael E. Pitman, MD, the 2016-2017 President.

INTRODUCTION OF THE GUEST OF HONOR

PEAK WOO, MD
New York, New York

Presented by: Gady Har-El, MD
New York, New York

Peak Woo is Clinical Professor of Otolaryngology at the Icahn School of Medicine.

In 1978, he received both his undergraduate and medical degrees as a graduate of the Boston University 6-year BA-MD program. This was followed by an internship in general surgery at the University of Pennsylvania Hospital and his residency training in the Combined Boston University Tufts University Otolaryngology program.

Upon completion of his residency in 1983, Dr. Woo joined the academic faculty at the State University of New York Upstate Medical Center. From 1994-1996 he was the vice-Chairman of the Otolaryngology department at Tufts University. In 1996, he became the Grabscheid Professor of Otolaryngology and the director of the Grabscheid Voice Center at the Mount Sinai School of Medicine, Department of Otolaryngology, Head and Neck Surgery. In 2008, Dr. Woo has been in clinical practice with an academic appointment as clinical professor and co-director of laryngology fellowship training program at the Icahn School of Medicine.

Dr. Woo was inducted as an Active Fellow in the ALA 1996 and has played an active role in the Association as Councilor-at-Large, Vice President/President-elect and as the 2015 President. He also serves as an Advisor to the ALA Post-Graduate Members In addition to his work with the ALA, Dr. Woo is a past president

of the American Broncho-esophaglogical Association. He currently serves as the current Vice President of the Eastern Section of the Triological Society.

His main clinical and research interests are in the medical and surgical treatment of laryngeal diseases. Dr. Woo is highly recognized as one who has lectured extensively on diagnosis and management of voice disorders. He has continued to be an active participant in laryngology fellowship training of international and national fellows since 1996.

He is the author of more than 126 papers, 24 book chapters and one book.

He and his wife, Celia, make their home in New Jersey. It is my pleasure to present to you our Guest of Honor, Dr. Peak Woo.

PRESENTATION OF
THE AMERICAN LARYNGOLOGICAL ASSOCIATION
AWARD
Eiji Yanagisawa, MD

Woodbridge, CT

Ellen M. Friedman, MD
Houston, TX

Dr. Eiji Yanagisawa has had a remarkable Otolaryngological career. After graduating from Nihon University School of Medicine in Japan, he began his Otolaryngology residency at Yale in 1956 on a Fulbright Scholarship, accepted by Dr John A. Kirchner, then section chief of Otolaryn- gology. Since completing his residency in 1959, he has remained in New Haven, where he has had a profound influence on the training and develop-ment of over 100 Yale residents from the 1960's to the 2010's, encouraging their participation in clinical research and publishing original articles. Resident education was his driving "mission".

He is a Clinical Professor of Otolaryngology at the Yale University School of Medicine and has received many honors including President of the American Broncho-Esophagological Association, Vice President of the Eastern Section of the Triological Society, President of New England Otolaryngological Society, Presidential Citations from the American Otological Society, American Laryngological Association (twice), Triological Society, and American Academy of Otolaryngology-Head and Neck Surgery, the Chevalier Jackson Award from the ABEA, and the Distinguished Service Award from AAO-HNS. He was the recipient of the Lifetime Achievement Awards from AAO-HNS (2003) and the 20th Politzer Society Meeting Honorary Membership was granted from the Nihon University School of Medicine, Japan

(2000) and the Japan Broncho-Esophagological Association (2000). He received many prize winning awards for his videotapes, including the Graham Eddy Endoscopic Award from Biological Photographic Association (1981) and served as a member of the jury of the Film Festival of World Congress of Otorhinolaryngology (Turkey, Australia, USA). He was a frequent lecturer both here and abroad. He has authored/coauthored 356 original articles, 80 book chapters, and 4 books. He held 19 Scientific exhibits, and has also created 77 teaching videotapes.

Dr Yanagisawa was a masterful mentor and instructor, teaching his residents intricate and practical details about the medical and surgical care of patients, and gained international recognition for his work in photographic and video documentation in Otolaryngology.

PRESENTATION OF THE GABRIEL F. TUCKER AWARD

Noel Garabedian, MD
Paris, France

Presented by *Reza Rahbar, MD*
Boston, Massachusetts

In 1987 in memory of Gabriel F. Tucker, Sr. and Gabriel F. Tucker, Jr., The Gabriel Tucker Award was created. The Award is to be given to an ALA member or to an individual in recognition of the individual's contributions to the field of Pediatric Laryngology and/or for outstanding service to the Association. This year's recipient is my friend, Dr. Noel Garabedian. Noel is a Professor of Otolaryngology & Head and Neck Surgery as well as Chief of the Pediatric Otolaryngology Department at Necker-Sick Children's Hospital in Paris, France, which is the largest pediatric otolaryngology department in Europe.

Dr. Garabédian is a member of a number of European and international societies. Additionally, he is an active international member of ASPO and ABEA. He was the past president of the French Association of pediatric ORL and past president of National Boards of French ENT academy. Noel also served as the president of European Society of Pediatric ORL. Currently, he is the President of the Medical Board of Paris University Hospitals.

He has a wide range of research interest ranging from Airway abnormality to otology and genetic of hearing loss. This has lead to over 250 publications.

He has received many awards and honors throughout his career, most notably the Officier de la Légion d'Honneur in 2011.

Noel is an outstanding physician, surgeon and an innovator in field of pediatric ORL. I am honored to have him as a colleague and most importantly as a dear friend.

INTRODUCTION OF THE FORTY-THIRD DANIEL C. BAKER, JR., MD, MEMORIAL LECTURER

Gayle Woodson, MD
Merritt Island, Florida

Introduction: *Marshall E Smith, MD*
Salt Lake City, Utah

Dr. Gayle Woodson, the 2018 Daniel Baker lecturer, is a Past-President of the American Laryngological Association. She is currently an Adjunct Professor of Otolaryngology at Drexel University and Professor Emeritus and Former Chair of Otolaryngology, SIU School of Medicine.

Dr. Woodson received a Bachelor's Degree from Rice University and graduated from Baylor College of Medicine. After two years of General Surgery Training at John's Hopkins Hospital, she completed an Otolaryngology Residency at Baylor. She served as a Fellow in Laryngology at the Royal National Throat, Nose, and Ear Hospital in London, England.

Dr. Woodson began her Otolaryngology career as an Assistant Professor at Baylor. She was an Associate Professor at UC San Diego, and was also Professor at UT Memphis and the University of Florida, before moving to Illinois in 2003. She retired from SIU in 2014. She and her husband now divide their time between Florida, Newfoundland, and Tanzania.

Dr. Woodson's research has focused on respiratory muscle physiology, laryngeal nerve injury and repair, and vocal fold scar. She has given invited lectures, in 21 countries on every continent except Antarctica. She has been very active in global medical outreach through volunteering and teaching in Africa, Central America, and the Middle East.

She was the first woman elected to the American Board of Otolaryngology, and served as its Exam Chair for five years. In addition to her term as president of the ALA, she served as President of the American Academy of Otolaryngology -Head and Neck Surgery, and Chaired the Residency Review Committee for Otolaryngology. She currently chairs the FDA Panel on ENT Devices. She has been elected to the Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum, the Johns Hopkins Society of Scholars, and the American Surgical Association. Her awards and honors include the Newcomb Award from the ALA, Chevalier Jackson Award from the American Broncho-esophagological Association, the Hans von Leden Award for Lifetime Achievement in Voice Care, and the Olga Jonasson Award from the Association of Women Surgeons. She and her husband, Tom Robbins, have 4 grown children and 3 grandchildren.

FORTY-THIRD DANIEL C. BAKER, JR., MD MEMORIAL LECTURE

Topic: Truth, Heresy, and Paradigm Shifts

Gayle Woodson, MD
Merritt Island, Florida

It is an honor present the Daniel C Baker lecture. This is not the first time I have had the opportunity to honor Dr. Baker's memory. In 2007, I was the Daniel C Baker Lecturer in Laryngology at Columbia University Medical Center. He Chaired the Department of Otolaryngology at Columbia for 10 years, until his sudden death. At that time, he was President of the American Laryngological Association and had served as President of the ABEA. It is fitting to honor his memory in this way, furthering the exchange of ideas in our field.

While this event honors Dr. Baker, I would also like to pay homage to Dr. Bobby Ray Alford, a giant in otolaryngology who passed away in February. He was a great mentor and role model for me and so many others. I would not be standing here today without his wise teachings.

It has been many years since I completed my training in Otolaryngology and I have witnessed profound evolution in the way we take care of patients. Progress has not always been smooth. In fact, some of the most significant advances have been met with considerable resistance.

For example, take obstructive sleep apnea (OSA). As a resident, I learned that OSA was due to obesity and that the only effective treatment was tracheotomy. Then, at the 1980 meeting of the AAO/HNS in Anaheim, I heard Dr. Shiro Fujita report the successful treatment of 9 of 12 OSA patients using a new operation: the uvulopalatopharyngoplasty. (1) I recall that the conversations among my senior colleagues went somewhere along the lines of "That's ridiculous." Or. "It'll never work." But before long, the procedure was in wide use. Since then, our understanding of the pathophysiology evolved and matured, and other treatment strategies have emerged.

When I was at UCSD, my Chairman, Jeffrey Harris told me about the challenges he faced in obtaining funding for his research into hearing loss, which involved introducing antigens into guinea pig cochleae. His first application for an NIH grant was "Not Recommended for Funding ", because everyone knew that if you drill into the cochlea, you will get a dead ear. Fortunately, he persevered with his experiments and proved that the cochlea could indeed survive meticulous surgical fenestration. (2) This launched a successful research career. And we know now that cochleostomy is a tolerable procedure. Hearing can be preserved in cochlear implant patients if done skillfully.

In the 1980's, I had the privilege of serving on the American College of Surgeons Committee on Medical Motion pictures.

Back in the days before the advent of

compact digital video cameras, making movies was expensive and labor intensive, requiring large, heavy equipment. Each year our committee selected a few procedures to be documented on film by the College film production crew. One year, I innocently suggested making a movie of Laparoscopic Cholecystectomy, an approach that had recently been introduced. The response of the general surgeons on the committee was vociferous and unanimous: Endoscopic surgery in the belly was malpractice. One year later, at the next committee meeting, every general surgeon on the committee had adopted the practice.

My own research of laryngeal paralysis encountered a major paradigm shift. "Everyone knew" that the position of a paralyzed vocal fold was determined by the site of the nerve lesion. In recurrent laryngeal nerve (RLN) paralysis, the vocal fold would lie in a paramedian position, held near the midline by the sustained action of the cricothyroid muscle, which was supplied by the superior laryngeal nerve. Implicit in this concept was the understanding that a nerve injury was an all or none phenomenon—that the muscles supplied by the RLN would simply be unplugged. After a few years of animal experiments, I grudgingly accepted what my data, and that of others, showed—that RLN injury is not all or none, and that even when the nerve was completely transected, the RLN would regenerate across the gap. The position of the vocal fold was NOT determined by the CT muscle, but by the actions of muscles reinnervated by the RLN. (3) It is now clear that paralyzed vocal folds are rarely completely denervated. Sometimes there is only a partial injury of the nerve. And a completely transected nerve often regenerates, with immobility due to misdirection of reinnervating axons. (4)

Resistance to new advances is not surprising. All human thinking is subject to bias, and one of the strongest is confirmation bias: the tendency to accept facts that agree with what we already believe, and to reject those things that are dissonant. Our instinct is to cling to the status quo. It can be hard to accept that we have not been doing things as well as we could. As the British playwright, Noel Coward said, "All great truths begin as blasphemy." Accepting new information that challenges the basis of our everyday thinking requires a new way of looking at the facts. In other words, there is a paradigm shift.

The term "paradigm shift "was coined in 1962 by Thomas Kuhn, a professor of philosophy and linguistics at the Massachusetts Institute of Technology. He observed that "Science does not progress via a linear accumulation of new knowledge but undergoes periodic revolutions." His book, *The Structure of Scientific Revolutions,* primarily deals with major changes in the physical sciences, but he acknowledged that similar revolutions in fundamental concepts can occur in all fields of knowledge. (5) He defines a paradigm thusly: "A paradigm is what the members of a scientific community share, and, conversely, a scientific community consist of men who share a paradigm."

Kuhn defined a scientific community as a group of people who "see themselves and are seen by others as the men uniquely responsible for the pursuit of a set of shared goals, including the training of their successors." Otolaryngology is such a community. We share a fund of literature that guides our care of patients, we have a system for training successors, and regular academic society meetings provide a forum for discussing new ideas and navigating paradigm shifts.

The development of functional endoscopic sinus surgery (FESS) is a good example for understanding the concept of a paradigm shift. (6) Otolaryngologists who trained after 1980 may not appreciate how radical this approach was when first

introduced. Everyone "knew," that surgical treatment of chronic sinusitis required removal of the irreversibly diseased mucosa. The maxillary sinus could only be adequately exposed with an open procedure, i.e., the Caldwell Luc. The anterior wall of the maxillary sinus was exposed and opened via a sublabial incision. Similarly, a Lynch incision was the preferred means of exenterating the ethmoid sinuses. Endonasal ethmoidectomy was generally avoided, due to risks of blindness, hemorrhage, or CSF leak. Adoption of FESS required acceptance of two concepts. First, chronic sinusitis can usually be reversed by establishing adequate drainage. Second, endoscopic surgery was safe in the hands of a surgeon with a working knowledge of the complex anatomy of the sinuses.

Our acceptance of new concepts is subject to bias. The most common is "confirmation bias," the tendency to accept facts that we confirm our beliefs, and to reject information that challenges them. This is a fundamental human trait which is an important "survival" mechanism. In fact, there is a neural basis for it. fMRI studies have shown that hearing a challenge to what someone believes activates emotional parts of brain. (7) But more often, confirmation bias gets in the way of logical thinking. If we only consume information that confirms our own views, we become more and more divided. Such bias can be blamed for the political fracturing in our country. "Sunk cost" fallacy is the reluctance to abandon an investment. For example, why try a new procedure if you have already purchased costly equipment for an older approach? "Attribution bias" is making broad generalizations from a limited observation.

This can be a common flaw in applying the findings of case reports or series, when an encounter with an unusual situation prompts a retrospective review. "Status quo" bias is hanging on to the tried and true, i.e., "We've always done it this way." Possibly the most treacherous bias is the inability to see our own bias: "Blind spot bias."

Novelty itself is not a virtue. Not every new "advance" is ultimately shown to valid. For example, in 2013, Google Glasses were touted as something revolutionary that would change our lives. But it did not turn out that way. In fact, I don't recall ever seeing anyone using Google glasses. I won't list the many innovative theories treatments, or technologies in our field that did not pan out. But I am sure all of us can recall a few things that did not live up to initial hype and have subsequently faded away.

We are continually bombarded with an increasing volume of new observations, novel theories, and cutting-edge technology. How do we sort out what will last and what will fade? We must evaluate the available evidence. Our paradigms, the collective consensus of the state of knowledge in our specialty, resides in textbooks of otolaryngology. Textbooks and intuition, or the teachings of mentors are not always sufficient to guide the care of patients. The science of medicine is constantly growing and evolving. and textbooks must be edited and updated every few years. Further, opinions in textbooks may not always be based on firm evidence, and sometimes serve to perpetuate unsubstantiated concepts.

My first foray into medical scholarship provided me a valuable lesson in verification of medical evidence. It was a report of one of Dr. Alford's patients who had the very first (to our knowledge) "Verrucous Carcinoma of the Middle Ear." (8) This is a very old publication--the image that demonstrating the lytic lesion in the mastoid is a plain radiograph, from the days before computed tomography. The senior author was a pathologist, Dr. Malcolm

McGavran, and by the time he finished reviewing my first draft, there was more red ink than black. In particular, he wanted to be certain that this really was the first reported case of this unusual problem. We had to be certain that a prior case of verrucous carcinoma had not been mistakenly reported as something else. For example, *everyone knew* that squamous carcinoma could arise in a cholesteatoma. I spent hours in the musty stacks of the library, tracking down all reports of this phenomenon. Curiously, all the reports were in textbooks, or review articles, and all the citations converged on a single case report from 1951, that did not include an illustration or description of the histopathology. The author was dead. The article had been published posthumously. Dr. McGavran instructed me to request the paraffin blocks of the specimen, so that he could prepare slides and confirm the diagnosis. I learned that the pathology lab containing the blocks had been struck by lightning and burned down.

In the 1991, the "Evidence Based Medicine Working Group" published a consensus article in JAMA, introducing "a new paradigm for medical practice." (9) The report stated that "Evidence-based medicine de-emphasizes intuition, unsystematic clinical experience and pathophysiologic rationale as sufficient grounds for clinical decision making…" Although systematic critical consideration of information was not really a novel concept, the movement codified the process of analysis, (Table 1) and developed a system for rating the level of medical evidence. (Table 2). The highest rated evidence is accrued through a randomized prospective clinical trial, which has come to regarded as the gold standard for medical evidence. However, confidence in this "golden calf" has recently been shaken, as a growing number of reports cite poor reproducibility of statistically significant results. For example, in 2012, Amgen, a large biotech company, reported the results of their efforts to reproduce 53 "landmark" articles in cancer research. The scientific findings were confirmed in only 6 studies. (10) A 2015 article in Science reported that only 36 of 100 published psychology studies with statistically significant results could be reproduced (11). In 2016, the journal, *Nature*, surveyed 1572 scientists and learned that more than 70% had tried and failed to reproduce another scientist's experiments. (12). The survey also asked the causes of this seeming epidemic of irreproducible results. The top factors cited by more than 80% of respondents, included selective reporting, pressure to publish, low statistical power or poor analysis, and poor experimental design.

The pressure to publish is widely recognized as a risk factor for irreproducibility. Although outright fraud is rare, the need to produce significant findings quickly as possible increases the susceptibility of researchers to bias at many levels, including research design and the analysis and interpretation of data. Confirmation bias can lead us to preferentially search for data that supports our hypotheses and to develop research questions that include unproven assumptions.

The advent of computers has made "big data" available for research. It seems logical that increasing numbers would improve the statistical validity of any study. However, A large data set does not guarantee accurate results. Big data collection can also be biased and may not eliminate confounding variables. Falsification analysis can ferret out erroneous results by demonstrating that the data also support alternative conflicting or even illogical hypotheses. For example, several observational studies have reported that the use of proton pump inhibitor

medication increases risk of pneumonia. Large data sets were analyzed, based on the assumption that decreasing gastric acid would alter the bacterial flora in the stomach. But falsification analyses also demonstrated similar associations of PPI's with myriad of other conditions, such as chest pain, urinary tract infections, rheumatoid arthritis flares, and thrombosis. (13)

Erroneous data and faulty assumptions in the literature become "baked" into our clinical paradigms, and are very difficult to expunge, due to publication bias. Medical and scientific journals favor publication of new information, not studies that confirm prior reports, which limits the motivation for researchers to investigate questions that appear to be settled. And studies with positive results are much more likely to be published than negative studies.
The publication of erroneous information can have devastating consequences. Case in point: In 1998, Wakefield published and article in Lancet linking MMR vaccination to the development of autism. (14) MMR immunization rates plummeted and there were multiple outbreaks of measles around the world. Multiple subsequent studies found no connection between immunization and autism. The Lancet editor fully retracted the Wakefield article, stating that the journal had been "deceived." Wakefield was found guilty of fraud and lost his license to practice. Yet, to date, many parents are still reluctant to allow their children to be immunized, and measles has returned as a public health problem.

The crisis in reproducibility and the resultant uncertainty of our knowledge are serious issues and the contributing factors are protean. Recently, the National Association of Scholars published a report, titled, THE IRREPRODUCIBILITY CRISIS OF MODERN SCIENCE: CAUSES, CONSEQUENCES, AND THE ROAD TO REFORM that discussed the root causes and presented a list of 40 recommended actions to address the issue. (15)

A proposal to reduce the standard threshold of statistical probability from $p<.05$ to $p<.005$ has garnered some support. (16) However, it is estimated that this would render move one-third of past "statistically significant biomedical results into the category of just "suggestive." Moreover, in a 2014 consensus statement, the American Statistical opined that issue of reproducibility is greater than a specific value for "p." The fundamental problem is a widespread lack of understanding about the meaning of "p." P-values do not measure the probability that a hypothesis is true and scientific conclusions should not be based solely on a p-value passing a specific threshold. (17)

Education in statistics and research design is not a new idea, but the work to date has been ineffective. Like alteration of promotion and tenure guidelines, the mechanisms and responsibility for implementation are diffuse. Changes in editorial processes and publication could be more feasible. For example the digital expansion of content could allow for publication of important but not exciting work that has to date been mostly excluded. There is capacity for online publication of studies that replicate "ground breaking" work, with the articles linked to the studies that they confirm or refute. There could also be an online repository for negative studies—evidence to deflate hypotheses that did not pan out.

In the face of uncertain literature, how are we to navigate the onslaught of new information? How do we discern what is truth and what is heresy? Each of us is ultimately responsible for ensuring that each of our patients receives the best care, following the steps of evidence-based medicine, not relying solely on textbooks. We should maintain a healthy skepticism for new things, without clinging to old ideas and

treatments. But keeping up with the gargantuan flood of randomized controlled trials is daunting, and we now know that many are flawed.

One answer can be found in consensus statements and guidelines generated by our Academic organizations. The American Academy of Otolaryngology/Head and Neck Surgery has been particularly productive in generating such documents. Admittedly, some have raised controversy and required revision, but the process of guideline development provides our best approximation of what can currently be regards as "truth." In his book on Scientific Revolutions, Kuhn states that progress in science is not a simple line leading to the truth. It is a movement away from less adequate conceptions of the world. In the current hierarchy of Medical Evidence, expert opinion is rated dead last. But it is now clear that out gold standard for Level one evidence, the randomized, prospective controlled trial is often flawed. Thus, collective wisdom, such as the careful consideration of a body of evidence by an expert panel, emerges as the most reliable source of information. Kuhn stated in his book, "As in political revolutions, so in paradigm choice—there is no standard higher than the assent of the relevant community."

The relevant community is us. Researchers can produce data. Expert panels can deliberate. But the proof, as the old saying goes, is in the pudding. It is up to each of us not only to keep up to date with current recommendations, but to also carefully monitor what happens to our patients, under our care. Many a treatment has been discarded, not because a journal article told us it was not effective, or because it was discredited by some panel, but because a community of physicians found that it does not work. As Einstein said, "Truth is what stands the test of experience." A systematic means of closing the loop, to facilitate a way to share and disseminate experiences would go a long way toward improving our ability to provide the best possible care for our patients.

TABLE 1
STEPS IN EVIDENCE BASED PRACTICE

1. Ask a question
2. Collect relevant evidence
3. Critically appraise evidence
4. Integrate best evidence, clinical experience, and patient preferences in decision or change.
5. Evaluate outcomes

TABLE 2

Level 1
Prospective, randomized controlled trial

Level 2
Prospective observational research with an experimental design

Level 3
Retrospective review comparing cases and controls

Level 4
Case series

Level 5
Expert opinion

REFERENCES

1. Fujita S, Conway W, Zorick F, et al. Surgical correction of anatomic abnormalities in obstructive sleep apnea syndrome: Uvulopalatopharyngoplasty. Otolaryngol Head Neck Surg 89:923-934, 1981.

2. Harris JP. Immunology of the inner ear: evidence of local antigen production. Ann Otol Rhinol Laryngol 1984; 93: 158–162.

3. Woodson, GE: "Configuration of the Glottis in Laryngeal Paralysis II: Animal Experiments." Laryngoscope, 103:1235-1241, 1993.

4. Crumley RL. Laryngeal synkinesis revisited. Ann Otol Rhinol Laryngol. 2000 Apr;109(4):365-71.

5. Kuhn, Thomas S. *The Structure of Scientific Revolutions*. University of Chicago Press. 1962.

6 Kennedy D.W., Zinreich S.J., Rosenbaum A.E., Johns M.E. Functional endoscopic sinus surgery. Theory and diagnostic evaluation. Arch Otolaryngol. 1985;111:576–582

7. Westen, D., Blagov, P. S., Harenski, K., Kilts, C. & Hamann, S. Neural bases of motivated reasoning: an FMRI study of emotional constraints on partisan political judgment in the 2004 U.S. Presidential election. J Cogn Neurosci 18, 1947–1958, doi: 10.1162/ jocn.2006.18.11.1947 (2006).

8. Woodson GE, Jurco S, Alford BR, McGavran M: Verrucous carcinoma of the middle ear and mastoid. Archives of Otolaryngology, 107:63-65, 1981.

9. Evidence Based Working Group. Evidence based medicine: a new approach to teaching the practice of medicine. JAMA 268:2420-2426, 1992.

10. Begley, C. G. & Ellis, L. M. Drug development: Raise standards for preclinical cancer research. Nature 483, 531–533 (2012).

11. Loken E., Gelman A. (2017). Measurement error and the replication crisis. Science 355, 584–585. 10.1126.

12. Baker, Monya. Nature 533: 453-4, 2016

13. Jena AB, Sun E, Goldman DP. Confounding in the association of proton pump inhibitor use with risk of community-acquired pneumonia [published online September 7, 2012]. J Gen Intern Med

14. Gerber, J Offit P. Vaccines and Autism: A Tale of Shifting Hypotheses. Clinical Infectious Diseases, Volume 48:456–461, 2009.

15. https://www.nas.org/images/documents/irreproducibility_report/NAS_irreproducibilityReport.pdf

16. Ioannidis, The Proposal to Lower P Value Thresholds to .005J. JAMA. 2018;319(14):1429-1430.

17. Ronald L. Wasserstein & Nicole A. Lazar (2016) The ASA's Statement on p-Values: Context, Process, and Purpose, The American Statistician, 70:2, 129-133

INTRODUCTION OF
THE STATE OF THE ART LECTURER

Melina Kibbe, MD
Chapel Hill, North Carolina

Gady Har-El, MD
New York, New York

The State of the Art Lecture will be delivered by Dr. Melina Kibbe, currently a Professor of Surgery and the Zack D. Owens Distinguished Professor and Chair of the Department of Surgery at UNC. Dr. Kibbe is also an Adjunct Professor in the Department of Biomedical Engineering. Previously at Northwestern University, she served as Vice Chair of Research in the Department of Surgery and as Deputy Director of the Simpson Querrey Institute for BioNano-technology. Dr. Kibbe has significant experience with both open and endovascular surgery, including the treatment of carotid stenosis, peripheral vascular disease, and abdominal aortic aneurysms. She is board certified in general and vascular surgery and is RVT and RPVI certified by ARDMS.

Dr. Kibbe's research interests focus on developing novel therapies for patients with vascular disease while simultaneously studying the mechanism of how these therapies impact the vascular wall. She is a PI on 3 NIH R01 awards and 1 VA Merit award. She holds 10 patents or provisional patents. Her research was recognized by President Obama with the Presidential Early Career Award for Scientists and Engineers in 2009.

Dr. Kibbe has proven to be a leader in both the national and international as she holds several national positions of leadership. She is the Editor-in-Chief for JAMA Surgery. She is past-president of the Association for Academic Surgery, and current past president of the Midwestern Vascular Surgical Society and the Association of VA Surgeons. Her bibliography

includes over 230 peer-reviewed manuscripts, review articles, and book chapters; authored or co-authored over 200 nationally and internationally presented abstracts. She was inducted into Alpha Omega Alpha Medical Honor Society in 1994. She has received 18 awards for teaching excellence from Northwestern University as a faculty member. Dr. Kibbe co-founded and is the Chief Medical Officer for VesselTek BioMedical, LLC, that specializes in the development of medical devices to treat vascular disease.

Dr. Kibbe graduated from the University of Chicago Pritzker School of Medicine in 1994. She completed her internship, residency, and research fellowship at the UPMC in 2002, and her vascular surgery fellowship at Northwestern University Feinberg School of Medicine in 2003. Dr. Kibbe completed a fellowship in The Hedwig van Ameringen Executive Leadership in Academic Medicine (ELAM) Program for Women at Drexel University College of Medicine in 2012.

THE STATE OF THE ART LECTURER

"The State of the Art in Managing Conflicts and Disruptive Behavior in Surgery"

Melina Kibbe, MD
Chapel Hill, North Carolina

Summary of Presentation

Disruptive and inappropriate behavior can affect patient care, jeopardize patient safety, lead to higher turnover with personnel, contribute to worsening patient outcomes, and ultimately lead to higher malpractice rates. Managing difficult people requires significant emotional intelligence. Unprofessional behaviors can be categorized into five different personality types to manage: 1) passive aggressive, 2) chronic whiner, 3) people pleaser, 4) disengaged, and 5) disruptive or hostile. The behaviors and implication of each personality type were discussed. Strategies on how to actively manage each of these five personality types were provided. Lastly, case scenarios were presented for discussion and solutions provided for the management of these personality types.

SCIENTIFIC SESSION

Vocal Motor Control and Central Auditory Impairments in Unilateral Vocal Fold Paralysis

Molly Naunheim, MD; Katherine C. Yung, MD; Sarah L. Schneider, CCC-SLP;
Jennifer Henderson-Sabes, AuD; Hardik Kothare, MS;
Srikantan S. Nagarajan, PhD; Steven W. Cheung, MD

Objectives: To evaluate differences in vocal motor control and central auditory processing between treated unilateral vocal fold paralysis (UVFP) and healthy control cohorts. Study Design: Cross-sectional comparison.

Methods: Ten UVFP study patients treated by Type I thyroplasty with stable voices were compared to 12 control subjects for vocal motor control and complex sound intelligibility. Vocal motor control was assessed using a pitch perturbation reflex task. Complex sound intelligibility was assessed using a central auditory processing battery. Additionally, standard subjective, perceptual, and objective voice measures were assessed.

Results: Central vocal motor control impairment was evident and measurable in treated UVFP. At 200 milliseconds following the onset of a pitch feedback perturbation, compensatory vocal response was reduced ($p < 0.05$). The range of pitch variations during normal feedback in study patients was correlated with the magnitude of the compensatory vocal response. Impaired compensatory vocal responses were observed despite demonstrated capacity in UVFP study patients to perform the vocal motor task at a level comparable to controls. The timing of the vocal motor control error suggests auditory processing impairments in UVFP patients. Concomitantly, UVFP patients exhibited central auditory processing impairments ($p=0.035$), especially for temporal compression and added noise challenges.

Conclusion: The combined central vocal motor control and auditory processing impairments demonstrate reciprocal interdependency of sensory and motor systems. Apparent isolated peripheral injury to the larynx has far reaching consequences that impact central motor control and auditory functions. Comprehensive treatment of UVFP may require novel approaches that also optimize central auditory processing performance.

Positive Effect of Nimodipine on Vocal Fold and Facial Motion Recovery Following Injury - A Systematic Review and Meta-Analysis

R. Jun Lin, MD, MSc; Michele Klein-Fedyshin MSLS, BSN, RN, AHIP;
Lauren Terhorst, PhD, Clark A. Rosen, MD

Introduction: Nimodipine is a calcium channel blocker that has been used to treat hypertension and vasospasm. Emerging evidence in the literature suggests that it is neuroprotective by reducing cellular apoptosis after neural injury and promoting axonal sprouting at the nodes of Ranvier. Objectives: To conduct a systematic review of the usage of nimodipine in cranial nerve injury and to perform a meta-analysis to estimate the efficacy of nimodipine on injured cranial nerve functional recovery. Methods: Literature search was performed in 8 databases using PRISMA guidelines. Publications that used nimodipine as a monotherapy for treating cranial nerve injury were included for review. Cranial nerve function recovery was the primary outcome measure.

Results: 68 full texts in English were assessed. 25 studies were included in the final review. Six of these including 121 participants who received nimodipine for either RLN or facial nerve injury and 531 controls were used for meta-analysis. Nimodipine significantly increased the odds of vocal fold motion recovery (OR 20.0, 95% confidence interval [CI] 10.5, 38.1, $p < 0.01$), and the odds of facial motion recovery (OR 10.4, 95% CI 1.2, 86.9, $p = 0.03$). Overall, nimodipine-treated patients had significantly higher odds of recovering vocal fold or facial motion compared with controls (OR 13.0, 95% CI 4.1, 41.4, $p < 0.01$).

Conclusions: Existing evidence supports the positive effect of nimodipine on vocal fold and facial motion recovery after injury. Future research should focus on randomized clinical trials comparing recovery rates between nimodipine- and placebo-treated groups.

Dynamic Voice CT Scan Improves Surgical Decision Making for Complex Airway Patients Undergoing Reconstructive Voice Surgery

Mathieu Bergeron, MD, BPharm; Robert J. Fleck, MD;
Meredith Tabangin, MPH; Alessandro de Alarcon, MD, MPH

Introduction: Dynamic voice computerized tomography (DVCT) is a novel technique that provides complementary information to characterize laryngeal function for patients with complex airway history that may alter surgical decisions. The study goals were to evaluate the impact of DVCT on decision making for reconstructive voice surgery for a cohort of post-airway reconstruction dysphonia patients.

Methods: Retrospective chart review at a pediatric tertiary center for patients with history of complex airway surgery and subsequent reconstructive voice surgery for dysphonia between 01/2010-04/2016. Study group had a DVCT prior to surgery while control group underwent surgery without a DVCT

Results: Twenty-one patients were analyzed (12 female, 57.1%) with a mean age of 13.9±7.7 year-old. Ninety percent (19/21) had a prior tracheostomy and a mean of 2.6±1.3 airway surgeries. Thirteen patients (61.9%) underwent DVCT prior reconstructive voice surgery. CAPE-V baseline scores were similar between study (49.1±4.6) and controls (57.1±6.0,P=0.72). Scores considerably improved for the study group after voice surgery (31.3±5.4,P<0.0001) while controls did not improve (57.8±5.7,P=0.99). Postsurgical improvement was significantly better for study patients(P=0.002). Baseline VHI scores were similar between both groups:54.0±5.4 vs 52.3±6.2, respectively(P=0.99). Postsurgically, VHI scores were also similar between both groups (46.1±7.1 vs 52.3±5.5,P=0.77). Reconstructive voice surgeries for study patients included posterior cricoid reduction (46.2%), vocal fold medialization/augmentation(46.2%) and laryngeal reinnervation(7.7%) while all controls underwent a single treatment (medialization/augmentation)

Conclusion: Patients with DVCT were more likely to improve. This suggests that DVCT altered surgical decision-making and allowed improved tailoring of reconstructive surgery to specific patients needs. DVCT could represent a key tool for complementary information prior reconstructive surgery

Prevalence and Otolaryngology Resource Utilization for Vocal Fold Paralysis/Paresis after Esophagectomy

Matthew G. Crowson, MD; Betty C. Tong, MD, MHS, MS; Hui-Jie Lee, PhD; David H. Harpole, MD; Harrison N. Jones, PhD; Seth M. Cohen, MD, MPH

Objectives: Vocal fold paralysis/paresis (VFP) is an uncommon but serious complication of esophagectomy. The objectives of this study were to: 1) identify the prevalence of VFP and associated complications after esophagectomy in the United States, and 2) determine the utility and relative cost of engaging otolaryngology-head & neck surgery and speech-language pathology (OHNS/SLP) in the management of these patients.

Methods: The National Inpatient Sample (NIS) represents a 20% stratified sample of discharges from US hospitals. Using ICD-9 codes, patients undergoing esophagectomy between 2008 and 2013 were identified in the NIS. Subcohorts of patients with VFP and those who utilized OHNS/SLP services were also identified. Weighted logistic regression models were used to compare binary outcomes such as in-hospital death and other complications; generalized linear models were used to compare total hospital charges and length of stay (LOS).

Results: We studied 10,896 discharges, representing a weighted estimate of 52,610 patients undergoing esophagectomy. The incidence of VFP after esophagectomy was 1.96%. Compared to those without VFP, patients with VFP had a higher incidence of postoperative pneumonia, more medical complications, and were more likely to undergo tracheostomy; hospital charges and LOS were also higher. In all patients, in-hospital mortality was associated with age >80, aspiration pneumonia, and the incidence of more medical and surgical complications. Of the patients with VFP, 35.0% received OHNS/SLP intervention.

Conclusion: VFP after esophagectomy is associated with postoperative complications, prolonged LOS, and higher hospital costs. OHNS/SLP intervention in the setting of VFP may help to mitigate the effects of these complications without significant increase in cost or LOS.

Voice Outcomes following Medialization Laryngoplasty with and without Arytenoid Adduction

Terence Zimmermann, MD, MPH; Diana Orbelo, PhD;
Rebecca Pittelko, CCC-SLP; Stephanie Youssef; Dale Ekbom, MD

Introduction: Voice outcomes following medialization laryngoplasty (ML) for unilateral vocal fold paralysis (UVFP) were compared to those that underwent ML plus arytenoid adduction (AA).

Methods: Single institution retrospective review of patients with UVFP undergoing ML and ML+AA (2009 to 2017).

Results: Of 236 patients, 127 met study criteria. Of those, 76(60%) underwent ML, age 63±14 years, male=34(45%), and 51(40%) underwent ML+AA, age 58±14 years, male=21(41%). Patients completed VHI-10 at baseline, n=127(100%), 3-months, n=110(87%) and/or 12 months n=58(46%). No group differences were found for sex (p=0.69) or occupation (p=0.77). Baseline differences were found for year of ML (p<0.001), age at ML (p=0.043), and prior vocal surgery (p=0.03). Baseline VHI-10 scores for ML+AA (29±7) were worse compared to ML alone (24±7 p<0.001). At 3 months VHI-10 scores improved (14±9, p<0.001) with ML+AA scores (12±9) showing greater improvement compared to ML (15±10, p<0.001) though the magnitude of difference reduced after controlling for baseline differences (p=.088). At 12 months overall VHI-10 scores also improved compared to baseline (15±10, p<0.001), again showing greater improvement for ML+AA group (10±8) compared to ML (18±10, p<0.001). This difference persisted after baseline controls (p=0.005). Maximum phonation times and perceptual voice measures are reported.

Conclusions: Based on current findings, patients that undergo ML+AA likely have greater voice handicap at baseline compared to those undergoing ML alone. Additionally, raw VHI-10 scores suggest that the addition of AA may improve voice outcome measures with those improvements persisting for at least 12 months. Further work is needed identify best candidates for AA.

Nationwide Estimations of Tracheal Stenosis Due to Tracheostomies

Romaine F. Johnson, MD, MPH

Introduction: Tracheal stenosis is a recognized complication of tracheostomy. Yet, the incidence and demographics of tracheal stenosis due to tracheostomies has infrequently been studied. We hypothesized that stenosis due to tracheostomy is rare but more common among older patients and women.

Methods: We performed a cross-sectional analysis of US emergency department visits, hospital discharges, and readmissions using the 2013 National Emergency Department Sample, 2013 National Inpatient Sample, and the 2013 Nationwide Readmission Database for patients with tracheal stenosis due to tracheostomies. Also, we queried the readmission database for new tracheostomy patients who were readmitted within the same calendar year with tracheal stenosis due to the tracheostomy tube. Results: There were an estimated 6156 ED visits, 4920 hospital discharges, and 1209 readmissions for tracheal stenosis due to tracheostomies in 2013. These cases represented 28% of all tracheostomy-related complications. Of the 103,484 patients who underwent tracheostomy in 2013, 1107 (1.1%) patients were readmitted within the calendar year with tracheal stenosis due to the tracheostomy tube. These stenosis patients' average age was 55 years old. They were 45% female, and 60% White. The mortality rate was 7.9%. The demographic risk of stenosis mirrored the risk of tracheostomy -- increasing age, male gender, and Black ethnicity.

Conclusions: Tracheal stenosis due to tracheostomy was uncommon accounting for 1% of readmissions after tracheostomies although it represented 28% of tracheostomy-related complications and had a high mortality rate. The risk of stenosis reflected the overall tracheostomy population without apparent age, gender, or racial predilections.

Healthcare Costs and Cost-Effectiveness in Laryngotracheal Stenosis

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Introduction: Laryngotracheal stenosis (LTS) is a rare but resource intense disease. It's a common physiological endpoint to multiple etiologies. The cost of LTS has not been adequately explored. We aim to 1) describe healthcare costs of LTS 2) identify key risk factors for increased cost and 3) conduct a cost-effectiveness analysis (CEA) to determine the role of cricotracheal/tracheal resection (CTR/TR) in the treatment of LTS.

Methods: 34 LTS patients (17 iatrogenic LTS [iLTS], 17 idiopathic LTS [iSGS]) were recruited from Johns Hopkins between April 2013 and March 2017. Annual costs were calculated using charges from the Department of Otolaryngology. A CEA was conducted to compare CTR/TR vs. endoscopic dilation. Procedures are considered cost-effective if they fall below an incremental cost-effectiveness ratio (ICER) of $100,000/Quality Adjusted Life Year (QALY), or cost less but result in higher QALYs.

Results: LTS patients were charged $15,801.81 (+/- $2,209.30) annually for related healthcare visits. Compared to iSGS patients, iLTS patients had significantly higher annual costs ($20,502.97 vs. $11,100.65, p=0.03). The cost of CTR/TR was $33,376 (+/- $8,613). Over a 5-year time horizon, CTR/TR has an ICER of $610/QALY and is cost-effective compared to serial dilations. Over a 10-year time horizon, CTR/TR has a lower cost and higher QALY than endoscopic dilation.

Conclusions: Treatment for iLTS is significantly more costly than iSGS. CTR/TR contributes to this higher cost but represents successful intervention in iLTS patients refractory to endoscopic dilation. Over a 5- and 10-year horizon, CTR/TR is cost-effective compared to endoscopic dilations in appropriately selected patients.

Drug Eluting Laryngeal Stents in a Mouse Model of Laryngeal Stenosis

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Introduction: Subglottic stenosis secondary to injury carries major long term morbidity. We have developed a murine model to study subglottic stenosis and showed decreased inflammatory responses with use of intraperitoneal injections of dexamethasone. Given our previous work, we proposed to implant drug-eluting stents into our mouse model to study local effects of sustained drug release.

Methods: Drug-eluting stents were created using polyethylene-co-vinyl acetate polymer (PEVA). 1.5 grams of PEVA pellets and 7.5mg of dexamethasone were dissolved into 10 mL of dichloromethane. The dichloromethane was then evaporated leaving the formed plastic which was shaped for implantation. Larynges were harvested from C57JL/J6 mice and injured using hydrochloric acid. Stents were then inserted into the larynx. Stented larynges and controls were implanted onto the backs of syngeneic mice and harvested at 3 weeks. Laryngeal were sent for both H&E staining and q-PCR looking at mRNA expression of inflammatory markers.

Results: H&E staining showed no significant differences in markers of inflammation. Moreover, there was no significant differences in expression of TGF-β and IL-2.

Conclusion: The results of our work show the difficulty in studying the use of drug eluting stents in the mouse model. There was no significant effect on use of laryngeal stents in improving the inflammatory response. Future studies can further look into different stent materials or medications that could modify the wound healing response.

Early Surgical Management of Thermal Airway Injury: A Case Series

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Introduction: Inhalation injury is an independent risk factor in burn mortality, imparting a 20% increased risk of death. Yet there is little information on the natural history, functional outcome, or pathophysiology of thermal injury to the laryngotracheal complex, limiting treatment progress. Methods: Case series (n=3) of significant thermal airway injury.

Results: In all cases, the initial injury was far exceeded by the subsequent immune response and aggressive fibro-inflammatory healing. Serial examination demonstrated progressive epithelial injury, mucosal inflammation, airway remodeling, and luminal compromise. Histologic findings in the first case demonstrate an early IL-17A response in the human airway following thermal injury. This is the first report implicating IL-17A in the airway mucosal immune response to thermal injury. Our 2nd and 3rd patients received Azithromycin targeting IL-17A and had showed clinical responses. The third patient also presented with exposed tracheal cartilage and underwent mucosal reconstitution via split-thickness skin graft over an endoluminal stent in conjunction with tracheostomy. This was associated with rapid abatement of mucosal inflammation, resolution of granulation tissue and return of laryngeal function.

Conclusion: Patients who present with thermal inhalation injury should receive a thorough multidisciplinary airway evaluation, including early otolaryngologic evaluation. New early endoscopic approaches (scar lysis, and mucosal reconstitution with autologous grafting over an endoluminal stent), when combined with targeted medical therapy aimed at components of mucosal airway inflammation (local corticosteroids and systemic Azithromycin targeting IL-17A) may have potential to limit chronic cicatrical complications.

Nanoparticle Delivery of RNA-Based Therapeutics Alter the Local Vocal Fold Response to Injury

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Objective(s). Our laboratory and others have suggested that Smad3 is a principle mediator of the fibrotic phenotype in the vocal folds (VF), and we hypothesize that alteration of Smad3 expression through short interfering (si) RNA likely holds therapeutic promise, yet delivery remains challenging. To address this issue, we employed a novel synthetic oligomer, lipitoid, complexed with siRNA to improve stability and cellular uptake with the goal of increased efficiency of RNA-based therapeutics.

Methods. In vitro, lipitoid cytotoxicity was quantified via colorimetric and LIVE/DEAD assay in immortalized human vocal fold fibroblasts and primary rabbit vocal fold fibroblasts. In addition, optimal incubation interval and solution for binding siRNA to lipitoid for intracellular delivery were then determined. In vivo, a rabbit model of vocal fold injury was then employed to evaluate Smad3 knockdown using locally injected lipitoid-complexed siRNA.

Results. In vitro, lipitoid did not confer additional toxicity compared to commercially available reagents. In addition, 20 minute incubation in 1xPBS resulted in maximal Smad3 knockdown. Smad3 expression increased following VF injury. This response was significantly reduced in injured vocal folds at 4 and 24 hours following injection ($p=0.035$ and 0.034, respectively).

Conclusion. The current study is the first to demonstrate targeted gene manipulation in the VFs as well as utility of lipitoid for localized delivery of genetic material in vivo. Ideally, these data will serve as a platform for future investigation regarding the functional implications for therapeutic gene manipulation in the vocal folds.

The Ability of Conditioned Media from Human Nasal Inferior Turbinate-Derived Mesenchymal Stem Cells to Repair Vocal Fold Injuries

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Background: This study investigated the ability of Conditioned media(CM) from human nasal inferior turbinate-derived mesenchymal stem cell (hTMSC) to repair injured vocal folds. We used quantitative real-time polymerase chain reaction (PCR) to analyze the early phase of wound healing, in xenograft animal models.

Methods: The right-side lamina propria of the vocal fold was injured in 30 rats. Next, CM from hTMSC was injected into half of the injured vocal folds (CM groups). As a control, phosphate-buffered saline (PBS) was injected into the other half of the injured vocal folds (PBS groups). Rat vocal folds were harvested for PCR at 1 week after injury.

Results: In the CM group, PCR showed that procollagen III expression was significantly downregulated compared with the PBS group. hyaluronan synthase, Fibronectin, transforming growth factor(TGF) - β1 and hepatocyte growth factor were upregulated compared with the PBS group, However, the differences did not attain statistical significance.

Conclusions: Injection of conditioned media into injured vocal folds showed anti fibrotic effect in early phase of wound healing. These results provide a foundation for future clinical use of CM for vocal fold regeneration.

Wound Healing after Transoral Angiolytic Laser Surgery for Early Glottic Carcinoma

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Purpose: Wound healing after transoral angiolytic laser surgery for early glottic cancer was analyzed to identify factors influencing healing and clinical significance of persistent granulation tissue.

Methodology: A retrospective review of 100 consecutive patients undergoing endoscopic angiolytic laser surgery for T1 and T2 glottic carcinoma was done. Patients with prior radiation or incomplete data were excluded. Post-operative endoscopies within the first 6 months were analyzed for time to healing, size and location of wound, and oncologic findings. Three blinded, independent raters graded wound appearance and presence of granulation tissue.

Results: Seventy-seven patients healed without need for intervention at a median of 3.5 months. Four patients had office-based ablation of granulation without biopsy and healed. The remaining 19 patients had biopsy for granulation tissue. Wounds that underwent biopsy at >3 months were more likely to contain carcinoma (5/6 patients, 83%) than wounds that were biopsied <3 months (2/13 patients, 15%) (p=0.004). Presence of granulation significantly correlated with resection involving anterior commissure (p=0.02), entire vocal fold length (p=0.03), and depth into muscle (p=0.002). Delayed healing (>3 months) correlated with T2b tumors (p=0.03) and anterior commissure involvement (p=0.04). T1a cancers more commonly healed <3 months (p=0.005). Inter-rater grading agreement was moderate to substantial (?=0.51-0.81).

Conclusion: Most vocal fold wounds heal completely within 3 months after angiolytic laser surgery for early glottic cancer. Larger and deeper wounds are more likely to heal with granulation tissue. Granulation can resolve without surgical intervention; however, granulation present >3 months warrants biopsy due to increased risk of malignancy.

Investigation of Surgical Adhesives for Vocal Fold Wound Closure

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Introduction: Phonosurgical excision of benign vocal fold lesions may result in scar formation, with permanent dysphonia. Surgical adhesives are increasingly used in vocal fold microsurgery to assist in wound closure and reduce the risk of scar formation. Currently used vocal fold adhesives such as fibrin glue, however, have a low tensile strength and are not very effective in promoting wound closure or reducing scarring.

Objectives: To investigate both the mechanical strength and the cellular response to three different surgical adhesives. Methods: Three commercially available adhesives were investigated: Glubran2, BioGlue, and Tisseel. Porcine larynges were harvested immediately post mortem and stored at -80 °C. Shear and tensile traction tests were performed to investigate the adhesive strength of the adhesives following standardized procedures (ASTM F2255-05 & ASTM F2258-05). The tests were performed on 150 larynges in humid conditions at 37°C. The cytotoxicity of the adhesives to immortalized vocal fold fibroblasts (IVFF's) was also investigated.

Results: The results showed that all three surgical adhesives had a higher failure strength under shear loading than under tension loading. The maximum failure strength in shear or tension of the three surgical adhesives ranked from strongest to the weakest was: 1) Glubran2; 2) BioGlue; and 3) Tisseel. Tissel was found to be the least toxic of the three adhesives, while Glugran2 was the most toxic.

Conclusions: Glubran2 was found to have the best adhesive strength, while Tisseel was the least toxic. There seems to be a tradeoff between adhesive strength and toxicity.

Expression of Trophic Factors Receptors during Reinnervation after Recurrent Laryngeal Nerve Injury

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Introduction: Injury of the recurrent laryngeal nerve(RLN), results in synkinetic reinnervation with vocal fold immobility. Netrin-1 and GDNF overexpression is observed in denervated laryngeal muscles, yet the production of their receptors within motoneurons(MN) is unclear. The aim of this study is to evaluate the production of Netrin-1 and GDNF receptors following RLN injury.

Methods: In 32 rats, the right RLN was severed and reanastomosed. The left side was the control. In group 1, dextran amine tracer was applied to the nerve stump. In group 2, cholera toxin (CtB) was injected into the right posterior cricoarytenoid(PCA) (CtB-AF488:green) and thyroarytenoid muscles(TA) (CtB-AF594:red). Brainstems were harvested 3,7,14,21 days post injury(DPI) and immunostained for Netrin-1 receptors (DCC, UNC-5) and GDNF receptors (Ret, GFRα1,2 and 3). The presence of receptors and their position in adductor or abductor MN was analyzed.

Result: Changes in the pattern of Netrin-1 and GDNF receptor production were observed in the ipsilateral MN versus controls following RLN injury. DCC was produced at 3DPI in the TAMN and PCAMN, UNC-5 in PCAMN at 7DPI. All GDNF receptors were expressed in both the PCAMN and TAMN.

Conclusion: Netrin-1 and GNDF receptor production increases after RLN injury. Netrin-1 receptor DCC is attractive and in the PCAMN and TAMN early, while UNC-5 is repulsive and expressed in the PCAMN at 7DPI, the same time when axon innervation ends in the PCA and shifts to the TA. This correlation suggests Netrin-1 may play a role in axon guidance after RLN innervation.

Laryngeal Adductor Function following KTP Laser Welding of the Recurrent Laryngeal Nerve

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Introduction: Recurrent laryngeal nerve (RLN) transection injuries may occur during thyroidectomy and other surgical procedures. Laser nerve welding has been shown to cause less technique-related axonal damage than the traditional suture method. We compared functional adductor results using these two methods of RLN repair.

Method: Canine hemilarynges underwent pretreatment testing of laryngeal adductor function, followed by RLN transection and repair using KTP laser welding (n=8) or microneural suture (n=16) techniques. Six months later, adductor function was measured again and expressed as a proportion of the pretreatment value.

Results: The mean laryngeal adductor pressure ratios were 82.4 ± 13.8% for the laser repair group and 55.5 ± 12.5% for the suture control group ($p<0.001$). Also, both spontaneous and stimulated glottic closure was observed to be tighter in the laser welding group.

Conclusion: Laser nerve welding resulted in greater strength of adduction than suture repair of an acutely transected RLN. This result likely indicates a greater number of axons successfully regenerated across the anastomosis in the laser group. Suture anastomosis may traumatize more axons than the laser. Stronger vocal fold adduction is associated clinically with better protection from aspiration and improved voice outcomes. KTP laser welding should be considered for anastomosis of the RLN and other nerves.

Molecular and Immunologic Analysis of Tumors from Non-Smokers with Laryngeal Squamous Cell Carcinoma

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Background: Laryngeal squamous cell carcinoma (LSCC) is strongly associated with tobacco use, but several studies have identified a cohort of patients without traditional risk factors who nonetheless develop LSCC, suggesting an alternative etiology. The purpose of this study was to compare immunohistochemical markers in tumor specimens from non-smokers and smokers with LSCC.

Methods: Non-smokers with LSCC at Johns Hopkins Hospital between 2003-2013 were stage and age-matched to control smokers with LSCC. A tissue microarray (TMA) was constructed and stained for numerous IHC markers.

Results: The TMA was composed of 14 non-smokers and 20 smokers with LSCC in triplicate samples. The average age of the non-smoking and smoking cohort was 58.4 and 60.0 (p=0.9). Of the 34 total patients, only 5 were p16 positive (3/14 non-smokers; 2/20 smokers). Two of those patients were positive for HPV via in situ hybridization (ISH). There was no correlation between smoking status and p16 (p=0.36) or HPV-ISH positivity (p=0.79). PD-L1 expression did not correlate with smoking status (p=0.27) or p16 positivity (p=0.15). PTEN expression also did not correlate with smoking status (p=0.91) or p16 positivity (p=0.24). Tumors that were p16+ had a higher ratio of CD3+ tumor infiltrating lymphocytes (p=0.005), although there was no correlation with smoking status.

Conclusion: In a stage and age-matched cohort of smokers versus non-smokers with LSCC, there does not appear to be a differential pattern of expression for common molecular and immunologic markers. HPV does not appear to be a major causative etiology in the non-smoking patient with LSCC.

Outcomes of Tracheoesophageal Puncture in Twice-Radiated Patients

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Background: Although previous research has demonstrated the safety of tracheoesophageal puncture (TEP) prosthesis placement in radiated patients, there is a growing population of twice-radiated patients with limited research on the outcomes of TEP-placement in this cohort.

Methods: After Institutional Review Board approval, a retrospective review of 96 patients who underwent TEP prosthesis placement from 2006 to 2017 at University Hospitals Cleveland Medical Center was conducted, of which 18 patients underwent two courses of radiation. Outcome measures included prosthesis removal, return to the operating room, repuncture, and duration of TEP utilization.

Results: Of the 18 patients who underwent re-irradiation, eight (46%) had ultimate removal of their TEP prosthesis with removal occurring at an average of 27.1 months. Reasons for removal included widening tracheoesophageal fistula (n=5), local recurrence (n=2), and dysphagia/esophageal stenosis (n=1). Five patients (28%) required TEP-related surgical intervention. In a comparative cohort of sixty-seven once-radiated patients, eleven (16%) had their prosthesis removed. This was statistically fewer than the twice-radiated group (p=0.009, RRR= 2.7, 95% CI= 1.28- 5.71). Reasons for removal were also different and included patient preference (n=5), persistent leakage (n=2), recurrence (n=2), enlarging tracheoesophageal fistula (n=1), and dysphagia (n=1). Eight patients (12%) required TEP-related surgical intervention (p=0.097). TEP removal occurred at an average of 16 months (p=0.7).

Conclusions: Our study uncovered a significantly higher incidence of TEP prosthesis-discontinuation in twice-radiated patients compared to once-radiated patients. Further characterization of differences in these populations is needed. Alternative means of communication may be more beneficial for this high-risk patient population.

Trans-Oral Tubed Supraglottoplasty: A New Approach to Intractable Aspiration

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Objective: Intractable aspiration can result in aspiration pneumonia and PEG tube dependence. Aspiration often occurs due to residual spillover into the larynx after an incomplete swallow attempt. We present a new supraglottoplasty procedure for the treatment of intractable aspiration by improving the supraglottic laryngeal height.

Material and Methods: Trans-oral tubed supraglottoplasty is performed by suspension laryngoscopy without tracheostomy. The Inter-arytenoid mucosa is incised from the inter-arytenoideus to the aryepiglottic fold. This creates two mucosal flaps. A releasing incision is made on the aryepiglottic fold on each side. The laryngeal side of the supraglottic mucosa is closed using a V- lock running suture. The pharyngeal side of the supraglottic mucosa is closed as a second layer. This procedure raises the posterior larynx wall by 2 cm, thereby reducing spillover and aspiration.

Results: This procedure was performed successfully in nine patients (eight male and one female) with intractable aspiration despite prior procedures. . Average patient age was 76 years (69-82) with an average follow-up period of 20 months (3-60 months). Pre-operative gastrostomy tube was successfully removed in 86 % (6/7) patients.

Conclusion: Trans-oral Tubed Supraglottoplasty is a novel, minimally invasive procedure to improve supraglottic laryngeal height. It can serve as an adjunctive procedure to reduce penetration and aspiration in the elderly with incomplete swallow.

Airway Closure Delay: The Predominant Pathophysiology in Reflux - Associated Dysphagia

Katherine A. Kendall, MD

Introduction: Reflux disease is common in the outpatient population presenting with dysphagia. Despite its prevalence, the impact of reflux disease on oropharyngeal swallowing function is not well defined. This study uses objective measures of swallowing function from modified barium swallow studies to describe the pathophysiology of dysphagia in a group of patients whose only associated condition is reflux.

Methods: The Swallowing Database at the University of Utah was queried for patients with a diagnosis of reflux without additional conditions known to impact swallowing function. Total pharyngeal transit time (TPT), distance of hyoid elevation (Hmax), maximum opening size of the upper esophageal sphincter (UESmax), area of pharynx at maximum constriction (PAmax), the timing of airway closure relative to the arrival of the bolus at the UES, and Penetration/Aspiration (Pen/Asp) score were assessed.

Results: 122 patients met criteria for inclusion in the study. 52 (42%) patients had normal pharyngeal swallowing function. 70 patients (57%) had at least one abnormal swallowing measure and 58 (47.5%) demonstrated a delay in airway closure relative to arrival of the bolus at the UES. The incidence of prolonged TPT, diminished Hmax, poor UESmax, and enlarged PAmax was 2.5%, 8%, 4%, 11.5% respectively. 60% with a delay in airway closure had a normal Pen/Asp score.

Conclusion: A delay in airway closure relative to the arrival of the bolus at the UES is the most common abnormality found in patients with reflux-associated dysphagia and is often not identified by the Pen/Asp score.

Does Dysphagia Improve Following Laryngeal Reinnervation for Treatment of Hoarseness in Vocal Fold Paralysis?

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Introduction: The efficacy of laryngeal reinnervation on voice has been extensively studied, but there is a paucity of literature on its impact on swallowing function. The goal of this study was to investigate the impact of laryngeal reinnervation on swallowing outcomes among unilateral vocal fold paralysis (UVFP) patients.

Method: We reviewed 22 UVFP cases of laryngeal reinnervation from our institution. Thirteen patients had complete datasets, including duration of denervation, Eating Assessment Tool (EAT-10), Reflux Symptom Index (RSI) and Voice Handicap Index (VHI) scores. Wilcoxon signed-rank test was used to compare pre- and postperative scores.

Results: Over the study period, 13 cases (mean age 42.1 ± 14.6 years; 8/13 men) with UVFP underwent ansa cervicalis to RLN anastomosis (9/13) or nerve-muscle pedicle (4/13). The median time between injury and reinnervation was 13.7 months (range 1.2–88.5 months). Twelve patients (92%) had an improved (8/13; 62%) or stable (4/13; 31%) EAT-10 score postoperatively. While the median EAT-10 score improved only modestly, from 3 to 2, this difference was statistically significant ($z = -2.079$, $p < 0.038$).

Conclusion: Even though laryngeal reinnervation is not thought of as a treatment for dysphagia, it is associated with a modest improvement in the EAT-10 score in patients after surgery for hoarseness in the setting of UVFP.

Auditory-Perceptual and Acoustic Evaluation of the Effects of Deep Brain Stimulation on Voice in Dystonia Patients

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Introduction: To determine the effects of Globus Pallidus Interna (GPi) Deep Brain Stimulation (DBS) on voice quality and pitch of patients with primary medically refractory (non-focal) dystonia.

Methods: The voices of fourteen patients aged ≥18 years (males=7 and females=7) with dystonia (DYT1 dystonia=4, cervical dystonia=6, and generalized dystonia=4) who had bilateral GPi DBS were assessed. Three blinded raters (two fellowship-trained laryngologists and one speech language pathologist specialized in voice) evaluated audio recordings of each patient's pre and post-DBS reading of a standardized passage and sustained vowel phonation. Perceptual rating of voice quality was completed using the Grade, Roughness, Breathiness, Asthenia, Strain (GRBAS) scale. Pitch range measurements (Speaking Fundamental Frequency (SF0), Mean Frequency (MF0), and Standard deviation (SD)) were also evaluated. Inter-rater reliability for the perceptual voice rating was assessed using the kappa coefficient.

Results: Perceptual parameters showed significant improvements in Grade ($p=0.0211$), Roughness ($p=0.0011$), and Strain ($p=0.0035$) at 12 months post-implantation. SF0, MF0, and SD all decreased at 6 and 12 months with significant changes in SF0 ($p=0.0139$) and MF0 ($p=0.0098$) at 12 months. Grade and strain were found to have "nearly perfect" and "substantial" inter-rater agreement (0.84 and 0.71, respectively).

Conclusions: Following DBS implantation for dystonia, patients had improvement in voice across several auditory-perceptual parameters. Decreases in pitch measurements were also identified. DBS implantation in the GPi may emerge as a treatment option as we investigate the implications for patients with primary vocal (focal) dystonias.

Laryngeal Botulinum Toxin Injection for Vocal Tremor: The Utility of Concurrent Strap Muscle Injection

Rebecca C. Nelson, MD; Valeria Silva Merea, MD;
Claudio Milstein, PhD; Paul C. Bryson, MD

Introduction: Vocal tremor is an uncommon diagnosis that can be treated with laryngeal botulinum toxin injections (LBTX); we seek to describe our experience with this modality.

Method: Retrospective chart review was performed of all patients with a primary diagnosis of vocal tremor treated with LBTX from 2012 through 2017.

Results: Twenty-one patients were included (mean age 69 years, 100% female). Thirteen patients (62%) had a minor component of spasmodic dysphonia in addition to their tremor. Fourteen patients had vertical and horizontal components to their tremor, and two had horizontal tremor alone. The remaining five patients did not have clear characterization of their tremor. A total of 50 injections were reviewed (26 thyroarytenoid (TA), 24 thyroarytenoid and strap muscle (TA+S)) and patients reported subjective voice benefit with 48 of these (96% overall, 92% TA, 100% TA+S). When available, the postprocedural change from baseline Voice Handicap Index-10 (VHI-10) and Consensus Auditory Perceptual Evaluation of Voice (CAPE-V) scores were calculated (mean -2.5, -6.9 overall; -3.6, -2.9 TA; -1.5, -10.3 TA+S) and indicated improvement. Subjective patient improvement ratings (scale 0-100%) were obtained for 47 injections, with a mean of 70% improvement per injection. Of patients with both horizontal and vertical tremor (31 injections), outcomes were improved with TA+S injection vs TA alone (mean improvement 74% vs 35%, p=0.005).

Conclusions: There is utility in the characterization of vertical and horizontal components of vocal tremor. Patients with both have increased benefit with injection of strap muscles in addition to thyroarytenoid muscles.

Rejuvenation of Aged Larynx with Alginate/Hyaluronic Acid Hydrogel Which Release Basic Fibroblast Growth Factor (Bfgf) Slowly

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As we enter into an aging society around the world, patients with laryngeal atrophy and dysfunction are increasing. Patients with decreased laryngeal function have symptoms of voice change, dysphagia, and aspiration pneumonia, which not only decrease the patient's quality of life, but also affects their lives. Although injection laryngoplasty has been widely performed for the treatment of glottic insufficiency, it cannot recover intrinsic microstructure of vocal fold. Thus, we fabricated an injectable alginate/hyaluronic acid hydrogel loaded with bFGF for inducing rejuvenation of aged laryngeal muscle. We fabricated bFGF–loaded alginate/hyaluronic acid hydrogel for injection laryngoplasty and identified bFGF release profile from the hydrogel. After 1 month and 3 months of injecting the hydrogel into laryngeal muscle of 18-month-old rat, rejuvenation efficacy of the bFGF-loaded hydrogel was evaluated by qPCR, histology, immune-fluorescence staining and functionality analysis. bFGF-loaded hydrogel induced an increase in expression of myogenic regulatory factor-related genes, decrease of interstitial fibrosis, hypertrophy of muscle fiber, proliferation of muscle satellite cells, and angiogenesis. In addition, bFGF-loaded hydrogel led successful vocal-gap-closure in the functionality analysis using high-speed camera. Therefore, bFGF-loaded alginate/hyaluronic acid hydrogel can be an excellent candidate for laryngoplasty with therapeutic effect for the rejuvenation of aged larynx.

Geriatric Dysphonia: Different Diagnoses in Different Cohorts of Older Adults in a Specialty Voice Clinic

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Objectives: An aging population has increased focus on geriatric otolaryngology. Recent gerontology literature emphasizes that physiologic differences between young-old (65-74), middle-old (75-84), and old-old (>85) patients mean that patients ≥65 years are not a uniform population. This study evaluates differences among dysphonia patients ≥65 relative to diagnosis and voice-related quality-of-life (VRQOL).

Methods: A retrospective chart review of all new patients ≥65 presenting to a University-based specialty voice center between April 2015-March 2017 identified chief complaint, diagnosis, and self-reported voice handicap. Analysis evaluated diagnoses and VRQOL as functions of patient age.

Results: Of 841 new patients ≥65, 461 reported chief complaint of dysphonia. Of these, 91 (19.7%) had diagnosis of vocal fold atrophy. When comparing the oldest half of this cohort (age =73) to the youngest half (age <73), older patients were more than twice as likely to have vocal fold atrophy; younger patients were more than twice as likely to have neurologic dysphonia and 1.7 times as likely to have benign vocal fold lesions (Pearson chi-square, p=0.002). Linear regression found that every additional year of age increased odds of vocal fold atrophy by 6% (OR 1.10, 95% CI 1.02-1.10), but decreased odds of benign lesion by 5% (OR 0.95, 95% CI 0.90-0.99). VRQOL scores were similar across young-old, middle-old, and old-old.

Conclusions: Dysphonia patients =65 are not a uniform group, and important differences exist in diagnosis as a function of age. Knowledge of these differences may inform further investigations in the growing field of geriatric otolaryngology.

High-Resolution in Vivo Coronal Cross-Sectional Imaging of the Vocal Folds during Phonation using Long-Range Optical Coherence Tomography: First Report of a Novel Diagnostic Tool to Evaluate Vocal Fold Morphometry and Kinematics

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Objectives: Current functional laryngeal imaging modalities including mirror laryngoscopy, flexible fiberoptic or rigid endoscopy ± stroboscopy and HD high-speed video are limited to analysis of structural features and mucosal wave kinematics at the vocal fold (VF) surface only. To date, descriptive analysis of in vivo human VF motion in the coronal cross-sectional plane has not been reported. We present the use of vertical cavity surface-emitting laser (VCSEL) optical coherence tomography (OCT), a micrometer-resolution imaging modality to accomplish this task.

Methods: We constructed a swept-source VCSEL OCT system to perform transoral laryngeal imaging in healthy adult patients. A Python-based algorithm was designed to automatically segment and measure VF epithelial and lamina propria thickness, vibrational frequency and VF displacement along the vertical component of the mucosal wave during native phonation. Measured vibrational frequencies were compared with frequency estimated by stroboscopy.

Results: Twenty-one patients underwent laryngeal OCT imaging. Mean epithelium and lamina propria thicknesses were 220 μm (±80 μm) and 860 μm (±260 μm) respectively. Mean male and female measured vibrational frequencies were 128 Hz ($p=0.03$) and 273 Hz ($p=0.08$); male vibrational frequencies were noted to be significantly correlated with measured stroboscopy frequency. Average vertical displacement of the VF during phonation was 1.86 mm.

Conclusions: VCSEL OCT is a novel, in vivo diagnostic imaging modality which allows for objective analysis of VF substructure, surface displacement within the vertical mucosal wave and vibrational frequency. OCT has an immense potential to aid Otolaryngologists in visualizing the subepithelial VF architecture while providing comprehensive kinematic analysis of VF vibration. Future OCT studies may be directed at evaluating functional VF properties in benign and malignant morphologic disease processes of the larynx.

Unearthing a Consistent Bilateral R1 Component of the Laryngeal Adductor Reflex in Awake Humans: A Stride Forward in Our Understanding of Laryngeal Pathophysiology

Catherine F. Sinclair, MD; Maria Tellez, MD;
Andrew Blitzer, MD, DDS; Sedar Ulkatan

Introduction: The laryngeal adductor reflex (LAR) is an essential tracheobronchial protective mechanism resulting in vocal fold adduction to laryngeal stimulation. It was thought to consist of an early ipsilateral R1 component and a later, bilateral but highly centrally modulated R2 component. We recently demonstrated that bilateral R1 responses are robustly present in humans under general anesthesia. We herein give evidence that the R1 response is also bilateral in awake humans and is likely the primary component responsible for initiating the LAR.

Method: Prospective series of 7 volunteers (3 males, 4 females). The reflex was initiated by direct percutaneous monopolar needle stimulation of the internal superior laryngeal nerve. ElectromyographicElectromyography traces from bilateral lateral cricoarytenoid muscles were recorded using hookwire electrodes. Reflex responses to variations in stimulus intensity and duration were evaluated.

Results: Bilateral R1 responses were recorded in all patients, even during deep inspiration when the vocal folds were maximally abducted. R1, but not R2, responses increased linearly in amplitude with sequential increases in both stimulation intensity (1mA to 8mA) and duration (100-500µsec) (Pearson correlation 0.94).

Conclusions: Contradicting over forty years of research, we demonstrate that the R1 LAR component is consistently bilateral in awake humans. It increases linearly with stimulus intensity and is unaffected by conscious state suggesting minimal central control. These findings may provide a means to objectively risk stratify patients for risk of laryngeal aspiration, even in unconscious states, and its potentially cardinal role in disease states such as laryngospasm and sudden infant death needs to be reevaluated.

Chemical Receptors of the Larynx: A Comparison of Human and Mouse

Marie Jette, PhD; Clary, MD; Jeremy Prager, MD; Thomas Finger, PhD

Introduction: The larynx is a highly responsive sensory organ that is subject to mechanical, thermal, and chemical stimuli. Chemosensory cells, including taste cells that make up taste buds, detect chemical stimuli and elicit sensory responses that likely vary based on location. These cells have been identified in the larynx of humans and animals and are believed to elicit cough, swallow, and apnea when stimulated by sour, bitter, and sweet chemicals. Solitary chemosensory cells (SCC) are chemical detectors that have been identified in the murine trachea, but little is known about their presence in laryngeal tissue. In the nasal cavity of mice, SCCs induce neurogenic inflammation when stimulated by irritants. As a first step toward developing a laryngeal model of neurogenic inflammation, we sought to map the distribution, density, and types of chemosensory cells and nociceptive polymodal nerve fibers in laryngeal epithelium.

Methods: Using immunohistochemistry, we identified taste cells and polymodal nociceptive nerve fibers in the arytenoid area of the laryngeal epithelium of 20 infants undergoing supraglottoplasty for airway obstruction and/or laryngomalacia. We then compared these findings to mouse.

Results: Arytenoid tissue from both human and mouse contained numerous taste buds comprising primarily Type II (bitter, sweet, umami-sensing) taste cells with few Type III (sour-sensing) cells present. The tissue was also densely innervated in both species.

Conclusions: Our findings suggest that human and mouse larynges are biologically similar from a chemosensation standpoint. This suggests that a murine model could be used in laryngeal chemosensory research going forward.

A Novel Means of Evaluating Laryngeal Myoelectric Activity Through High Density Surface Electromyography: An Intuitive Visualization Method of Laryngeal Muscle Activity

David Bracken, MD; Philip Weissbrod, MD; Todd Coleman, PhD; Gladys Omelas, BS

Laryngeal muscle activation is a complex dynamic process. Currently, surface or needle electromyography is used for evaluation of laryngeal motor unit activity. Practical limitations exist for needle electromyography including patient discomfort, technical complexity, and short duration of task. Surface electromyography (sEMG), although non-invasive, demonstrates loss of spatial selectivity and challenges associated with electrical noise. This study presents a novel use of high-density sEMG arrays and signal analysis techniques. A 16-channel electrode grid was developed to allow for acquisition of spatially and temporally associated sEMG data. Ten subjects were recruited to perform phonatory and swallowing tasks with the array in place. EMG data was recorded and processed into a two- dimensional coronally oriented heat map to correlate with anatomic position of extrinsic laryngeal musculature. With this method, we were able to accurately delineate cricothyroid and strap muscle location and degree of activity. This pilot study suggests that noninvasive high-density sEMG has a compelling potential in diagnosis and therapeutic monitoring for voice and swallow applications.

Permeability and Weibel-Palade Bodies of the Blood Vessels in the Human Vocal Fold Mucosa

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Introduction: Transendothelial exchange and permeability of the capillaries in the superficial layer of the lamina propria (Reinke's space) of the vocal fold mucosa affect physiological and pathological conditions of the human vocal fold mucosa. The mechanism of permeability and Weibel-Palade bodies of the blood vessels in the human vocal fold mucosa were investigated using electron microscopy.

Method: Six normal human vocal folds (three adults and three newborns) obtained from autopsy cases and three human vocal folds with Reike's edema from surgical specimens were investigated under transmission electron microscopy. Thin sections were stained with uranyl acetate and lead citrate.

Results: There were three possible capillary wall transport systems related to the permeability of the blood vessels in the vocal fold mucosa: 1. Fenestra transport-plasma exuded from the capillaries into surrounding tissue via the fenestrae with or without a diaphragm. 2. Vesicular transport (transcellular transport via vesicles)-the use of vesicles to ferry fluid and solutes across endothelial cells. 3. Junctional transport (intercellular transport)-molecules passed through intercellular gaps between endothelial cells. Weibel-Palade bodies were present in the cytoplasm of endothelial cells both in adults and newborns. They were present in high numbers in the cytoplasm of endothelial cells with intercellular transport in the vocal folds with Reike's edema.

Conclusion: There were three types of mechanisms for the permeability of the blood vessels in the human vocal fold mucosa. Some physiologically active substances such as histamine produced by Weibel-Palade bodies may adversely influence the permeability of the blood vessels.

Anesthesia and Ventilation Options for Flex Robotic Assisted Laryngopharyngeal Surgery

Yosef Krespi, MD; Robert Koorn, MD; Victor Kizhner, MD

Background: During laryngopharyngeal surgery, an endotracheal tube is often placed to ensure safe anesthesia. This may interfere with surgery by impeding vision and/or distorting soft tissue. Conversely the absence of a secured airway introduces risk. The Flex Robotic System (FRS) with 3D camera and instrumentation provides ideal operating conditions combined with safe airway management. We present our experience utilizing the FRS in the shared airway setting.

Methods: Case series describing over 50 patients with laryngopharyngeal conditions treated with FRS over the course of two years.

Results: We describe various intubation options including oral intubation, nasal intubation and the innovative jet ventilation while performing effective FRS surgery. In the case of jet ventilation, a jet needle was placed through a modified instrument port allowing unobstructed ventilation. An algorithm was developed for selecting the ideal ventilation mode for different airway procedures, with specific guidelines described depending on surgical target: a) no tube or jet ventilation (10% of patients), b) nasal (70%) or c) oral intubation (20%).

Conclusions: Lesions of the tongue base, hypopharynx, larynx and trachea have the possibility to be managed transorally utilizing an innovative robotic high definition camera with various ventilation techniques. This ultimately allows the surgeon and anesthesiologist to perform surgery and monitor the critical airway simultaneously. Future additions of a third instrument port would allow ability to jet ventilate and perform these procedures bimanually with high precision.

Are Perioperative Antibiotics Necessary during Direct Microlaryngoscopy?

Sunil Verma, MD; Megan Yetzke, BS; Valeria Silva Merea, MD;
Richard Heyes, MD; Matthew Clary, MD; David Lott, MD; Paul Bryson, MD

Introduction: Despite being one of the most commonly performed procedures, there are currently no established recommendations for the use of perioperative antibiotics (PA) to prevent surgical site infections (SSI) for direct micro-laryngoscopy (DML). This study examined the incidence of SSI in patients undergoing DML with and without PA.

Methods: A retrospective, multi-institutional chart review was performed at four tertiary referral academic medical centers. Patients undergoing DML from 2010-2017 were identified using CPT codes. Medical records of patients undergoing DML with biopsy, microsurgery, laser ablation or vocal fold injection were reviewed. Procedures with significant cartilage destruction, concurrent open surgery, or esophageal surgery were excluded. Patients with no follow-up were excluded. Data recorded included age, gender, pacemaker history, ASA class, wound class, indication for surgery, use of laser, complications, ER visits, hospitalization, pain, fever, and postoperative steroid and antibiotic prescriptions. Presence and absence of SSI was recorded.

Results: 725 patients met inclusion criteria. 617 did not receive PA and 108 received PA. Patients on average were 56 years of age and all cases were recorded as wound class II. 59% of surgeries involved use of carbon dioxide or KTP laser. 0.7% of patients reported post-operative fevers; all of these individuals received PA. There were no SSIs in either patient group.

Conclusions: Given the absence of SSIs in this large retrospective study, PA are not warranted during DML.

The Glottis Is Not Round: A Novel, Anatomically Appropriate Dilatation Method for the Treatment of Early Posterior Glottic Stenosis

Daniel J. Cates, MD*Hailun Wang, MD; Libby Smith, DO; Clark A. Rosen, MD

Introduction: Posterior Glottic Stenosis (PGS) results in severe derangement of laryngeal configuration and function with significant morbidity as a sequalae. Presently there is no treatment for patients with "early" PGS. Dilation is often used for stenotic disease but present dilation methods are limited to a round shape and the glottis is a sector (inverted ice cream cone). Round dilation of the larynx results in compression of the membranous vocal folds (with potential for injury) and minimal expansion of the posterior larynx. We present a novel laryngeal dilation method that matches the unique anatomic shape of the glottis.

Methods: We present a clinical series of early PGS patients treated with a unique laryngeal dilation method. Five patients with dyspnea and significantly reduced vocal fold mobility due to early PGS were treated with a dilation method that involves placement of a triangular static stent in the anterior glottis with simultaneous use of a round balloon dilator in the posterior glottis.

Results: All patients reported improved ease of breathing, a decrease in their dyspnea index score and were decannualated following treatment. Video perceptual analysis of pre/post-laryngoscopy examinations was performed with five blinded reviewers and all patients were scored to have improved posterior glottic airway space following treatment with a mean improvement of 2.4 on a 5-point scale.

Table 3: Pulmonary Function Results (Patient C)

Parameter	Pre-op	Post-op
FVC (L)	2.10	3.43
FEV1 (L)	1.29	2.53
FEV1 / FVC	0.61	0.74
FEF25-75% (L/s)	1.12	2.21
PEFR (L/s)	1.27	3.39
Vext (%)	1.73	3.24

Conclusion: These clinical results demonstrate that there is enormous potential for the identification and treatment of patients with early PGS and the use of a laryngeal dilation technique that matches the anatomic configuration of the glottis.

Anatomic Considerations for a Posterior Endoscopic Approach to the Cricoarytenoid Joint

Michael Z. Lerner, MD; Sherry Downie, PhD;
Melin Tan-Geller, MD

Introduction: While the neuromuscular forces responsible for vocal fold motion have been studied extensively, the joint upon which they act continues to receive relatively little attention. An improved understanding of CAJ anatomy with an emphasis on surgical access might broaden clinical applications beyond steroid injection for arthritis. This anatomic study considers the feasibility of a posterior endoscopic approach to the CAJ by describing relationships between readily identifiable anatomic landmarks and the posterior CAJ space in cadaver larynges.

Methods: 6 adult cadaver larynges (2 male, 4 female) were studied. Digital calipers were used for measurements and Image J software was used for angle calculations. All cricoarytenoid joints were injected with colored-gel via a posterior approach using a 25-gauge needle.

Results: The average age of the larynges studied was 78.7 ± 10 years. The average posterior CAJ space (pCAJs) length measured 4.95 ± 0.9 mm. The average distance from the superior aspect of the midline cricoid lamina (MCL) to the center of pCAJs and the corniculate cartilage (CC) to the center of the pCAJs were 8.35 ± 1.5 mm and 14.54 ± 1.9 mm, respectively. The average pCAJs angle of declination (AD) from the horizontal plane was 54 ± 6.2 degrees. All 12 cricoarytenoid joints were successfully injected with colored-gel via a posterior approach.

Conclusions: The posterior CAJ space can be located surgically using readily identifiable anatomic landmarks. An understanding of this posterior CAJ anatomy may allow for more consistent intra-articular injection and support the development of other CAJ procedures for a range of disorders of vocal fold motion or malposition.

Surgical Treatment of Glottic Web using Butterfly Mucosal Flap Technique: Experience on 12 Patients

Taner Yilmaz, MD

Introduction: Many surgical methods have been described for treatment of glottic web with very little experience on each. Butterfly mucosal flap technique utilizes superior and inferior mucosal flaps on corresponding surfaces of the web; superior flap is elevated with its base on one vocal fold and inferior flap is elevated with its base on the other vocal fold. These flaps are sutured to the vocal fold where flap's base is located. This requires 4-6 microsutures. The disadvantage of this technique is its difficulty. Its advantages are single stage, endoscopic, outpatient surgery and high success rate.

Methods: This is an individual prospective cohort study. All consecutive 12 cases of glottic web were treated with butterfly mucosal flap technique and followed for at least 1 year postoperatively. Voice Handicap Index (VHI-30) including physical, functional, emotional and total scores, acoustic analysis with /a/, aerodynamic measures and respiratory function tests with a spirometer were determined pre- and postoperatively.

Results: Six patients were male, 5 were female and one was male-to-female transsexual. Their ages ranged between 9 and 60 with a median of 32. Eleven webs were caused by surgical trauma and one was congenital. All webs were cured with one surgery. The postoperative VHI scores, acoustic analysis results, aerodynamic measures and respiratory function test results of patients improved significantly postoperatively ($p<0.05$).

Conclusion: Although technically difficult, butterfly mucosal flap technique is a very successful single stage, endoscopic surgical option for treatment of glottic webs.

A Novel Laryngoscope with an Adjustable Distal Tip

Adam Honeybrook, MBBS; Walter Lee, MD; Seth M. Cohen, MD, MPH

Introduction: Various laryngoscopes are currently available for both laryngeal and proximal esophageal exposure, yet, none allow for articulation of the laryngoscope distal tip. We sought to create a new laryngoscope to improve anatomical exposure.

Methods: 3D printed plastic/titanium prototype designs were created using Solidworks™. Validation testing was performed in a cadaveric model. Optimal exposure of the cadaveric larynx was determined by ensuring the tip endoscope was exactly 3.5cm from the level of the vocal cords. The prototype exposure (22cm adjustable tip laryngoscope) was compared to the Weerda® (18cm distending laryngoscope) and Dedo® (18cm operating laryngoscope) laryngoscope exposures. Anteroposterior (AP) and lateral (L) exposure measurements were obtained from analysis of endoscopic images. Objective millimeter quantification was performed by pixel calibration to the known width of the vocal cord (Bersoft®).

Results: The prototype provided 77.3mm anteroposterior and 40.6mm lateral exposure of the cadaveric larynx and supraglottis. These measurements were then compared to the exposure provided by the Weerda (49.9mm AP, 40.4mm L) and Dedo (15.7mm AP, 18.6mm L) laryngoscopes. The investigators found the prototype had similar handling characteristics to the Weerda laryngoscope and laryngeal instrumentation was enhanced due to a wider distal field of view.

Conclusion: The prototype laryngoscope provided superior laryngeal exposure when compared to the Weerda and Dedo laryngoscopes in a cadaveric model. As this laryngoscope has the advantage of distal tip adjustability, we anticipate it will be particularly useful for performing endoscopic zenkers diverticulostmy procedures. Further clinical testing is required to ensure safety and validate its effectiveness in proximal esophageal procedures.

POSTER PRESENTATIONS

A Novel Silk Based Vocal Fold Augmentation Material: 6-Month Evaluation in a Canine Model

Thomas J. Carroll, MD; Christopher P. Gulka, PhD; Joseph E. Brown, PhD; Jodie E. M. Giordano, PhD; Jennifer E. Hickey, BS; Maria P. Montero, BS; Anh Hoang, PhD

Objectives: Ideal vocal fold augmentation materials should be safe, biocompatible, delivered through small gauge needle, available "off the shelf" and allow tissue integration for long term effect, if desired. This remains an unmet need, and a novel silk/hyaluronic acid (Silk/HA) material has been developed specifically for vocal fold augmentation. This paper presents the 6-month, pre-clinical findings of a canine vocal fold injection trial for Silk/HA.

Materials and Methods: In vivo canine study. Twenty-four 4-6-month-old beagle dogs were injected transorally in the lateral/deep aspect of their right thyroarytenoid muscles with 0.3 ml of the designated material. 12 were injected with Silk/HA and 12 with calcium hydroxylapaptite. Silk particles were delivered via a custom catheter and calcium hydroxylapatite was delivered through a commercially available 25 cm needle. All 24 dogs were briefly anesthetized at 3 months for photodocumentation and gross appearance. Six dogs from each material group will be sacrificed 6-months from injection date for evaluation of implant longevity, immune response, and collagen typing of deposited matrix within the implants.

Results: Acknowledging our data is incomplete at abstract review, we offer separate report of 2 spare dogs that were also injected per the same protocol but sacrificed at the 2-month time point. The implant did not elicit any adverse reaction or migration at that time. Grossly, at 3 months, both materials were present and exhibited no gross inflammation.

Conclusions: The 6-month time point is December 2017. Tissue response, migration, and collagen ingrowth typing to differentiate scar vs. healthy collagen will be reported.

A Simple Hybrid Technique for Difficult Intubations: Combining Video Laryngoscopy with Flexible Fiberoptic Intubation

Casey Hay, MD; Michelle Fincham, MD; Joseph Mucarella, DO

Introduction: The incidence of difficult intubation in the operating room ranges from approximately 1-4% and results in failed attempts at intubation in up to 0.35% of the time. We will discuss the combined use of video laryngoscopy and flexible fiberoptic intubation to quickly and safely secure the airway in patients with presumed difficult airways.

Methods: The video laryngoscope is obtained and an endotracheal tube is placed into position over a flexible endoscope. The video laryngoscope is used by one provider to obtain the best possible view of the glottic opening and then the endoscope is used by a second provider as a flexible stylet to access the trachea. The VL view is used to help guide the endoscope into the trachea; the endoscope camera feature is not utilized, but is available if necessary. Once inside the trachea, the ETT can be advanced and intubation is achieved.

Results: Anectodally, this technique has been performed at least 100 times over the past 10 years and there has been no associated morbidity or mortality.

Conclusion: This technique is a simple and efficient technique that can convert a difficult airway case into a successful intubation within seconds. Knowledge of this technique could increase the success rate of noninvasive intubation of airways and decrease the number of surgical airways, which require much more post-procedure care and result in increased morbidity for the patient.

Aerodynamic Changes in Patients with Chronic Cough Treated with Cough Suppression Therapy

Jim Yang, BA; Thomas Murry, PhD; Brianna Crawley, MD; Priya Krishna, MD, MS

Objective: Voice therapy has been suggested as the choice of treatment for patients with chronic cough. However, the voice aerodynamic parameters that may account for improvement in cough symptoms have not been well studied. The purpose of this study was to determine the changes in the aerodynamic parameters of phonation and self-ratings of cough severity following cough suppression therapy.

Methods: Chart review was conducted for 14 patients with long term chronic cough (>6 months) refractory to various medical treatments, who received from 2 to 4 visits of cough suppression therapy over a 5-month period. Sessions consisted of breathing modification exercises such as reported in the literature1. Aerodynamic parameters including mean peak estimated subglottal air pressure, mean airflow during voicing, aerodynamic resistance, and maximum phonation time (MPT) were obtained before and after therapy. Patients also completed the Cough Severity Index (CSI).

Results: Fourteen patients (M:F=3:11), mean age 62 (range=28-78) had significant CSI improvement from 18.1 to 9.7 ($p=0.0003$) after cough suppression therapy. Mean estimated subglottic air pressure decreased significantly from 8.02 to 6.61 cmH2O ($p<0.05$). MPT increased significantly from 12.7s to 19.8s ($p<0.05$). Laryngeal airway resistance decreased from 64.4 to 46.6 cmH2O/cc/sec though not statistically significant.

Conclusion: This investigation provides evidence that reduced mean estimated subglottic air pressure and MPT are associated with symptomatic improvement in chronic cough. These objective changes in aerodynamic measures support the use of cough suppression therapy for chronic cough patients, especially those refractory to other treatments. Key words: chronic cough, behavioral treatment, cough severity index

Application of Thulium Laser as an Office Procedure for the Treatment of Vocal Cord Polyps

Elie Khalifee, MD; Abdul-Latif Hamdan, MD, EMBA, MPH

Introduction: This is a retrospective chart review reporting voice outcome measures following the application of Thulium laser as an office based procedure in the treatment of vocal fold polyps.

Material and Method: Demographic data includes age, gender, smoking, and alcohol intake. Both subjective and objective voice outcome measures are reported. Subjective measures include Voice Handicap Index-10 and perceptual evaluation using GRBAS system. Objective measures include extent of disease regression and laryngeal video stroboscopic findings, namely glottic closure and extent of mucosal waves.

Results: A total of 20 patients with vocal fold polyps who underwent unsedated office based laser therapy using Thulium laser (Power 3.5-4.5W pulsed mode) were included. All patients had subjective improvement in voice quality associated with partial or complete regression of their lesions on endoscopy.

Conclusion: Thulium laser can be used as an office procedure for the treatment of vocal fold polyps.

Aspiration Prevention and Swallowing Evaluation before and after Injection Medialization Laryngoplasty for Acute Vocal Fold Immobility – Our Experience and Suggested Protocol

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Introduction: The morbidity of glottic insufficiency resulting from unilateral vocal fold immobility (UVFI) may significantly compromise postoperative recovery in patients with decreased pulmonary reserve or inability to protect their airway. Early recognition allows earlier intervention by means such as vocal fold (VF) medialization or speech pathology maneuvers to improve the voice and lower rates of swallowing dysfunction and potential pneumonia. There is limited literature and no accepted protocol for swallowing evaluation before and after VF medialization.

Methods: Retrospective review of patients undergoing injection medialization laryngoplasty for acute UVFI (<30 days) at a tertiary academic center. Records were reviewed for demographics, clinical characteristics, procedural details, and short-term outcome measures of oral intake. Only patients who had instrumental swallowing studies both before and after the procedure were included. An extensive literature review was done.

Results: A total of 285 patients with documented UVFI, swallow evaluation, and VF injection were identified. Only 18 patients met the inclusion criteria and had data on swallowing studies before and after injection. Seventy percent were found with safe swallowing study following the injection and had their diet advanced to adequate oral intake. No complications were noted, and all patients were able to tolerate awake, bedside injection.

Conclusions: Acute UVFI following surgery requires immediate diagnosis and therapeutic strategy to minimize postoperative complications and to overcome impairments in the voice, swallow, and cough. An interdisciplinary assessment protocol is suggested based on our experience and extensive literature review. Further research is needed on the immediate outcomes of bedside medialization injection.

Association of Pepsin and Inflammatory Mediators in Patients with Clinically Suspected Laryngopharyngeal Reflux

Karen M. Kost, MD; Nicole Li-Jessen, PhD; Hao Fu, MEng, PhD; Xiyu Liu, PhD

Introduction: Laryngopharyngeal reflux (LPR) affects as much as 40% of population in North America. The nonacid gastric content, notably pepsin, is the major agent causing symptoms of LPR. In addition to pepsin, proinflammatory cytokines are implicated in the inflammation of esophageal mucosa related to reflux. Pepsin has been shown to enhance the expression of proinflammatory cytokines in pharyngeal epithelial cell cultures. However, the association of pepsin and proinflammatory cytokines in LPR has not been prospectively studied in humans.

Purpose of the Study: This study was to investigate the association of pepsin and two inflammatory cytokines (interleukin [IL] 1-beta and tumor necrosis factor [TNF]-alpha) in laryngeal surface secretions from individuals with clinically suspected LPR and asymptomatic controls.

Methods: Nine clinically suspected LPR patients and nine asymptomatic individuals were recruited to this study. The diagnosis of suspected LPR was based on the Reflux Symptom Index (RSI) greater than 13 and clinical symptoms associated with LPR. Laryngeal surface secretions were sampled and subjected to enzyme-linked immunosorbent assays for protein quantification of pepsin, IL-1β and TNF-α.

Results: Concentrations of pepsin were significantly higher in LPR group compared to controls ($t = -2.52$; $p < 0.05$). Levels of IL-1β and TNF-α were not statistically different between the two groups. Correlations among these three biomarkers were statistically insignificant in the LPR group as well.

Conclusion: Pepsin appears to be the strongest biomarker to differentiate LPR and controls. However, the presence of pepsin might not indicate detectable laryngeal inflammation in patients with clinically suspected LPR.

Automated Indentation Mapping of Vocal Fold Structure and Cover Properties Across Species

Gregory R. Dion, MD; Jean-Francoi Lavoie, PhD; Paulo Coelho, DDS, PhD; Milan R. Amin, MD; Ryan C. Branski, PhD

Objectives/Hypothesis: Various animal models have been employed to investigate vocal fold (VF) and phonatory function. However, biomechanical testing techniques to characterize vocal fold structural properties vary and have not compared critical properties across species. We adapted a non-destructive, automated indentation mapping technique to simultaneously quantify VF structural properties (VF cover layer and intact VF) in commonly used species based on the hypothesis that VF biomechanical properties are largely preserved across species.

Study Design: Ex vivo Methods. Canine, leporine, and swine larynges (n=4 each) were sagittally bisected, measured, and subjected to normal indentation mapping (indentation at 0.3mm; 1.2mm/s) with a 2mm spherical indenter to quantify normal force along the VF cover layer, structural stiffness, and displacement at 0.8mN; 2-D maps of the free VF edge through the conus elasticus were created for these characterizations.

Results: Structural stiffness was 76.34mN/mm (1.47-730.59) for leporine, 24.30mN/mm (1.96-409.15) for canine, and 14.21mN/mm (5.49-44.69) for swine. For each species, the lowest values were along the free VF edge (mean ± SD; leporine: 3.90±2.08mN/mm, canine: 11.15±4.83mN/mm, swine: 8.72±2.79mN/mm). Similar results were obtained for the cover layer normal force at 0.3mm. On the free VF edge, mean (SD) displacement at 0.8mN was 0.24mm (0.05) in leporine, 0.12mm (0.05) in canine, and 0.13mm (0.03) in swine.

Conclusions: Automated indentation mapping yielded reproducible biomechanical property measurement of the VF cover and intact VF. Divergent VF structural properties across canine, swine, and leporine species were observed.

Classification of Voice Disorders using Deep Learning Models

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Yusuke Okanoue, MD; Seiji Oyagi, MD; Hiroki Kagoshima, MD; Kazuhiko Shoji, MD, PhD

Introduction: Auditory-perceptual voice analysis is the gold standard for the quantification of overall voice quality, but perceptual ratings are based on subjectivity and there remains the issue of rating variation by examiner. Many acoustic parameters have been studied to evaluate severity of dysphonia objectively. However, because the interpretation of acoustic parameters measured in each individual case is difficult, the technique is not widely used by clinicians. Furthermore, level of excellence as an objective index of hoarseness is paradoxically measured by correlation with subjective evaluation. The aim of this study was to establish standardized methods to discriminate GRBAS (Grade, Roughness, Breathiness, Asthenia, Strain) scale of voice samples directly using deep neural network.

Method: We used voice waveforms or time-frequency frames as the input to the model, and investigate convolutional neural network (CNN) models with some different designs of convolution filters or network structures. Sustained vowel phonation samples recorded through voice acoustic analysis of voice disorder patients were rated using GRBAS scale by otolaryngologists. They were preprocessed appropriately according to respective models, then used to train neural network and to evaluate model performance by cross validation.

Results: The classification accuracy of the currently available best model is 73.5% with our test data.

Conclusion: We think the test results are acceptable. We are continuing this research to make the problem clearer of this method and aim for better outcomes sufficient to use this method as the replacement of human judgment in clinical or research use.

Clinical Implications of Reinke's Edema

Raluca Tavaluc, MD; Howie Herman, MS; Paul Bryson, MD; Michael S. Benninger, MD; Juan Lin, PhD; Melin Tan, MD

Introduction: Reinke’s edema (RE) is a benign disease of the vocal folds with a wide spectrum of clinical severity. Clinical implications of RE grading have not yet been elucidated. We aim firstly to evaluate the clinical impact of RE and secondly to determine if RE grade correlates with severity of dysplasia and tobacco exposure.

Methods: Patients diagnosed with isolated RE between December 2010 and December 2014 were retrospectively reviewed. RE grade was determined from archived laryngeal videostroboscopy (LVS) exams. Grade of dysplasia and tobacco history were extracted from medical records.

Results: Of 120 lesions, 49 (33%) lesions were grade 1, 35 lesions (29%) were grade 2, and 18 (15%) were grade 3 and 9 (7.5%) were grade 4. Those patients with RE grade 3 or higher proceeded to surgery 82% of the time. Patients with smaller lesions as determined by RE grade underwent surgery 35% of the time. Of those undergoing surgery, 62% of specimens had no dysplasia on pathologic evaluation. No statistical correlation was identified between RE grade and severity of dysplasia. Furthermore, no statistical correlation was seen between tobacco exposure and severity of dysplasia or RE grade.

Conclusions: Treatment for RE has classically been indicated for dysphonia; however, our study population reveals that patients are more likely to proceed to surgical intervention when the size of the lesion is larger and potentially obstructive. Severity of dysplasia neither correlates with RE grade nor tobacco exposure.

CNS Multiple Myeloma Presenting as Isolated Bilateral Vagal Palsy: An Unusual Case of Dysphonia and Dysphagia

Amit A. Patel, MD

Introduction: Involvement of the CNS in multiple myeloma (MM) is very uncommon; it has been observed in approximately 1% of MM patients. We present a case of CNS MM presenting as bilateral vagal palsy leading to dysphonia and dysphagia.

Methods: Case Report/Literature Review Case Report: A 62 F who was diagnosed with MM 3 years ago was treated with autologous SCT followed by maintenance chemotherapy. She then developed acute onset breathy dysphonia, hypernasal speech, and dysphagia. Laryngoscopy revealed symmetric palate weakness and bilateral vocal fold immobility with aspiration, suggestive of a bilateral vagal palsy. CSF analysis revealed plasma cells, diagnostic of CNS multiple myeloma. No mass lesions or leptomeningeal enhancement were seen on imaging. The patient was treated with intrathecal chemotherapy with near complete resolution of symptoms. PET/CT was clear. When last examined, the soft palate weakness had resolved, she was tolerating an oral diet without aspiration, and exam showed a trace left vocal fold paresis with good compensation.

Discussion: To our knowledge, this is the first case report of CNS MM presenting as bilateral vagal nerve palsy, and without CNS plasmacytoma, mass, or leptomeningeal enhancement. Other reports have shown CNS MM presenting with other cranial nerve palsies, such as III, IV, and VI palsies causing ocular symptoms, however, some of these cases were also associated with CNS plasmacytoma causing the issue, which was not the case with our patient. Treatment options include intrathecal chemotherapy, systemic chemotherapy, cranial irradiation or a combination.

Common Practices in Botulinum Toxin Injection for the Treatment of Spasmodic Dysphonia: A National Survey

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Introduction: Protocols in the treatment of spasmodic dysphonia (SD) vary among physicians. Previously published work comes from relatively few centers.

Methods: An online 58 item survey was sent to all Otolaryngologists who self-identify as Laryngologists on the AAO-HNSF website. Items surveyed included Botulinum toxin injection technique, laterality and dosage.

Results: An 80% response rate was achieved (70 completed the survey). Participants collectively reported treating over 4000 patients with SD in the past year (mean 71±68 patients/laryngologist). 87% perform injections exclusively in the office, the remainder both in the office and OR. For ADSD injections, 88% use EMG guidance alone via cricothyroid approach. The remainder use anatomical landmarks alone (9%) or EMG with endoscopic guidance (3%). Sitting is the preferred patient position (70%; supine: 30%). A substantial majority (87%) starts with bilateral injections (starting dosage, mode: 1.25U/side). For ABSD injections, 67% use EMG guidance alone and 31% use endoscopic guidance with or without EMG. Sitting is the preferred patient position (84%; supine: 16%). Preferred approach is anterior-translaryngeal (51%) followed by lateral-retrolaryngeal with rotation (34%). A considerable majority (79%) starts with unilateral injections (starting dosage, mode: 5U). When deciding on initial dosage, the most influential factor was balancing effect/side effects, followed by patient's frailty and risk of aspiration. The typical planned interval between injections is 3-4 months.

Conclusions: Laryngologists follow fairly uniform protocols in the treatment of SD with some important and previously unpublished differences. This study documents areas of agreement and discordance among Laryngologists in the US for the treatment of SD.

Comparing the Utility of 3-Day vs 10-Day Voice Rest Following Type 1 Thyroplasty

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Introduction: Post-operative voice rest is often prescribed to patients following laryngeal surgery. Voice rest has significant social and economic impacts, and the optimal duration of voice rest is unknown. This pilot study compared vocal fold edema and restoration of mucosal wave between two postoperative voice rest regimens.

Study Design: Randomized control trial

Methods: Twenty patients were randomly prescribed 3-days (n=10) or 10-days (n=10) complete post-operative voice rest following type 1 thyroplasty. Video stroboscopy was recorded on day 3, day 10, and 6 weeks following surgery, and mucosal wave and vocal fold edema were rated by expert reviewers at these time points. Patients were instructed to wear vocal activity monitor during the voice rest period. Vocal activity was recorded and compared.

Results: There was no significant difference in either mucosal wave or edema ratings between the two groups at any of the time points. Average use of vocal activity monitor was 2.6 hours/day (range 0.3 – 6.8 hours/day) in the 3-day voice rest group compared to 1.5 hours/day (range 0.8 – 6.6 hours/day) in the 10-day voice rest group. The average percentage of time with vocal activity above threshold (unacceptable voice use) was 6% (range 0-11%) for the 3-day voice rest group and 4% (range 0-14%) for the 10-day voice rest group.

Conclusion: Mucosal wave and vocal fold edema were not significantly different between patients prescribed 3-day and 10-day voice rest. The vocal activity monitor did not detect a significant difference in voice rest compliance between the two groups.

Correlation between Voice Therapy Compliance and Response to Voice Handicap Index Questions

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Introduction: Voice therapy (VT) is a helpful tool in the management of many voice disorders. Despite this, many patients are non-compliant and approximately 2/3 drop out before completion. In this study, we examine whether responses to specific items on the voice handicap index (VHI) can be used to predict VT compliance.

Methods: This is an IRB-approved retrospective cohort study. All patients presented to a tertiary care center between January 2011 and June 2016 with chief complaint of dysphonia and were referred for VT. Patients were excluded if they were seen by SLP only for pre-operative assessment or if completion of therapy was unknown. Data collected included survey data from the first visit, as well as demographic and clinical information. Statistical analysis was performed using SPSS.

Results: Of 489 patients, 36.2% were recommended VT but did not attend, 36% partially completed VT, and 27% completed VT. Patients who partially completed VT were younger compared to the other groups (p=0.017). Patients who completed or partially completed voice therapy were more likely to use their voice for work (p=0.015). There were statistically significant differences among the groups for five individual VHI questions. Patients who were recommended voice therapy but did not attend had a statistically significant lower VHI-total score, VHI-10 score, and lower scores in each of the VHI sub-categories (“functional,” “physical,” “emotional”).

Conclusions: Patient responses to specific VHI items may indicate which patients will attend recommended VT.

Decreased Calcium Hydroxyapatite Reabsorption in a Rat Model of Osteoporosis

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Objective: Calcium hydroxyapatite (CaHA) is a common material for vocal fold injection augmentation. Durability is variable, and factors involved in implant longevity are not understood. Animal models of osteoporosis show decreased bone density and increased mineral liberation, suggesting CaHA retention may be altered in these conditions.

Study design: Prospective murine investigation

Methods: Fourteen skeletally mature, 10-month-old female Sprague-Dewley rats were treated by one of three interventions: oophorectomy, laparotomy without oophorectomy (sham), or monthly risedronate injection (90 μg/kg, subcutaneous). CaHA was implanted into the right lateral thigh muscle in all animals at the time of procedure or first risedronate injection. After 17 weeks, all rats were sacrificed and the residual CaHA isolated from excised lateral thigh muscle through incubation in a 900°C calcinator for 9 hours.

Results: Mean CaHA mass remaining in the oophorectomy group was 65.9 (SD±16.1) mg, compared to 44.4±10.0 mg CaHA in the risedronate group and 48.6±7.5 mg in the sham group. One way analysis of variance found a statistically significant difference between the oophorectomy and risedronate groups, but not between the sham and other groups, $F(2,11)=4.404$, $p=0.039$.

Conclusion: Persistent estrogen deficiency in a murine model of osteoporosis demonstrated decreased rate of CaHA reabsorption. This suggests that hormone alterations associated with osteoporosis may alter the longevity of CaHA implant resorption through an uncertain mechanism.

Defining a Phonomicrosurgical Learning Curve using Motion Metrics in Novices

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Objective: Motion metrics objectively describe surgical dexterity, but are not yet widely applied to phonosurgical training. The Video-based Phonomicrosurgical Instrument Tracking System (V-PITS) successfully measures changes in motion metrics in novice subjects after repeating a phonomicrosurgical simulation. We aim to define the learning curve of novices, using each of the motion metrics captured by V-PITS as dependent variables and number of repetitions on a simulator as an independent variable.

Methods: In a prospective cohort study, 20 participants (11 females) without prior surgical experience completed 15 sessions with a validated vocal fold polypectomy simulation. At each session, participants operated on each hemifold in randomized order. Microforceps, microknife, and microscissors movements were used to compute: path length, depth perception, motion smoothness on 3 independent axes, net motion smoothness, and net orientation smoothness. The average metrics for each session were fit to a power function according to Wright's Cumulative Average Model: $Y=aX^b$.

Results: For left-sided lesions, the depth perception data fit a power function for all 3 microinstruments (microforceps $p=0.03$; microknife $p<0.01$; microscissors $p=0.01$), as did path length data for the microforceps ($p=0.04$) and microknife ($p<0.01$). For right-sided lesions, path length and depth perception fit a power function for microforceps ($p<0.01$ for both). Bilateral path length (microforceps $p<0.01$; microknife $p=0.01$; microscissors $p<0.01$) and depth perception (microforceps $p<0.01$; microknife $p=0.02$; microscissors $p=0.03$) fit a power model for all 3 instruments.

Conclusion: In a novice population performing a simulated phonomicrosurgical task, a learning curve can be defined in terms of path length and depth perception as measured by V-PITS.

Detection of Muscle Tension Dysphonia using Eulerian Video Magnification

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Purpose: Eulerian Video Magnification (EVM) is a new technology developed at the Massachusetts Institute of Technology which detects the frequency and intensity of blood perfusion to tissues. Through the examination of extralaryngeal muscle perfusion during rest and phonation, EVM has the potential to alter our understanding of the complex body motions involved in phonation. This study investigated the utility of EVM in diagnosis of muscle tension dysphonia (MTD).

Methods: Adult patients scheduled for evaluation of dysphonia were recruited between November 2016 and March 2017. Demographic and clinical data were extracted from patient charts. MTD diagnosis was confirmed with videostroboscopic and physical exam, and by a speech-language pathologist. Eighteen MTD patients were video recorded at rest and phonation. Five patients without MTD were analyzed as controls. Videos were analyzed using EVM software to assess change in blood flow at the forehead, infrahyoid muscles, sternocleidomastoid muscles, and the background wall (as a control).

Results: Patients with MTD demonstrated little change in perfusion to the infrahyoid muscles while phonating (+1% ± 55%). Control patients demonstrated an increase in perfusion to the infrahyoid muscles while phonating (+102% ± 164%). This difference was significant when comparing the two groups ($p=0.04$). No differences in perfusion were found between other regions assessed. Patient age and gender did not correlate with change in perfusion between rest and phonation.

Conclusion: Our data suggest that EVM can be used in the diagnosis of MTD by focusing on the difference in perfusion to the infrahyoid muscles between rest and phonation.

Endoscopic Excision of a Large Combined Laryngocele: A Case Report and Review of the Literature

Adam R. Szymanowski, MD; Linnea Fechtner, MD; Joseph Muscarella, DO

Introduction: A laryngocele is an abnormal, air-filled cavity originating from the laryngeal saccule that can present with a variety of symptoms ranging from a benign neck mass to significant respiratory distress. The majority of patients are treated surgically using an open transcervical approach; however, complete transoral excision can significantly reduce surgical morbidity. Objectives: (1) Present a case of a laryngocele with a large external component excised endoscopically using a CO2-laser and microsurgical instruments. (2) Review new, minimally invasive techniques to excise laryngoceles.

Methods: A case of complete endoscopic laryngocele excision, including capsule, is presented. Subsequently, a PubMed literature review of minimally invasive, endoscopic laryngocele excision was completed.

Results: Large laryngoceles, including their capsule, can be excised through an entirely transoral approach using microsurgical instruments and a CO2-laser. This technique minimizes operative morbidity compared with a transcervical approach, and has good patient outcomes. A small pool of case reports and case series employing similar techniques support transoral excision of laryngoceles.

Discussion: Our case report and literature review demonstrate that complete endoscopic excision of laryngoceles, regardless of size, is safe and efficacious. A transoral approach minimizes patient morbidity, allowing for prompt hospital discharge and limited wound care. While a notable gap in the literature remains, our case report lends further support to endoscopic excision of laryngoceles.

Examining the Safety and Efficacy of Awake, Bilateral Injection Medialization Laryngoplasty in the Management of Bilateral Vocal Fold Atrophy

Zachary Kelly, BA; Anju Patel, MD; Adam Klein, MD

Introduction: Office-based injection laryngoplasty (IL) has emerged as a useful procedure for Otolaryngologists to correct glottic insufficiency while avoiding the costs and risks of general anesthesia. This is the first study focused on addressing the safety and efficacy of this particular procedure solely for bilateral vocal fold (VF) atrophy, an important morbidity associated with the aging voice.

Methods: Patient records were reviewed from Emory University Hospital Midtown during the period of 2005-2017. Patients who underwent awake, bilateral transthyrohyoid, transroral, transcricothyroid, or transthyroid cartilage IL for bilateral VF atrophy were analyzed. Complication rate was used to evaluate safety. Before and after Voice Related Quality of Life (VRQOL) scores were recorded to determine efficacy.

Results: 240 patients met inclusion criteria. There were seven complications, yielding a complication rate of 2.9%. Complications included aborted cases for difficult anatomy or poor patient tolerance, injection material not absorbing, and a VF hematoma. No patients required admission to the hospital or evaluation in the emergency room. VRQOL scores were obtained from 133 patients. The average decrease in score was 8.1, correlating to an overall improvement in vocal quality ($p<.0001$).

Conclusions: This study illustrates a low complication rate for awake IL in treating bilateral VF atrophy. Complications were associated with patient tolerance, unique anatomy, and in one case, anticoagulant medication. The improvement in VRQOL scores and low complication rate support the conclusion that not only is bilateral medialization IL laryngoplasty safe in the awake setting, but it is also efficacious for patients with bilateral VF atrophy.

Gender-Based Outcomes in Type I Thyroplasty for Non-Paralytic Glottic Incompetence

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Introduction: Clinical outcomes for Type I Gore-Tex thyroplasty (GTP) for non-paralytic glottic incompetence (GI) have been reported in the literature. Given differences in male and female laryngeal anatomy, gender-based outcomes should also be evaluated. We endeavored to evaluate gender-specific post-GTP voice outcomes.

Methods: We performed a retrospective review of patients undergoing GTP for non-paralytic GI. Multidimensional voice outcome measures including Voice-Related Quality of Life (VRQOL), Glottal Function Index (GFI), and Grade/Roughness/Breathiness/Asthenia/Strain (GRBAS) were analyzed at post-operative time frames: 0-3 months, 3-9 months, 9-18 months, 18-36 months, and 3-5 years, and 5-10 years.

Results: 89 subjects (46 females, 43 males) with average age 52.2 undergoing GTP for non-paralytic GI from 2005 to 2017 met inclusion criteria. Etiologies included vocal fold hypomobility (N=37, 41.6%), paresis (N=19, 21.3%), vocal fold atrophy (N=17, 19.1%), and scarring (N=16, 18.0%). Females had significantly greater improvement on VRQOL at 0-3 months and 9-18 months' timeframes compared to males with mean change in VRQOL: 38.9 vs 22.3 (p=0.001) and 41.7 vs 20.4 (p=0.002), respectively. Similarly, women had significantly greater improvement in GFI at 0-3 months' follow-up (mean difference -10.3 vs -5.0, respectively, p=0.0004). There was no statistically significant gender difference in GRBAS at any follow-up interval.

Conclusions: Following GTP, females report greater improvement in patient-reported voice quality in the early post-operative period. No significant difference between genders was seen in perceptual measures (GRBAS). Gender-specific outcomes should be evaluated for clinical interventions to improve specificity of pre-operative counseling.

Glucocorticoids Regulate Smad Signaling Via Phosphorylation of the Glucocorticoid Receptor in Human Vocal Fold Fibroblasts

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Objectives. Direct glucocorticoid (GC) injection for vocal fold scar has evolved as a therapeutic strategy, but the mechanisms underlying the anti-fibrotic effects remain unclear. GCs act via glucocorticoid receptor (GR), which is phosphorylated at multiple serine residues in a hormone-dependent manner to affect bioactivity. We hypothesize that GCs regulate Smad signaling via GR phosphorylation in vocal fold fibroblasts (VFFs). We sought to quantify the effects of dexamethasone (DM) on Ser211 and Ser203 phosphorylation and regulation of TGF-β1 signaling.

Methods. Immortalized human VFFs were treated with DM (10-5-10-7M) +/- TGF-β1 (10ng/ml). The GR antagonist (RU486,10-6M) was employed to isolate the regulatory effects of GR. Expression of total GR, Ser211, and Ser203 phosphorylation was examined via SDS-PAGE and immunocytochemistry. Quantitative polymerase chain reaction was employed to determine GR-mediated effects of DM on SMAD3, SMAD7, COL1A1 and ACTA2 expression.

Results. Total GR and Ser211 phosphorylation was observed predominantly in the nucleus 1 hour after DM administration. Whereas DM decreased total GR expression, Ser203 and Ser211 phosphorylation increased. RU486 limited the effects of DM. SMAD3 and SMAD7 mRNA expression significantly decreased 4 hours after DM administration ($p<0.05$); this response was negated by RU486. COL1A1 remained unchanged and ACTA2 significantly increased following 24 hours of DM treatment ($p<0.05$).

Conclusions. DM regulated TGF-ß1 signaling via altered SMAD3 and SMAD7 expression. This response is associated with changes in GR phosphorylation. These findings provide insight into the mechanisms of steroidal effects on vocal fold injury, with the goal of enhanced therapeutic strategies for these challenging patients.

Incidence and Treatment Outcomes of Vocal Fold Mobility Impairment after Total Arch Replacement

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Background: Vocal fold mobility impairment (VFMI) secondary to neuronal injury is a known risk factor after aortic surgery. Total arch repair is technically challenging and the incidence of recurrent laryngeal nerve injury is unknown. This study examines the incidence of VFMI after total arch replacement and inpatient medialization outcomes.

Study Design: Retrospective Cohort Study Methods: All patients who underwent total arch replacement at our tertiary care center from 2006-2017 were identified through an institutional data base. A total of 358 patients were reviewed. End points included evidence of vocal fold immobility on flexible laryngoscopy, time to diagnosis, time to treatment, performance on pre-and postoperative swallow studies, ICU and hospital length of stay.

Results: Nineteen percent of patients who underwent total arch replacement were diagnosed with VFMI during their initial inpatient stay. Seventy-eight percent of those injuries involved the left vocal fold, 16% were on the right and 6% were bilateral. The majority of patients (61%) received inpatient vocal fold medialization (VCM), 66% of those received injection laryngoplasty and 33% had a type 1 thyroplasty. Those with vocal fold paralysis had significantly longer stays in the intensive care unit (8.6 and 5.7 days, p=.03) and in the hospital (20.4 and 16.0 days, p=.04). Patients with VFMI, who received VCM trended toward shorter ICU (p=.08), and hospital stays (p=.5), though it was not significant.

Conclusions: Incidence of VFMI following total arch replacement is similar to those receiving other aortic arch surgeries. Prospective studies and standardization is needed to evaluate treatment outcomes.

Interesting Case of Delayed Gore-Tex Extrusion following Medialization Laryngoplasty: Case Report and Literature Review

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Objective: To report a complicated case of late onset Gore-Tex extrusion six years after initial medialization laryngoplasty (ML).

Methods: Case report and literature review.

Results: A 65-year-old female presented with a foreign body sensation following an asthmatic attack, associated with severe coughing. The patient had had a right ML six years prior, which was complicated by a small tear (2mm) in the right ventricle, however the decision was made to proceed with Gore-Tex implantation. One year later the patient developed Gore-Tex extrusion and granuloma formation at the site of the previous tear, but after discussion the patient elected to partially remove the Gore-Tex in order to maintain quality of voice. Healing was complete with no issues until five years later, where on examination she had evidence of further Gore-Tex extrusion through the right ventricle, sitting above the laryngeal introitus. Attempts to remove this in office were unsuccessful and thus she had definitive removal of the implant via microlaryngoscopy in the OR.

Conclusion: Implant extrusion is a recognized complication of medialization laryngoplasty. This case demonstrates several important surgical steps. Firstly, implantation should not proceed if there is a surgical defect in the ventricle. If however there is reason to still proceed, then the tear should be repaired with mucosa or alloderm and reinforced with periosteum. Finally, complete explanation should be performed at the time of the initial extrusion event.

Ipratropium Bromide: A Novel Treatment for Paradoxical Vocal Fold Motion

Karuna Dewan, MD; Elizabeth Direnzo, PhD, CCC-SLP

Purpose: To establish the efficacy of inhaled ipratropium bromide in the treatment of paradoxical vocal fold movement (PVFM), and to compare its efficacy to that of respiratory retraining therapy.

Methods: In this prospective cohort study in a tertiary care laryngology practice, patients at the time of PVFM diagnosis, are asked to complete four validated surveys: Reflux Symptom Index, Voice Handicap Index-10, Cough Severity Index and Dyspnea Index. They are asked about the frequency of shortness of breath, duration of these attacks and the number of times they presented to an Emergency room in the past month. One group of patients are treated with ipratropium bromide only for one month, while another group of patients are treated with only respiratory retraining therapy for one month. During this timeframe, neither is treated for reflux. After one month, the same questionnaires are administered to both groups. Results will be compared before and after treatment. Outcome measures from the ipratropium bromide group will be compared to those of the respiratory retraining group after one month.

Results: Anecdotally, patients with PVFM, treated with inhaled ipratropium bromide report symptom improvement. This is an ongoing treatment regimen and results will be analyzed upon patient return.

Conclusions: PVFM is a difficult to treat condition. It causes significant patient discomfort resulting in a notable decrease in quality of life. Ipratropium Bromide inhalation anecdotally has provided some patients with relief. Its efficacy is worthy of formal investigation.

Kinetic Energy Laser in the Larynx: A Preliminary Canine Study

Michael S. Benninger, MD; Anh N. Diep, VMD; Seth Kaplan, MD

Introduction: The application of laser energy in the larynx has relied on thermal injury while there have been ongoing attempts to reduce the impact on the tissues adjacent to the laser. A new technology (by Precise Light Surgical - PLS) utilizes kinetic energy through Pressure Induced Tissue Resection (PITR) to cut tissues, theoretically eliminating injury to the adjacent tissue. The purpose of this study was to evaluate the PSL in canine vocal folds.

Methods: 4 dogs underwent PITR incisions (4mJ pulses at 200Hz) on the vocal folds, through the mucosa into the muscle. The animals were sacrificed at days 0, 3, 7 and 21 days' post-surgery, their larynges were harvested and histology was performed with H&E, Masson's trichrome, and Verhoeff-van Giessen.

Results: At day 0 focal denudation of the epithelium and coagulation necrosis in the lamina propria and adjacent connective tissue is noted. On day 3 and 7 an inflammatory infiltrate consisting of neutrophils is seen within the lamina propria and surrounding connective tissue with minimal edema and an early deposition of collagen. At day 21, the mucosa is completely regenerated with the area of previous ablation into the muscle replaced with thick bundles of collagen.

Conclusion: The unique PITR characteristics of the PLS system offer a potentially unique cutting technology for laryngeal microsurgery. The current canine study suggests appropriate and rapid healing. With refinements of the tip size of the prober and adjustment of energy the PSL will likely be an appropriate alternate to traditional lasers in laryngeal surgery.

Laryngeal Cryptococcoma Resulting in Airway Compromise in Immunocompetent Patient- A Case Report

Justin Morse, MD; Alexander Gelbard, MD

Objectives: To report a case of laryngeal cryptococcoma resulting in airway obstruction in an immunocompetent patient and its management.

Methods: Cryptococcus neoformans is a yeast than can result in isolated pulmonary infections or disseminate and infect the central nervous system or soft tissues, classically associated with immunocompromise. This case report describes an immunocompetent patient presenting with airway obstruction secondary to laryngeal crypotococcoma, mimicking a laryngeal malignancy, and describes associated management.

Results: A 68-year-old immunocompetent female with COPD, history of colon cancer, and new PET avid laryngeal lesion was transferred from an outside hospital intubated after acute respiratory decompensation. The patient was taken to the operating room for direct laryngoscopy, and bronchoscopy. Airway evaluation revealed diffuse mucosal changes in the supraglottis with irregular waxy-appearing bilateral true vocal folds with significant loss of normal native tissue architecture. The subglottis demonstrated mucosal inflammation and exudative change throughout. The patient was successfully extubated. Results from operative biopsy confirmed subglottic infection of cryptococcal neoformans. The patient was treated with extended course fluconazole with resolution of airway obstruction and restoration of normal phonation.

Conclusion: Laryngeal crypotococcal infection is a rare entity sparsely described in the literature. This case reinforces characteristic physical and histologic findings described for laryngeal cryptococcal infection. To our knowledge, this is the first described case of subglottic crypotococcoma contributing to airway compromise. Extended course oral fluconazole is a successful treatment regimen for this infection.

Long-Term Voice and Swallowing Outcomes after Chemoradiation

Linda Soldatova, MD; Natasha Mirza, MD

Objective: Chemoradiation (CRT) for head and neck cancer (HNC) has been associated with toxicity leading to functional sequelae. The literature on post-CRT voice and swallowing function lacks long-term follow-up and focuses on laryngeal cancers, especially when it comes to voice. The purpose of this study was to examine the voice and swallowing function from the patient's perspective at least 5 years after completion of CRT.

Methods: Twenty-eight patients with a history of non-laryngeal HNC who underwent CRT with or without surgery at least 5 years ago (Mean 10.5, SD 5.2 years) were surveyed utilizing a survey instrument based on previously validated questionnaires (PPSFQ, EAT-10, VHI-10, V-RQOL).

Results: Ten of the surveyed patients (36%) scored in the categories of "poor to fair" or "poor" voice perception on the V-RQOL questionnaire. VHI-10 scores were abnormal in fourteen patients (50%) indicating residual post-treatment voice dysfunction (VHI-10 scores≥20 in ten (36%) patients). The patient perception of swallowing function scores on PPSFQ questionnaire were abnormal in all but one patient, with eighteen patients (64%) reporting scores of 30 or higher. Seventeen patients (61%) had EAT-10 scores indicating presence of residual swallowing dysfunction (ten (36%) patients with EAT-10 score≥20).

Conclusion: Post-treatment voice and swallowing dysfunction following surgery and CRT for non-laryngeal HNC can persist or worsen beyond 5 years. This study shows that patients may have residual treatment sequelae affecting their voice and swallowing function after traditional post-treatment 5-year follow-up. More research is needed to investigate the long-term effects of CRT on voice and swallowing function.

Multipotency of the Cells in the Macula Flava of the Human Vocal Fold

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Takashi Kurita, MD; Kiminobu Sato, MD; Hirohita Umeno, MD; Hirohisa Yano, MD

Objectives: The latest research shows, there is growing evidence to suggest that the cells in the macula flava (MF) are tissue stem cells or progenitor cells of the human vocal fold mucosa (HVFM), and that the MFe are a candidate for a stem cell niche. The purpose of this study is to investigate the multipotency and stemness of the cells in the MFe of the HVFM.

Methods: Four normal human adult vocal folds from surgical specimens were used. After extraction of the anterior MFe under microscope, the MFe were minced, cultured and proliferated in mesenchymal stem cell growth medium and morphological features including immunohistochemistry were assessed. Cell differentiation into adipogenic, chondrogenic and osteogenic lineages was performed. Cell surface markers were detected using a flow cytometry. Pluripotency was assessed using a human pluripotent stem cell functional identification kit.

Results: Subcultured cells formed a colony-forming unit. Subcultured cells expressed CD105, CD73 and CD90, and lacked expression of CD 45, CD34, CD11b, CD19 or HLA-DR. They differentiated into adipogenic, chondrogenic and osteogenic lineages. Consequently, the cell features in the MFe meet the minimal criteria defining human mesenchymal stem cells. In addition, subcultured cells expressed stage-specific embryonic antigen 3 (SSEA-3, human pluripotent stem cell marker) and they differentiated into endoderm, ectoderm and mesoderm.

Conclusion: The results of this study are consistent with the hypothesis that the cells in the maculae flavae are tissue stem cells and the MFe are a candidate for a stem cell niche in the HVFM.

Novel Anesthetic Management for Thyroplasty Performed under Monitored Anesthesia Care using Simultaneous Infusions of Dexmedetomidine, Remifentanil and Propofol

Megan Hamre, MD; Kathryn Handlogten, MD; Dale Ekbom, MD;
Toby Weingarten, MD; Troy Seelhammer, MD

Introduction: Thyroplasty type I, or medialization thyroplasty (MT), is an operation for voice reconstruction performed for correction of unilateral vocal cord paralysis. We present a retrospective case series of 75 consecutive thyroplasties performed under a multimodal analgesic and sedation combination using simultaneous infusions of remifentanil and dexmedetomidine with or without propofol.

Methods: Using the institution's electronic medical record, patient records from June 2015 through June 2017 were compiled for patients who underwent thyroplasty with or without arytenoid adduction.

Results: All patients received dexmedetomidine and remifentanil infusions while 74 patients (98.7 %) received continuous propofol infusions. Eighteen patients (24%) experienced transient hypopnea events, all treated conservatively with supplemental oxygen delivery. Three patients (4%) experienced bradycardia (heart rate less than 50 beats per minute) requiring pharmacologic intervention. There were no adverse respiratory or cardiovascular events including intensive care unit admissions, requirement for blood product transfusion, adverse medication reaction or mortality during the hospital stay. One patient required surgical re-exploration due to post-surgical bleeding after initial hospital discharge.

Conclusions: Despite being amongst the most commonly utilized anesthetic agents in the setting of monitored anesthesia care, the novel simultaneous combination of remifentanil, dexmedetomidine and propofol has not previously been described in the literature. Co-administration of dexmedetomidine and remifentanil has previously been reported to result in optimization of analgesia, onset of appropriate level of sedation, speed of emergence and surgeon satisfaction. The concurrent, balanced infusions of dexmedetomidine, remifentanil and propofol safely facilitate medialization thyroplasty with or without arytenoid adduction while minimizing perioperative adverse events.

Oncologic Efficacy and Voice Outcomes after Potassium Titanyl Phosphate (KTP) Laser Therapy for Early Stage Glottic Carcinoma: A Retrospective Review

Matthew Ward, MD; Robert L. Eller, MD; Brentley Lindsey, BS

Introduction: Radiation therapy and carbon dioxide laser excision are the mainstays of treatment for early stage glottic carcinoma. While oncologically effective at treating these early-stage lesions, these modalities can have a damaging effect on long-term voice outcomes. Over the past decade, potassium titanyl phosphate (KTP) laser ablation has emerged as a new treatment modality that may offer similar oncologic efficacy while achieving superior voice outcomes. This study adds to the growing body of evidence supporting use of KTP laser to achieve oncologic success while improving voice outcomes.

Method: We retrospectively reviewed 5 patients with low-grade (CIS, T1a) glottic lesions treated with KTP laser. Metrics utilized to evaluate effectiveness of therapy included disease recurrence, and pre- and post-procedure Voice Handicap Index-10 (VHI-10) scores and Voice-Related Quality of Life (V-RQOL) scores, when available.

Results: At the time of this study, none of the 5 patients showed evidence of disease recurrence, with a mean post-procedure follow-up period of 28 months. Of the 5 patients, 2 patients with complete pre/post-procedure data showed a >66% decrease in VHI-10 and/or V-RQOL scores with post-procedure VHI-10 scores ranging from 0-3/40 and a post-procedure V-RQOL of 0/50. The remaining 3 patients had only post-procedure scores available, with documented VHI-10 and V-RQOL scores ranging from 0-2.

Conclusions: In this small case series, we found that utilization of KTP laser therapy for early stage glottic lesions provides local disease control with excellent voice outcomes post-operatively.

Osteoradionecrosis of the Sternoclavicular Joint after Larynogopharyngeal Radiation

Rachel T. Irizarry, MD; Deborah R. Shatzkes, MD;
Stephanie Teng, MD; Nikita Kohli, MD; Gady Har-El, MD

Introduction: Adequate treatment of laryngopharyngeal malignancy often incorporates radiation therapy. Structures around laryngopharynx exposed to traditional radiation doses are susceptible to post-treatment toxicity. Amongst poorly understood sequelae is the rare manifestation of sternoclavicular joint (SCJ) osteoradionecrosis (ORN).

Methods: Three institutional encounters prompted a comprehensive literature search, generating three published case reports. Systematic extraction and analysis (n=6) of demographics, cancer history, comorbidities, ORN presentation, imaging, and management established the largest series to investigate this pathology.

Results: Patients were males (6), 54–70 years old, smokers (4), with HTN/DLD (5), MI/CAD (2), second primary (2), DM (1), and myelofibrosis (1). Four underwent total laryngectomy, one primary, three as salvage. Five patients had concurrent chemoradiation (>70Gy). All patients presented with swollen, tender neck wounds concerning for persistent/recurrent malignancy. CT demonstrated bone erosion (5/5) and increased bone scan uptake (2/2). All responded to surgical exploration with drainage alone (1), sequestrectomy (2), or bone resection with synovectomy (3). Complete healing took two months to three years. One unrelated patient death occurred before control of ORN was achieved.

Discussion: Given varied patient characteristics, synergistic risk factors exist which alter bone radiation threshold resulting in irreversible damage and osteonecrosis. Vascular susceptibility and inability to repair may regulate that threshold. Understanding this relationship will facilitate early detection and intervention.

Conclusion: Integrating cases of sternoclavicular joint ORN promotes awareness of atypical laryngopharyngeal radiation complications, elucidates contributing factors, educates physicians on presentation and management, and provides a platform for prospective investigation.

Patient Pain Perception during Flexible Laryngoscopy, Assessment with a Validated Pain Questionnaire

Javier J. M. Howard, MPH; John Paul Gilberto, MD

Objectives: Flexible laryngoscopy is performed many times daily in otolaryngology clinics worldwide. Patients typically ask, 'will it hurt?' Some studies have provided ratings for this procedure on ordinal scales and visual analog scales (VAS). With no publication that has yet assessed pain perception during laryngoscopy with a validated assessment tool, our prospective study uses the Short Form McGill Pain Questionnaire (SF-MPQ) to score our patients' perceptions.

Methods: In our tertiary academic medical center, 81 adults completed the SF-MPQ immediately after undergoing flexible laryngoscopy/stroboscopy and 6 patients did not complete the survey (i.e., reasons related to English literacy).

Results: Of the 81 (93%) patients who completed the survey, there were 46 (57%) women and 35 (43%) men (mean age 51.4 and 52.7 years, respectively). Notably 95% of our patients rated the procedure less painful than expected, and commonly described the procedure as tender (36%) and fearful (31%). Mean scores for sensory, affective, and total pain were 1.7/33, 0.8/12, and 2.4/45, respectively. Mean scores for present pain intensity and VAS were 0.68/5 and 7.1/100 mm, respectively. Compared to historical values, laryngoscopy was rated less painful than chronic sinusitis, labor pain, carpal tunnel syndrome, among others (table).

Conclusions: Our patients who underwent flexible laryngoscopy/stroboscopy rated low pain scores on all domains of the SF-MPQ. These findings may serve as a reference for future quantification of pain during in-office procedures. Potentially, these scores will also reassure patients, given the nearly 1/3 who reported feeling fearful and 95% expected more pain than actually experienced.

Patients' Attitudes Regarding Treatment for Vocal Fold Atrophy

VyVy Young, MD

Introduction: Up to one-third of the elderly population have voice disorders, but few pursue treatment. A common but unproven assumption is that patients only want reassurance about lack of malignancy. This study aims to understand factors affecting decision-making about treatment for vocal fold atrophy and to identify potentially correctable systematic impediments to appropriate treatment.

Methods: Prospective study of 34 consecutive patients with primary diagnosis of vocal fold atrophy. Participants answered an anonymous, single-page questionnaire at end of clinic visit following development of treatment plan.

Results: 19 patients (56%) wanted to pursue treatment (e.g. voice therapy or surgery) and 15 patients (44%) did not. Most common reasons for pursuing treatment included desire for better voice (100%), aggravation by voice symptoms (84%) and decreased functionality of voice (63%). Most common reasons to forego treatment included feeling reassured by the lack of malignant findings (67% and 40% of those not wanting surgery and voice therapy, respectively) and the lack of a significant degree of symptomatology (80% and 53%, respectively). No patients cited insurance or transportation concerns, and few (13 and 27%, respectively) indicated other health issues taking priority.

Conclusions: This pilot study represents an important first step in understanding patients' motivations in pursuing or declining treatment, which will help clinicians better counsel and guide patients to make appropriate treatment choices. It is imperative that clinicians develop better understanding about treatment outcomes as symptomatology and functionality are primary driving factors in the treatment-seeking population. Improved methods to assess candidacy for appropriate treatment are needed.

‘Peeling’ Technique for Epithelial Lesions of the Vocal Fold in Singer

Shigeru Hirano, MD, PhD; Yoichiro Sugiyama, MD, PhD

Background: Epithelial lesions including leukoplakia, CIS, and papilloma are generally treated by phonomicrosurgery, in which type I cordectomy or resection of the epithelium is performed. Excessive resection causes postoperative dysphonia due to scar formation, and should be avoided. Peeling is basically performed as cosmetic skin procedure to remove the stratum corneum, the superficial portion of the epithelium of skin. Peeling of the vocal fold should be minimally invasive for epithelial lesions which can maximally preserve the vibratory function.

Case series: Case 1 was 72-year-old tenor singer. Leukoplakia on the surface of the vocal fold was revealed as CIS by biopsy. The lesion was located from upper lip down to lower lip of the vocal fold free edge. Careful exploration of dissection layer of the vocal fold during phonomicrosurgery enabled intraepithelial resection (peeling). Postoperative recovery of vibratory function was quick, and voice was improved.

Case 2: 64-year-old female jazz singer. Papilloma was found on the left vocal fold membranous portion. Angiolytic laser was used for dissection of the lesion under phonomicrosurgery. The lesion was detached from the underlying epithelium, and was removed preserving the epithelium.

Conclusion: Peeling can be applied for selected cases with very superficial epithelial lesions. Angiolytic laser is useful for peeling of papilloma because of the coagulation effects of tumor vessels.

Predictive Value of Globus Pharyngeus in Patients with Functional Dysphonia vs. Organic Dysphonia

Elie Khalifee, MD; Anthony Ghanem, MD;
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Introduction - This is a retrospective study investigating the prevalence of globus pharyngeus in patients with dysphonia

Material and Method - A retrospective chart review looking at the prevalence of globus pharyngeus in patients presenting with history of dysphonia at the Voice Center American University of Beirut Medical Center was performed. The etiology of dysphonia was categorized as organic in the presence of laryngeal pathology vs. functional in the absence of any laryngeal pathology on laryngeal videostroboscopic examination. Functional dysphonia was further stratified as muscle tension dysphonia and non-muscle tension dysphonia based on the presence or absence of supraglottic muscle tension patterns.

Results - The medical records of 300 patients were reviewed. Total prevalence of globus pharyngeus was 14.33%. There was a significant difference in the prevalence of globus pharyngeus between patients with organic dysphonia and patients with functional dysphonia (p value <0.001). Out of 43 patients with globus, 41.86% had organic voice disorders vs 58.14% had functional voice disorders. Among those with functional voice disorders, globus pharyngeus was more prevalent in patients with MTD vs non-MTD (p-value = 0.19). Out of 25 patients with functional voice disorders and globus, 72% had MTD vs. 28% had no MTD (p-value=0.19).

Conclusion - Globus pharyngeus is significantly more prevalent in patients with functional dysphonia vs. patients with organic dysphonia. More so, in patients with functional dysphonia, the prevalence of globus was higher in those with MTD despite not reaching statistical significance. Globus pharyngeus may be either the cause or the result of laryngeal aberrant functional behavior.

Prevalence and Characteristics of Dysphagia in Patients with Unilateral Vocal Fold Immobility: A Systematic Review

Dimin Zhou, MS, MD; Mohsin Jafri, BS; Inna Husain, MD

Objective: To identify the prevalence and characteristics of dysphagia in patients with unilateral vocal fold immobility (UVFI) through a systematic review of current literature.

Methods: A review of four electronic databases (Embase, PubMed, ScienceDirect, Wiley Online Library) was completed based on preferred reporting items for systematic reviews and meta-analysis statement (PRISMA) criteria. Inclusion criteria were that: the major theme examined dysphagia in UVFI patients; subjects were 18 years or older; and the article was an original study. Non-English language publications and case reports were excluded. Qualified articles were analyzed independently by two researchers.

Results: Of 445 studies discovered through the literature search, 17 satisfied eligibility criteria. The prevalence of dysphagia in patients with UVFI ranged from 40 to 76%. Left-sided UVFI predominated. The most common cause of UVFI was iatrogenic, followed by thoracic and mediastinal malignancy, idiopathic, neurologic disease, and trauma. Videofluoroscopic swallowing study (VFSS) examining aspiration and penetration was the most common method for evaluating dysphagia. Primary findings were impaired airway protection due to incomplete laryngeal elevation and abnormal epiglottis mobility as well as prolonged bolus transit due to delayed triggering of pharyngeal swallow and impaired pharyngeal squeeze. Patients were more likely to aspirate on thin liquids than on purées and solids. Benefits of medialization thyroplasty for dysphagia symptoms were equivocal.

Conclusion: A significant portion of patients with UVFI present with dysphagia. Methodological heterogeneity and small sample sizes in the reviewed studies may have compromised the reliability of summarized data, calling for large-scale studies with standardized diagnostic techniques.

Prevalence and Characterization of Dysphonia in U.S. Marine Corps Drill Instructors

Joseph Spellman, MD, LCDR; Christopher M. Johnson, MD, LCDR; Carole R. Roth, PhD; Michael J. Coulter, MD, LT

Introduction: Prior studies have evaluated populations at increased risk of voice overuse and dysphonia, however, little work has been done for drill instructors. The purpose of this study was to determine the prevalence of subjective and objective dysphonia in drill instructors and evaluate factors associated with dysphonia.

Methods: A cross-sectional analysis of 151 active military drill instructors was undertaken investigating demographics, validated subjective measures of dysphonia, and questions related to impact on function. Acoustic and cepstral-spectral analyses were also performed. Multiple linear regression and ANOVA were used to evaluate associations of voice use with measures of dysphonia. Predictors of dysphonia were compared by univariate analysis.

Results: Subjective dysphonia was present in 47.7% by the Voice Handicap Index-10 (VHI-10). 47% and 11.9% of subjects reported voice problems limiting to function for at least 1 day and at least 1 week, respectively, in the month prior to being surveyed. The mean Cepstral-Spectral Index of Dysphonia (CSID) and Rainbow Passage CSID were abnormal in 95.8% and 100%, respectively. There was no progression of dysphonia as the number of completed training cycles increased. However, there was significant improvement based on time elapsed since the last training cycle.

Conclusions: There is a strikingly high prevalence of dysphonia in drill instructors. The VHI-10 may underestimate impairment in this population based on comparison to CSID. Dysphonia develops shortly after the initiation of recruit training. There was no evidence of progression of dysphonia over time, however, there was a relationship between rest and improvement.

Proton Density Weighted Laryngeal MRI in Systemically Dehydrated Rats

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Objective: Dehydrated vocal folds are inefficient sound generators. While systemic dehydration of the body is believed to induce vocal fold dehydration, this causative relationship has not been demonstrated in vivo. Here we investigate the feasibility of using in vivo proton density (PD) weighted magnetic resonance imaging (MRI) to demonstrate hydration changes in vocal fold tissue following systemic dehydration in rats.

Method: Sprague Dawley rats (n=10) were imaged at baseline and following a 10% reduction in body weight secondary to withholding water. In vivo, high-field (7T), PD-weighted MRI was used to successfully resolve vocal fold and salivary gland tissue structures.

Results: Normalized signal intensities within the vocal fold decreased post-dehydration by an average of 11.38 ± 3.95% (mean ± S.E.M, p=0.0098) as compared to pre-dehydration levels. The salivary glands experienced a similar decrease in normalized signal intensity by an average of 10.74 ± 4.14% (mean ± S.E.M, p=0.0195) following dehydration. The correlation coefficient (percent change from dehydration) between vocal folds and salivary glands was 0.7145 (p=0.0202).

Conclusion: 10% systemic dehydration induced vocal fold dehydration as assessed by PD-weighted MRI. Changes in the hydration state of vocal fold tissue were highly correlated with that of the salivary glands in dehydrated rats in vivo. These preliminary findings demonstrate the feasibility of using PD-weighted MRI to quantify hydration states of the vocal folds and lay the foundation for further studies that explore more routine and realistic magnitudes of systemic dehydration and rehydration. This paper has been accepted for publication in The Laryngoscope.

Safety and Feasibility of Outpatient Medialization Thyroplasty

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Objectives: To evaluate the safety of outpatient medialization thyroplasty in adult patients with unilateral vocal fold paralysis.

Introduction: Type I medialization thyroplasty (MT) is a commonly performed procedure for dysphonia secondary to unilateral vocal fold paralysis. The safety of this procedure performed in the outpatient setting has not been previously established. The purpose of the study was to assess the incidence and timing of post-operative complications in patients undergoing MT in two different tertiary care medical centers.

Methods: Retrospective review of charts for patients who had undergone MT at two tertiary care academic medical centers from 2011 to present was performed. Patients undergoing bilateral medialization thyroplasties or those patients undergoing additional laryngeal framework procedures were excluded. Patient demographics, operative details and complications were evaluated and compared between those patients who underwent inpatient versus outpatient MT. Postoperative airway edema, hemorrhage, emergency room visits, readmissions, and any postoperative complications documented in subsequent clinic visits were recorded.

Results: 161 total procedures met inclusion criteria. 10 were performed as 23-hour stays, and 151 were performed as outpatient surgeries. Silastic or Gore-Tex implants were used in all patients, and all were discharged home on a regular diet. There were no post operative airway complications.

Conclusions: The incidence of adverse events after unilateral type I thyroplasty is very low. These data justify performance of the operation in the outpatient setting.

Silastic Vocal Implant Complications: A Case Series and Literature Review

Tyler Mingo, MD; Benjamin Rubinstein, MD; John Sinacori, MD

Introduction: Medialization thyroplasty is a commonly performed procedure for glottic insufficiency. Silastic is a preferred prosthetic, in part due to its low tissue-reactivity. Despite this, infection and extrusion are known complications with rates quoted at 0.8%-8%. Two interesting presentations of silastic infection and extrusion prompted a review of the literature.

Methods: The cases presented represent those encountered by an academic laryngologist at a tertiary referral center. A PubMed search was performed with the terms “medialization,” “thyroplasty,” “complication,” and “extrusion.” Case reports, case series, review articles were analyzed.

Results: A 73-year-old female with sarcoidosis presented with a painful, enlarging paramedian neck mass concerning for chondrosarcoma on imaging. She had undergone a Silastic medialization thryoplasty eight years prior. In the operating room, an extruding Silastic implant within granulation and purulence was identified without mucosal violation. A 70-year-old male with previous silastic medialization was seen in clinic for hoarseness. Laryngoscopy revealed an anteriorly located, over-sized implant. He refused intervention, and later coughed up a foreign body with further voice deterioration. This was brought to clinic, and it was identified as his silastic implant. The largest review of laryngeal framework procedures demonstrated a 0.8% rate of extrusion, however it did not sub-divide based on prosthesis type. Smaller reviews limited to silastic implants demonstrated rates of 0% (n=116), 1.5% (n=194), and 8.6% (n=56).

Conclusion: Extrusion and infection after silastic medialization thyroplasty is a known, rare complication. Familiarity with the rates and varied clinical presentations allows for patient counseling and appropriate diagnosis.

Subglottic Stenosis: An Evaluation of an Elderly Treatment-Seeking Population

Alissa Collins, MD; Kevin Chorath, BS; C. Blake Simpson, MD

Objective/Hypothesis: To evaluate the demographics, etiology, intraoperative findings and treatment outcomes of patients with subglottic stenosis, comparing those patients less than 65 years of age to an elderly population (age >65).

Study Design: Retrospective review.

Methods: Nine-year review of patients with subglottic stenosis comparing patients less than 65 years of age to an elderly population (age >65).

Results: Forty-three adults presented for evaluation and treatment of subglottic stenosis between 2008 and 2017. At the time of treatment, 35 were younger than age 65 (27 female, 8 male) and 8 (6 female and 2 male) were older than age 65. Comparing age younger than 65 to older than 65 groups, the etiology was idiopathic in 32% vs 50% (n=11 vs n=4), intubation in 35% vs 37.5% (n=12 vs n=3) and GPA (granulomatosis with polyangiitis) in 33% vs 12.5% (n=11 vs n=1). No statistically significant difference was noted in the two groups when comparing the demographics, etiology and intraoperative findings. The age greater than 65 group was noted to have a shorter interval between surgeries than those younger than 65 (310 ± 246 days vs 651 ± 452 days, p=0.0373).

Conclusion: Patients with subglottic stenosis treated after age 65 have a shorter interval between surgical interventions.

Subjective and Objective Swallowing Outcomes Do Not Correlate in Head and Neck Cancer Patients Treated with Radiation

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INTRODUCTION: Dysphagia is a known toxicity after chemoradiation for head and neck cancers (HNC), but the correlation of subjective patient-reported outcomes and objective measure of swallowing function is not well characterized. The primary objective of this project was to retrospectively investigate the relationship between subjective and objective swallowing measures after chemoradiation therapy.

METHODS: Adult patients who underwent chemoradiation therapy for HNC from 2005-2017 and presented for modified barium swallow (MBS) were reviewed retrospectively. Surgically treated patients were excluded. Patient-reported swallowing function was assessed via the MD Anderson Dysphagia Inventory (MDADI). Objective measure of swallow function was assessed with the Dynamic Imaging Grade of Swallowing Toxicity (DIGEST) scale, divided into safety (DIGEST-S – penetration/aspiration) and efficiency (DIGEST-E- residue) scores. Statistical analysis for correlation coefficients was performed. RESULTS: 30 patients met the inclusion criteria. The oropharynx was the most commonly affected site (70.0%), followed by the larynx (16.7%). The median radiation dose was 72Gy (range: 66-72Gy). The DIGEST-E and DIGEST-S scores were correlated (Pearson r=0.59, p<0.001), but there was no correlation between the MDADI and either the DIGEST-E (r=0.06, p=0.765) or DIGEST-S score (r=-0.14, p=0.443). MDADI scores did not change significantly with increasing time since radiation (p=0.375), whereas both DIGEST-E and DIGEST-S scores worsened over time (p=0.001 and p=0.007, respectively).

CONCLUSIONS: Objective assessment of swallowing function worsened after radiation therapy, but this did not correlate with patient-reported quality-of-life measures. Reduced patient awareness of swallow dysfunction years after completion of chemoradiation has implications for management of dysphagia in the face of physiologic decline.

The Effect of Time Dose of Raised Intensity Phonation on Functional Outcomes

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Shintaro Sueyoshi, MD; Bernard Rousseau, PhD, MMHC, CCC-SLP

Objective: Evaluate the effect of time dose of raised intensity phonation on vocal fold vibratory function in an in-vivo rabbit phonation model.

Design: Prospective animal study

Methods: Adult male New Zealand white breeder rabbits underwent an in vivo phonation procedure. Phonation was achieved through the simultaneous delivery of electrical stimulation to the cricothyroid muscles and membrane via custom hooked electrodes and airflow directed through the glottis via a cuffed endotracheal tube placed in the upper segment of a tracheostomy. Rabbits in the experimental group were phonated at raised intensity for 120 minutes. Rabbits in the control group received continuous airflow without stimulation for 120 minutes, and only received stimulation for data capture. Vocal fold vibratory function was captured via monochrome high-speed videoendoscopy (HSV) at 8000 frames per second. Data was collected at baseline, 30 minutes, 60 minutes, 90 minutes, and 120 minutes. For both groups, data was collected at normal intensity phonation. Following phonation, HSV image sequences were analyzed for amplitude and left-right phase asymmetry.

Results: Preliminary results indicate increased variability of amplitude and left-right phase asymmetry after 60 minutes of phonation, followed by reduced amplitude of vibration, and increased left-right phase asymmetry after 120 minutes of phonation compared to controls.

Conclusion: Exposure to 120 minutes of raised intensity phonation results in altered amplitude and phase asymmetry compared to controls. Analysis of findings from interim data points will be discussed.

The Expression and Distribution of Claudins in the Vocal Fold Epithelium

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Ichiro Tateya, MD, PhD

Objective: Previous study indicated the localization of occludin and ZO-1 in the vocal fold stratified squamous epithelium (SSE). However, the expression of claudins (cldns), the essential integral membrane proteins constituting TJs, remains unknown. The aim of this study was to clarify the gene expression pattern and the distribution of cldn subtypes in the vocal fold epithelium.

Methods: The normal and injured vocal folds of Sprague-Dawley rats were used. Reverse transcription polymerase chain reaction was performed to determine mRNA expression profile of cldn-1 to -23 in the vocal fold tissue. Immunohistochemistry was performed to clarify the localization of cldn subtypes in the vocal fold SSE.

Results: Gene expression of cldn-1, -3, -4, -5, -6, -7, -8, -10, -11, -12, -17, -22, -23 was identified in the vocal fold tissue. Of these, cldn-3 signals were localized to the cell-cell junction at the most luminal epithelium, and cldn-3, -4, -7, -8 signals were also localized between deeper cells of SSE. The distribution of each cldn subtypes was slightly different in the vocal fold epithelium at 5 and 14 days postinjury.

Conclusions: It was suggested that cldn-3 is a main component of TJ strands existing at the junctional region of the outermost layer of SSE, and is responsible for the paracellular diffusion barrier against small molecules. Although the role of cldns in SSE remains controversial, improved understanding of cldns expression in the vocal fold epithelium may offer new insight into the elucidation of the physiology and various pathogenesis of the vocal folds.

The Incidence of Idiopathic Vocal Fold Paralysis: A Population-Based Study

Farzad Masroor, MD; Debbie Pan, BS; Julia Wei, MPH; Nancy Jiang, MD

Introduction: The incidence and rate of spontaneous recovery of idiopathic vocal fold paralysis (IVFP) is unknown.

Methods: A retrospective analysis of the Kaiser Permanente Northern California electronic healthcare record system was done to identify patients with idiopathic vocal fold paralysis and paresis between 2008 and 2014. The incidence, rate of spontaneous recovery, and their relation to demographic variables and steroid use were determined.

Results: 183 patients with idiopathic vocal fold paralysis and 81 patients with idiopathic vocal fold paresis were identified, yielding a total cohort of 264 patients. 96.% of these cases were unilateral, and 89.8% were over the age of 45. The incidence was 1.04 per 100,000 per year. This was highest for Caucasians (1.60), lowest for Asians (0.63), and similar for gender (1.02 for males and 1.05 for females). 15 (5.7%) patients were treated with steroids, 74 (28%) with speech therapy, 34 (12.9%) with vocal cord injection, and 13 (4.9%) with thyroplasty. The rate of spontaneous recovery was 28.8%, where 20.8% had endoscopic evidence of resolution and 8.0% had clinical improvement in their voice without endoscopic confirmation. The median time to symptom resolution was 4 months and the mean time was 11.4 months. Age, steroid use, and speech therapy were not predictive of spontaneous recovery on multiple logistic regression analysis.

Conclusion: The incidence of IVFP is 1.04 cases per 100,000 per year. 28.8% of patients experience spontaneous recovery.

The Prototype Device for Real-Time Light-Guided Vocal Fold Injection

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Sun Choel Yang, PhD; Il-young Cho, MD; Min-gyu Jo, MD; Hyoseok Seo, MD

Introduction: Vocal fold injection (VFI) is a minimally invasive technique for vocal fold pathologies. Among various approaches, the trans-cricothyroid (CT) membrane approach is a good option for office-based VFI. However, due to invisibility of the needle tip during injection with CT approach, accurate localization requires a high level of experience and there is a steep learning curve involved in mastering this approach. To overcome the current limitations, we conceptualized a novel technique; real-time light-guided vocal fold injection (RL-VFI), which enables simultaneous injection under precise needle localization by visualization of a lighted needle tip. In this study, we developed the prototype device for RL-VFI and applied it in ex vivo canine larynx.

Methods: The device comprised the three parts of light source, controller, and injector. The light source had laser diode modules of two wavelengths (red and green). An ex vivo canine larynx model was used to validate the device in high-resolution flexible videolaryngoscopy system.

Results: The location of the needle tip was accurately indicated by light, and the depth from the mucosa could be estimated by brightness and size of the light. The needle routes from various insertion points could be identified by light. Precise and simultaneous injection could be easily performed on the intended location under the guidance of light.

Conclusions: RL-VFI might be a feasible and promising technique to treat vocal fold pathologies. It is expected that the technique can improve precision of VFI and expand its indication in laryngology.

The Repeatability of Vocal Outcomes across Serial Botulinum Toxin Injections – Using a Novel Method for Real-Time Patient Reported (Vocal) Outcomes

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Douglas Farquhar, MD, MPH; Katherine Adams, BS; Robert A. Buckmire, MD

Introduction: The precise location, and consequently, the effect of intra-laryngeal botulinum toxin deposition within the laryngeal musculature is subject to subtle variability from injection to injection. We employed a novel, real-time method of obtaining patient reported vocal outcomes to investigate subtle temporal variations between voice parameters across serial botulinum toxin injections.

Methods: 13 patients with adductor spasmodic dysphonia receiving stable doses of intralaryngeal botulinum toxin were recruited. The Remind Application (a freeware application) permits real-time patient queries via the patient's preferred method of communication (email, text etc.). Patients were queried in real-time about perceived breathiness, global voice quality and vocal spasms on post-injections days 0, 3, and, weekly throughout at least two consecutive injection cycles.

Results: 13 subjects were included in the study with a total of 30 injections analyzed. The response rate was 93.8%. No statistically significant difference was found between the first and second injection for each of the individual subjects or averaged group response for each parameter. Weekly point to point measures for all parameters were within 9% of one another.

Conclusions: Despite the known variability of toxin depositions during intralaryngeal injections, serial injections by a consistent injector produced repeatable voice results (within 10%), across consecutive injections. The Remind application provides a novel way to improve the collection of patient reported data, in real-time, with a significantly improved response rate in comparison to traditional data collection methods.

The Role of Metformin in Dysplastic Mucosa of the Larynx: A Follow-up Study

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Andrew Blitzer, MD, DDS; Marshall Strome, MD, MS

Objective: To report our ongoing institutional experience with metformin, an oral antihyperglycemic drug, as a possible agent to halt the progression of dysplastic lesions to carcinoma, in those with previously treated laryngeal squamous cell carcinoma (SCC).

Methods: Case series with longitudinal follow up.

Results: There were three patients included who had laryngeal dysplasia (age 66.67 ± 7.09; range 68 – 73 years; 3 male). Follow up time ranged between 12 to 32 months and the average metformin dose was 500mg twice daily. Only one patient experienced a side effect, that being light-headedness and dizziness, but required no change in dose. Two patients showed complete or partial regression of the laryngeal dysplastic mucosa and have not yet required any additional surgeries. The third patient demonstrated a worsening of his dysplastic change after he halted treatment for six weeks, but has since been restarted on metformin and undergoes close surveillance.

Conclusion: This longitudinal case series continues to demonstrate metformin's potential to treat dysplastic change in non-diabetic patients. This effect is thought to possibly occur at the cellular level through the activation of adenosine monophosphate activated protein (AMP) kinase, inducing apoptosis and therefore halting tumour progression. Given that metformin is safe, inexpensive, easy to administer and has minimal side effects it may be a therapeutic candidate to potentially prevent the progression of dysplasia to carcinoma.

The Trach Talk: Improving Knowledge and Confidence of ICU Trainees to Optimize Patient Care

Yael Bensoussan, MD; Jennifer Anderson, MD, MSc; Molly Zirkle, MD, MSc; Allan Vescan, MS, MSc; Melissa Roy, MD, MSc; Tanya Beranjee, MD

Introduction: Patients living with temporary or permanent tracheostomies will be cared for by multiple health care professionals throughout their lives. There remain many educational gaps and misconceptions about their care within the healthcare community, which can unfortunately lead to avoidable morbidity and mortality for these patients. The literature provides evidence that formal training about tracheostomy technique, care and emergencies increases the confidence of the junior doctors and their effectiveness in treating airway emergencies resulting in reduced complication rates for patients. However, there is no formal cross discipline tracheostomy education at our institution. Objective: To assess the impact of a 1-hour interactive seminar on tracheostomy and tracheotomised patient care on the knowledge and confidence level of intensive care trainees in two Level 1 trauma tertiary hospitals in Toronto, Canada.

Methods: Quality improvement prospective study. A 1-hour interactive seminar was developed by a multidisciplinary team and given to intensive care trainees of 2 Level 1 trauma centers in Toronto. A questionnaire including basic knowledge and emergency management was completed by the trainees before, immediately after and 1 month after the seminar. Primary outcome was competency improvement measured by pre- and post-questionnaires. Secondary outcomes were retention of information measured by the 1-month follow-up questionnaire as well as confidence level measured by Likert scales within the questionnaires.

Results: Primary and secondary outcomes for 45 medical trainees will be discussed. Improvement in post questionnaire scores and confidence levels was observed.

Time Course of Recovery of Iatrogenic Vocal Fold Paralysis

Lucian Sulica, MD; Solomon Husain, BS; Babak Sadoughi, MD; Niv Mor, MD

Objective: This study aims to determine the rate and natural time course of iatrogenic vocal fold paralysis (IaVFP) recovery.

Methods: Records of 294 patients with IaVFP treated between 2006 and 2017 were reviewed. Patients seen >1 year after onset (27), lost to follow up (70) or with framework surgery <1 year from onset (76) were excluded. Patient demographics, disease onset, recovery and treatment details, including timing and type of injection augmentation and surgery were recorded. Recovery was defined as return of normal vocal quality.

Results: 121 patients (76F:45M, age 58±13.9, 82 L:32 R:7 Bilateral) were included in the study. 55 patients did not undergo injection augmentation; time course could be assessed in 42 patients who recovered (31F:11M, age 55±14.4). Overall, they recovered in a mean of 175±109 days. Mean time to recovery of R-sided paralysis was 222±115.6 days; L-sided paralysis was 166±104.8 days (p-value=0.091). Patients were stratified by anatomic site of surgery. Mean time to recovery was 180±124 days after neck (20F:4M, age 53±13.8), 144±80 days after thoracic (2F:3M, age 46±15.0), 171±116 days after skull-base (3F:1M, age 56±9.0), 135±40 days after intubation (4F:1M, age 61±10.7), and 239±100 days after carotid (2F:2M, age 75±8.2). ANOVA testing demonstrated a p-value of 0.67. The overall probability of recovery was 71% at 3 months, 59% at 6 months, 40% at 9 months, and 20% at 12 months.

Conclusion: Recovery time of IaVFP is not defined by injury site or laterality. Recovery rates at time from injury may be better guides for determining intervention.

Transcutaneous Electrical Nerve Stimulation as a Treatment for Chronic Cough: A Feasibility Study

Alexandra Michalowski, BA; Naum Shaparin, MD; Michael Z. Lerner, MD

Introduction: For a subset of patients with chronic cough, pharmacological intervention does not provide adequate symptom relief. This study explored the feasibility of using transcutaneous electrical nerve stimulation (TENS) as an adjunct or alternative to standard pharmacologic therapy. TENS is a form of electroanalgesia commonly used to treat an array of pain disorders, including neuropathic pain disorders, which may be physiologically similar to "neuropathic" or refractory chronic cough.

Methods: Laryngeal TENS therapy was administered to three subjects with refractory chronic cough. TENS electrodes were placed on the left neck over the lateral thyrohyoid membrane, approximating the location of the superior laryngeal nerve, and the cricothyroid space. A high frequency current of 120 Hz was applied for 30 minutes. Pre-treatment cough severity index (CSI) and Newcastle Laryngeal Hypersensitivity Questionnaire (NLHQ) data were collected and subjects rated symptoms pre-, during, and post-TENS treatment using a 5-point Likert scale. Flexible laryngoscopy was performed to evaluate for laryngeal muscle contraction during TENS application.

Results: Laryngeal TENS was well-tolerated by all subjects. Adverse effects included brief neck discomfort when increasing TENS intensity and one report of mild post-treatment hoarseness. No abnormal laryngeal muscle contraction was noted on laryngoscopy during stimulation. The self-reported Likert scores showed a trend toward reduction in symptom severity during and after treatment.

Conclusions: In light of this promising paradigm, future research is suggested to investigate the efficacy of TENS as a novel non-pharmacologic intervention for patients suffering from chronic cough or symptoms of laryngeal irritability.

Transoral Rigid 70 Degree Laryngeal Stroboscopy in a Pediatric Voice Clinic

Jennifer Yan, MD; Julina Ongkasuwan, MD

Objective: Complaints of dysphonia and dysphagia frequently require rigid or flexible laryngeal stroboscopy in the office to aid in diagnosis. Transoral rigid 70o stroboscopy allows for higher quality, magnified views of lesions and vibratory patterns compared to flexible stroboscopy. For young children, flexible stroboscopy can be uncomfortable and often requires multiple adults to restrain the child. Rigid stroboscopy does not result in tears but does require patient cooperation; thus it is used primarily in adults. This project describes our experience using rigid stroboscopy in a pediatric cohort.

Methods: This was a retrospective chart review of patients at a Pediatric Voice Clinic who underwent stroboscopy from December 2011 through March 2017. Data analysis is via student t-test and descriptive analysis.

Results: 311 patients were identified with 423 unique stroboscopy exams, of which 212 were flexible and 210 were rigid. One patient did not tolerate either rigid or flexible exam. There was a statistically significant difference in age between children diagnosed via rigid mean 10.92 years (range 2.39-19.14 years) vs. flexible mean 6.51 years (range 0.41-19.29 years), $p \leq 0.01$. Of the 44 children under 3 years, flexible stroboscopy was used almost exclusively, with 43/44 (97.7%) flexible scope exams. Rigid stroboscopy was performed on 24/115 (20.9%) children ages 3-5, 26/40 (65%) 6-year-olds, and 159/223 (71.3%) aged 7 and older.

Conclusion: Transoral 70o rigid stroboscopy can be used in select children down to 3 years. This modality allows for improved visualization of lesions with greater comfort for patients.

Treatment and Outcomes of Self Reported Voice Problems in the US Population Over Age 65 Years

Stephanie Misono, MD, MPH; Schelomo Marmor, PhD, MPH

Objectives: (1) Characterize the US general population ≥age 65 with self-reported voice problems, (2) describe characteristics of voice treatment in this group, and (3) identify factors associated with self-reported voice improvement.

Methods: We identified a cohort of adults aged ≥65 years in the US from the National Health Interview Survey, a population-based cross-sectional national survey data. Descriptive and multivariable regression analyses were performed.

Results: The prevalence of self-reported voice problems in this cohort was 10%. The strongest predictor of reporting voice improvement was receipt of voice treatment (OR 3.18 [95%CI 1.36, 7.42]). Eleven percent of those reporting voice problems reported receiving voice treatment. Female gender was significantly associated with reporting treatment (OR 2.5 [95% CI 1.13, 5.56]). Among those who received voice treatment, 38% reported "better," 33% "same," and 29% "worse" voice symptoms over the past year, compared to 17%, 67%, and 16%, respectively, among those who did not receive treatment. Among those who reported treatment, we observed differences related to gender, race, age, and education associated with report of "better," "same," or "worse" voice symptoms.

Conclusions: A significant portion of the US population ≥age 65 reported voice problems. A small minority reported receiving voice treatment. Vocal improvement was associated with treatment. Further investigation is needed to clarify patient and treatment characteristics most associated with vocal improvement.

Trends in Editorial Board Membership over the Past 20 Years

Elizabeth H. Wick, MD; Mark E. Whipple, MD, MS;
Julie Goldman, MD; Jamie Litvack, MD, MS

Objectives: 1. Determine the proportion of female representation on a cross-section of general and subspecialty-specific otolaryngology editorial boards over the past 20 years 2. Measure relative rate of advancement between male and female cohorts over duration of service

Methods: This is an observational study reviewing female representation across nine otolaryngology journals from 1997-2017. Journals were selected based on impact factor and subspecialty coverage using the 2015 Scimago Journal & Country Rank for initial screening. Female representation was evaluated at the following levels of leadership: editorial board member, associate and/or section editor, and editor-in-chief. Advancement criteria and member demographics were obtained via direct communication and public records.

Results: In 2017, 20% of all editorial board members, and 22% of all associate or section editors were women. However, there was huge variability between journals with the proportion of female editorial board members ranging from 11 to 39% and the proportion of female associate editors ranging from 5 to 40% per journal. No editor-in-chief was female. One journal demonstrated a significantly higher proportion of female associate editors and was observed to have more transparency regarding advancement criteria.

Conclusion: The proportion of female editorial board members and associate or section editors is comparable to the proportion of women in otolaryngology practice. However, there is still large variability in the gender make up of journal editorial boards. Transparency with regard to advancement criteria may explain part of this variability. Disparity at the highest level of advancement still exists: none of the nine journals has a female editor-in-chief.

Trigger Reduction Prior to Drugs for Neurogenic Chronic Cough

Craig H. Zalvan, MD; Craig Berzofsky, MD;
Jan Geliebter, PhD; Raj Tiwari, PhD

Introduction: Neurogenic chronic cough (NCC) typically presents as a post-viral chronic cough spasms, preceded by a tickle sensation with multiple triggers and often recalcitrant to multiple treatments. Current treatment has focused on the use of neuromodulating agents with moderate success. Post nasal drainage and laryngopharyngeal reflux (LPR) can be a trigger for these coughing events in the setting of laryngopharyngeal hypersensitivity. Treatment with a trigger reduction approach using nasal toilet and a dietary regimen for LPR will be presented.

Methods: This is a retrospective chart review of new patients with cough (R05.0) from the past year excluding those found to have asthma, sinus disease, or pulmonary causes. Cough symptom index (CSI) and Reflux symptom index (RSI) were evaluated at initial presentation and again at 6 weeks after treatment with a trigger reduction approach.

Results: Of 119 patients, 29 met criteria. This cohort of 29 patients exhibited a statistically significant reduction ($p<0.0001$) in mean RSI from 21.2 (95% CI; 17.6 – 24.76) at baseline to a 6 wk mean of 11.2 (95% CI; 7.4 – 15.0). Twenty one of these 29 patients experienced a clinically significant 6-point reduction in RSI. Concomitant with this decrease in RSI was a statistically and clinically significant reduction ($p<0.0001$) in mean CSI from 17.9 (95% CI; 14.6 – 21.3) at baseline to a 6 wk mean of 7.02 (95% CI; 3.7 – 10.4).

Conclusion: Based on this review, it is reasonable to initiate a trigger reduction approach in patients with NCC prior to the initiation of neuromodulating medications

Type I Thyroplasty Using Gore-Tex and Silastic Implant: A Safe Outpatient Procedure

Attapon Junlapan, MD; C. Kwang Sung, MD; Edward J. Damrose, MD

Objective: Overnight hospitalization is routinely advocated following type I thyroplasty (TP) because of concerns for airway compromise. Hospitalization increases cost and patient inconvenience, and may not necessarily be appropriate. This study evaluated complications following surgery and identified predictors for same in order to assess which patients benefit most from hospitalization. Methods: A retrospective chart review was conducted on patients who underwent TP with or without arytenoid repositioning procedures, between June 2008 and March 2017. The demographic data of the subjects, characteristics, etiology of glottic insufficiency, interventions performed, and subsequent complications were evaluated.

Results: Of 147 patients reviewed, 100 underwent TP alone, 41 underwent TP with arytenoid adduction (AA) and 6 patients underwent TP with adduction arytenopexy (AP). Iatrogenic vocal fold paralysis was the most common indication. Major complications, which included transient airway compromise and hematoma requiring reoperation, occurred in 7% of patients. Revision surgery and thyroplasty combined with repositioning maneuvers were associated with increased risk of major complications.

Conclusions: In general type 1 thyroplasty is a safe procedure, with a major complication rate that is lower than that of outpatient thyroidectomy. Overnight hospitalization should be considered in patients undergoing revision surgery and in those requiring concurrent arytenoid reposition procedures.

Wrapping Airway Cart Instruments: Limitations to Access without the Intended Safety Benefits

Skyler Nielsen, DO; Jayne Stevens, MD; Gregory Stevens, MD;
Jagatkumar Patel, BS; Robert Eller, MD

Introduction: A few case studies have shown improper sterilization or contamination of equipment from Anesthesia carts can lead to transmission of disease and even death. Citing this literature, national accrediting agencies recently mandated that all instruments in the Otolaryngology airway carts at San Antonio Military Medical Center be packaged to prevent contamination. This study sought to determine the safety and efficiency of a packaged instrument airway cart.

Methods: A retrospective review of upper aerodigestive tract procedures, some of which penetrated mucosa, was performed by analyzing 100 consecutive patient records during the unpackaged period and 100 during the packaged period. A comparison of infections, deaths, and length of stay in the hospital was included in the analysis. Additionally, a timed simulation to setup instruments for an emergency airway situation from both the unpackaged and packaged airway carts was performed using a total of 11 surgical technologists and nurses.

Results: Each group had a total of 4 airway infections and neither had any deaths. The average length of hospital stay was 0.36 days for the unpackaged period and 0.44 days from the packaged period. None of these variables reached statistical significance. The average time to find and set out the correct instruments for the two groups was 46.6 and 95.5 seconds for the unpackaged and packaged airway carts, respectively (p-value = 0.004).

Conclusion: This study suggests individually packaging of instruments used for emergency airway cases may put lives at risk when time matters and fails to decrease the risk of infection.

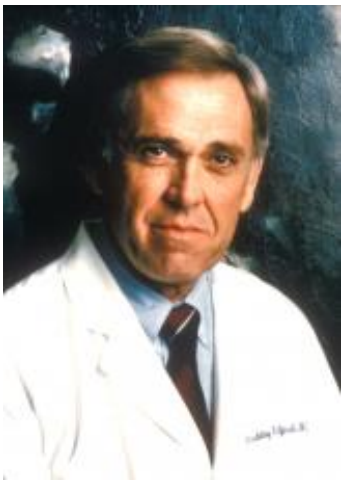
BOBBY R. ALFORD, MD
May 30, 1932 – February 20, 2018

One of our long-time and enduring Fellows, Dr. Bobby R. Alford passed away on February 20, 2018 after a brief illness. Dr. Alford was inducted as an Active Fellow in 1974 and during the 2017 annual meeting, was elevated to Emeritus status. He played a pivotal role in the merging of AAO and ACO as the American Academy of Otolaryngology-Head & Neck Surgery as we know it today.

Graduating cum laude from Tyler Junior College, Dr. Alford attended the University of Texas at Austin, and earned his M.D. with Honors from Baylor College of Medicine. He completed his internship and residency at Jefferson Davis Hospital and Baylor College of Medicine in Houston, followed by the completion of a fellowship in otology at the University of Texas Medical Branch in Galveston and was an NIH special fellow in neurophysiology at the Johns Hopkins University School of Medicine in Baltimore, Maryland.

In 1962, Dr. Alford joined the faculty of Baylor College of Medicine where for more than 40 years, he served as professor and chairman of the department that now bears his name, the Bobby R. Alford Department of Otolaryngology – Head and Neck Surgery. He also served as chief of the otolaryngology services facilities throughout Houston. During his tenure at Baylor College of Medicine, Bobby was executive vice president and dean of medicine, distinguished service professor, program director of the otolaryngology residency program, and held the Olga Keith Wiess Chair of Otorhinolaryngology and Communicative Sciences and the Friedkin Chair for Research in Sensory System Integration and Space Medicine.

Dr. Alford also served as interim chairman of the Michael E. DeBakey Department of Surgery after Dr. DeBakey's retirement. From 1997 to 2017, he was chairman of the board of directors of the



National Space Biomedical Research Institute in Houston during which time he also served 14 years as chief executive officer. From 2004 to 2010, he was chancellor of Baylor College of Medicine.

Dr. Alfords' most enduring legacy may be the enrichment of the lives of countless patients he treated over the years and the innumerable students, residents, and fellows he trained during more than 50 years of service. As the consummate physician and surgeon, his true legacy will live on in the lives of those inspired by his dedication and commitment to patients, research, education, and the pursuit of excellence he instilled in the more than 300 residents and faculty who continue to be leaders in otolaryngology and organized medicine.

An avid outdoorsman and yachtsman, Dr. Alford received much enjoyment many years years he sailed on Galveston Bay. An accomplished sailboat racer, he competed in many different classes of boats, including Ensigns and Solings. Bobby spent his later years cruising and motorboating along the Texas coast. His love for the outdoors and competitive sailing was passed on to all three of his children.

He is survived by his high school sweetheart and wife of 64 years, Othelia; children: Brad (Donna), Raye and Scott (Tommie); his grandchildren, Brice, Savannah and Linleigh Alford; nieces, nephews and other family.

JAMES H. KELLY, MD
March 18, 1943 - April 8, 2018

Dr. James H. Kelly, age 74 years old and former chairman of Greater Baltimore Medical Center's Department of Otolaryn-gology, passed away on February 8, 2018 of complications from cancer at Gilchrist Hospice Care in Towson, Maryland. Dr. Kelly was inducted as an Active Fellow of the ALA in 1998 and in 2012 was elevated to Emeritus status.

Born in Savannah, Georgia, Dr. Kelly completed his undergraduate studies at the University of Georgia, and received his medical degree in 1968 from the Medical University of South Carolina. His surgical internship and first year residency was completed at Vanderbilt University Medical. Following this training, Dr. Kelly served our country in the military as a captain with the Army Reserve Otolaryngology Service from 1968 to 1971 at Tripler Army Hospital in Honolulu where he treated wounded soldiers requiring specialty surgery. For the next two years, he served in a similar capacity as a major at Madigan General Hospital in Tacoma, Washington that was followed at Fort Hood Army Hospital, Texas, from 1972 to 1973.

Dr. Kelly entered private practice as an emergency room staff member at Bradley Memorial Hospital in Southington as well as the Meriden-Wallingford Hospital from 1973 to 1974. In 1974, he completed a residency in otolaryngology at the Massachusetts Eye and Ear Infirmary at the Harvard Medical School. Prior to establishing what is recognized as a very distinguished medical career, Dr. Kelly held positions at numerous facilities included the MA Eye and Ear Infirmary, Harvard Medical School, Beth Israel and Brigham & Women's hospitals. He also established the Joint Center of Otolaryngology, a private practice, with several colleagues, and was a consultant at the Sidney Farber Institute in Boston.

In 1987, he was appointed chairperson of Otolaryngology at the Greater Baltimore Medical Center (GBMC) and served in that

capacity until his retirement in 2011. During his tenure at GBMC, the otolaryngology program was named as national best by U.S. News & World Report. Among his many accomplishments, he developed cleft palate and cochlear implant programs, established a facial reconstructive clinic for children with cleft palates, and brought Hopkins head and neck surgery faculty to GBMC, for collaboration with their counterparts.

Numerous colleagues paid tribute to him including Dr. Thomas Lansdale III who acknowledged Dr. Kelly had "wonderful professional judgment and was an excellent teacher," He also spoke of Dr. Kelly's "twinkle in his eye that would always light up a room." Dr. David W. Eisele, director of the Johns Hopkins Department of Otolaryngology-Head and Neck Surgery, stated it very well in describing his colleague, "He was a beloved faculty member in the department. He developed strong relationships and was one of our best faculty members in terms of engagement with our trainees. All of our residents… looked up to Jim as a role model."

For relaxation and spending time with family and friends, Dr. Kelly was an inveterate fly fisherman but also enjoyed playing tennis, cooking international cuisine and reading spy thriller and detective novels.

Dr. Kelly leaves to cherish his memory, his wife, Jane Hill; two sons, James H. Kelly Jr. of Boston and Alexander Kelly of Canton; a daughter, Erin Tilghman of Winter Haven, Fla.; siblings, William David Kelly (Brooklet, GA), John L. Kelly (Charlotte, NC), Kelly Fields (Athens, GA), and three granddaughters.

William H. Saunders, M.D.
January 7, 1920 – March 5, 2018

William Howerton Saunders, M.D., an ALA Emeritus Fellow, passed away on March 5, 2018 at the age of 98 years old. Dr. Saunders was inducted into the Association as an Active Fellow in 1964 and elevated to Emeritus status in 1989.

Graduating in 1943 from the University of Iowa where he received his medical degree, he completed his residency in Otolaryngology at the University of Michigan in 1954. In 1954, he accepted an appointment as an Assistant Professor in the Department of Otolaryngology at The Ohio State University (OSU) College of Medicine. For 30 years, Dr. Saunders remained at OSU and of that time, he served as chairman of the department for 21 years, creating one of the nation's most well-respected Otolaryngology programs in patient care, medical education and medical research, and garnering an international reputation for excellence. He held the position of professor from 1960 to 1985, and professor emeritus since 1985. Upon retirement, he was honored with the creation of the endowed William H. Saunders Chair in Otolaryngology at The Ohio State University and the William H. Saunders Lectureship Award that is presented to internationally renowned physicians for their accomplishments in patient care, research and education in Otolaryngology-Head and Neck Surgery.

Dr. Saunders was a member of many prestigious societies including the AOS, the AHNS, the ABOto, and the Ohio State Medical Association. He served as president of the American Triological Society and as vice president of both the American Board of Otolaryngology and the American Laryngological Association.

He was an examiner for board certification for the American Board of Otolaryngology, and served as a consultant to Wright Patterson Air Force Base in Dayton, Ohio, and the Veterans

Administration in Dayton and Columbus. Dr. Saunders was a recognized author of many medical textbooks that were translated into multiple languages, in addition to numerous scientific papers.

He co-authored the Textbook of Otolaryngology with David DeWeese, M.D. which became the best-selling textbook of the specialty for several years. Dr. Saunders possessed many non-medical talents including being a registered gemologist. He and his wife, Putzi, combined their artistic talents to design jewelry which was sold at national Otolaryngology meetings to benefit the Deafness Research Foundation. In addition, he was an award-winning weaver of quilts that were initially designed by Putzi.

Dr. Saunders is survived by his wife of 59 years, Putzi Saunders, and three children, daughter, Elaine (Joe) Rainwater of Charlottesville, Virginia; sons, Tom (Jennifer) Saunders of Portland, Oregon; Mike Saunders of Boulder, Colorado, and son-in-law, David Chandler of Sydney, Australia, He also leaves to cherish his memory, four grandchildren, Christopher Rainwater (Lyndhurst, New Jersey), Tom Chandler and Elizabeth Flack (Sydney, Australia) Maggie Chandler (New York, New York) , and Gregory and Daniel Saunders (Portland, Oregon).

MINORU HIRANO, M.D.
December 10, 1932 – December 19, 2017

Dr. Minoru Hirano, a foundational figure of modern Laryngology, passed away suddently on December 19, 2017.

Dr. Hirano was elected Corresponding Fellow in 1984, and received the ALA Award in 2012. Dr. Hirano became a Corresponding Emeritus Fellow in 2015.

He is widely known for his original contributions to functional vocal fold anatomy. His landmark publication, *Histological Color Atlas of the Human Larynx*, presented anatomic observations which now form the basis for modern clinical practice. As an academic laryngologist, he spent his career at Kyoto University, where he mentored numerous laryngeal surgeons

and investigators, not least his son, Dr. Shigeru Hirano, now a leading figure in the own right.

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1894	J. O. Roe
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1898	W. E. Casselberry
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1900	H. L. Swain
1901	J. W. Farlow
1902	J. H. Bryan
1903	J. H. Hartman
1904	C. C. Rice
1905	J. W. Gleitsmann
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1907	H. S. Birkett
1908	A. Coolidge, Jr
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1910	D. Braden Kyle
1911	James E. Newcomb
1912	George A. Leland
1913	Thomas Hubbard
1914	Alexander W. MacCoy
1915	G. Hudson Makuen
1916	Joseph L. Goodale
1917	Thomas H. Halsted
1918	Cornelius G. Coakley
1919	Norval H. Pierce
1920	Harris P. Mosher
1921	Harmon Smith
1922	Emil Mayer
1923	J. Payson Clark
1924	Lee Wallace Dean
1925	Greenfield Sluder
1226	Chevalier Jackson
1927	D. Bryson Delavan
1928	Charles W. Richardson
1929	Lewis A. Coffin
1930	Francis R. Packard
1931	George E. Shambaugh
1932	George Fetterolf
1933	George M. Coates
1934	Dunbar Roy
1935	Burt R. Shurly
1936	William B. Chamberlain
1937	John F. Barnhill
1938	George B. Wood
1939	James A. Babbitt
1940	Gordon Berry
1941	Thomas E. Carmody
1942-43	Charles J. Imperatori
1944-45	Harold I. Lillie
1946	Frank R. Spencer
1947	Arthur W. Proetz
1948	Frederick T. Hill
1949	Ralph A. Fenton
1950	Gordon B. New
1951	H. Marshall Taylor
1952	Louis H. Clerf
1953	Gordon F. Harkness
1954	Henry B. Orton
1955	Bernard J. McMahon
1956	LeRoy A. Schall
1957	Harry P. Schenck
1958	Fred W. Dixon
1959	William J. McNally
1960	Edwin N. Broyles
1961	Dean M. Lierle
1962	Francis E. LeJeune
1963	Anderson C. Hilding
1964	Albert C. Furstenberg
1965	Paul A. Holinger
1966	Joel J. Pressman
1967	Lawrence R. Boies
1968	Francis W. Davison
1969	Alden H. Miller
1970	DeGraaf Woodman
1971	F. Johnson Putney
1972	Frank D. Lathrop
1973	G. Slaughter Fitz-Hugh
1974	Daniel C. Baker, Jr
1974	Joseph H. Ogura
1975	Stanton A. Friedberg
1976	Charles M. Norris
1977	Charles F. Ferguson
1978	John F. Daly
1979	John A. Kirchner
1980	Daniel Miller
1981	Harold C. Tabb
1982	M. Stuart Strong
1983	John S. Lewis
1984	Gabriel F. Tucker, Jr
1985	Douglas P. Bryce
1986	Loring W. Pratt
1987	Blair Fearon
1988	Seymour R. Cohen
1989	Eugene N. Myers
1990	James B. Snow, Jr
1991	John M. Fredrickson
1992	William R. Hudson
1993	Byron J. Bailey
1994	H. Bryan Neel III
1995	Paul H. Ward
1996	Robert W. Cantrell
1997	John A. Tucker
1998	Lauren D. Holinger
1999	Gerald B. Healy
2000	Harold C. Pillsbury III
2001	Stanley M. Shapshay
2002	Gerald S. Berke
2003	W. Frederick McGuirt, Sr.
2004	Robert H. Ossoff
2005	Robert T. Sataloff
2006	Gayle E. Woodson
2007	Marshall Strome
2008	Roger l. Crumley
2009	Marvin P. Fried
2010	Andrew Blitzer
2011	Michael S. Benninger
2012	Claremce T. Sasaki
2013	C. Gaelyn Garrett
2014	Mark S. Courey
2015	Peak Woo
2016	Kenneth Altman
2017	Gady Har-El

Vice Presidents (First and Second)

1879	F.H. Davis
1880	W. C. Glasgow, J. O. Roe
1881	E. L. Shurly, W. Porter
1882	C. Seiler, E. F. Ingals
1883	S. W. Langmaid, S. Johnston
1884	J. H. Hartman, W. H. Daly
1885	H.A. Johnson, G. W. Major
1886	E. C. Morgan, J. N. Mackenzie
1887	J. N. Mackenzie, S. W. Langmaid
1888	W. C. Glasgow, C. E. DeM. Sajous
1889	F. Holden, C.E. Bean
1890	J. O. Roe, J. H. Hartman
1891	M. J. Asch, S. Johnston
1892	S. Johnston, J. C. Mulhall
1893	J. C. Mulhall, W. E. Casselberry
1894	C.C.Rice, S. H. Chapman
1895	J. Wright, A. W. de Roaldes
1896	T. M. Murray, D. N. Rankin
1897	A. W. MacCoy, H. S. Birkett
1898	J. W. Farlow, F.W. Hinkel
1899	T. A. DeBlois, M. R. Brown
1900	H. L. Wahner, A. A. Bliss
1901	J. W. Gleitsmann, D. Braden Kyle
1902	G.A. Leland, T. Melville Hardie
1903	J. H. Lowman, W. Peyre Porcher
1904	Thomaso Hubbard, W. J. Freeman
1905	J. L. Goodale, C. W. Richardson
1906	G. H. Makuen, A. R. Thrasher
1907	J. P. Clark, J. E. Rhodes
1908	E. Mayer, F. R. Packard
1909	C. G. Coakley, H. O. Moser
1910	Robert C. Myles, J. M. Ingersoll
1911	F. C. Cobb, B. R. Shuly
1912	A. W. Watson, W. Scott Renner
1913	F. E. Hopkins, George E. Shambaugh
1914	Clement T. Theien, Lewis A. Coffin
1915	J. Gordon Wilson, Christian R. Holmes
1916	Thomas H. Halsted, Greenfield Sluder
1929	William B. Chamberlin, Ralph A. Fenton
1930	Harris P. Mosher, James A. Babbitt
1931	Joseph B. Greene, E. Ross Faulkner
1932	Gordon Berry, Frank R. Spencer
1933	E. Ross Faulkner, Thomas S. Carmody
1934	Fordon B. New, Samuel McCullagh
1935	Edward C. Sewall, H. Marshall Taylor
1936	William P. Wherry, Harold I. Lillie
1937	Frank R. Spencer, Bernard J. McMahon
1938	Ralph A. Fenton, Frederick T. Hill
1939	John H. Foster, Thomas R. Gittins
1940	Charles H. Porter, Gordon F. Harkness
1941	Arthur W. Proetz, Henry B. Orton
1942-3	Harold I. Lillie, Dean M. Lierle
1944-5	John J. Shea, Thomas C. Galloway
1946	H. Marshall Taylor, C. Stewart Nash
1947	John J. Shea, Frederick A. Figi
1948	Henry B. Orton, Anderson C. Hilding
1949	LeRoy A. Schall, Fletcher D. Woodward
1950	W. Likely Simpson, Lyman, G. Richards
1951	William J. McNally, Thomas C. Galloway
1952	J. MacKenzie Brown, Edwin N. Broyles
1953	Claude C. Cody, Daniel S. cunning
1954	James H. Maxwell, Clyde A. Heatly
1955	Robert L. Goodale, Paul H. Holinger
1956	Henry M. Goodyear, Robert E. Priest
1957	Frances H. LeJeune, Pierre P. Viole
1958	Charles Blassingame, Chevalier L. Jackson
1959	James H. Maxwell, Oliver Van Alyea
1960	Walter Theobald, Anderson C. Hilding
1961	Julius W. McCall, P. E. Irlend
1962	Paul M. Moore, Jerome A. Hilger
1963	Paul M. Holinger, Lester A. Brown
1964	B. Slaughter Fitz-Hugh, Daniel C. Baker
1965	C. E. Munoz-McCormick, Arthur J. Crasovaner
1966	Lawrence R. Boies, G. Edward Tremble
1967	John F. Daly, Stanton A. Friedberg
1968	DeGraaf Woodman, John Murtagh

Vice Presidents (First and Second)

1917	John Edwin Rhodes, D. Crosby Greene
1918	George E. Shambaugh, John R. Winslow
1919	Francis R. Packard, Harmon Smith
1920	Harmon Smith, W. B. Chamberlin
1921	Dunbar Roy,m Robert C. Lynch
1922	George Fetterolf, Lorenzo B. Lockard
1923	Hubert Arrowsmith, Joseph B. Greene
1924	Ross H. Skillern, Gordon Berry
1925	John E. Mackenty, Robert Levy
1926	Lewis A. Coffin, William V. Mullin
1927	Charles W. Richardon, Hill Hastings
1928	Robert Cole Lynch, Francis P. Emerson
1969	Joseph P. Atkins, Stanton A. Friedberg
1970	Robert B. Lewy, Oliver W. Suehs
1970	James A. Harrill, James D. Baxter
1972	Francis L. Weille, Sam H. Sanders
1973	William H. Saunders, Blair Fearon
1974	Joseph H. Ogura, Douglas P. Bryce, John A. Kirchner
1975	S. Lewis, Edwin W. Cocke, Jr.
1976	Emanuel M. Skolnik, John T. Dickinson
1977	J. Ryan Chandler, Herbert H. Dedo
1978	John E. Bordley, Lester A. Brown
1979	Albert H.Andrews, Seymour R. Cohen
1980	John Frazer, George A. Sisson

Vice Presidents (President-Elect)

1981	M. Stuart Strong
1982	John S. Lewis
1983	Gabriel F. Tucker, Jr
1984	Douglas P. Bryce
1985	Loring W. Pratt
1986	Blair Fearon
1987	Seymour R. Cohen
1988	Eugene N. Myers
1989	James B. Snow, Jr
1990	John M. Fredrickson
1991	William R. Hudson
1992	Byron J. Bailey
1993	H. Bryan Neel III
1994	Paul H. Ward
1995	Robert W. Cantrell
1996	John A. Tucker
1997	Lauren D. Holinger
1998	Gerald B. Healy
1999	Harold C. Pillsbury III
2000	Stanley M. Shapshay
2001	Gerald S. Berke
2002	W. Frederick McGuirt, Sr.
2003	Robert H. Ossoff
2004	Robert T. Sataloff
2005	Gayle E. Woodson
2006	Marshall Strome
2007	Roger l. Crumley
2008	Marvin P. Fried
2009	Andrew Blitzer
2010	Michael S. Benninger
2011	Claremce T. Sasaki
2012	C. Gaelyn Garrett
2013	Mark S. Courey
2014	Peak Woo
2015	Kenneth Altman
2016	Gady Har-El
2017	C. Blake Simpson

Secretaries and Treasurers

1879	G. M. Lefferts	1889	C. H. Knight	1900	P. E. Newcomb
1882	D. Bryson Delavan	1895	H. L. Swain	1911	Harmon Smith

Secretaries

1911	Harmon Smith	1947	Louis H. Clerf	1988	H. Bryan Neel III
1918	D. Bryson Delavan	1952	Harry P. Schenck	1993	Gerald B. Healy
1919	J. M. Ingersoll	1957	James H. Maxwell	1998	Robert H. Ossoff
1920	George M. Coates	1959	Lyman G. Richards	2003	Marvin P. Fried
1933	William V. Mullin	1968	Frank D. Lathrop	2008	C. Gaelyn Garrett
1935	James A. Babbitt	1972	John F. Daly	2013	Gady Har-El
1939	Charles J. Imperatori	1977	William Trible	2017	Lucian Sulica
1942	Arthur W. Proetz	1982	Eugene N. Myers		

Treasurers

1912	J. Payson Clark	1953	Fred W. Dixon	1990	Robert W. Cantrell
1912	George Fetterolf	1958	Francis E. LeJeune	1995	Harold C. Pillsbury, III
1932	William V. Mullin	1962	Alden H. Miller	1999	Robert T. Sataloff
1933	James A. Babbitt	1969	Charles M. Norris	2005	Allen D. Hillel
1935	Charles J. Imperatori	1976	Harold G. Tabb	2006	Michael S. Benninger
1939	Frederick T. Hill	1981	Loring W. Pratt	2011	Kenneth Altman
1948	Gordon F. Harkness	1985	John M. Fredrickson	2015	Clark Rosen

Librarians

1879	F. H. Bosworth	1903	J. H. Bryan	1934	Burt R. Shurly
1883	T. R. French	1930	John F. Barnhill	1935	George M. Coates

Librarian and Historian

1936	George M. Coates	1944	LoLouis H. Clerf

Librarian, Historian and Editor

1947	Harry P. Schenck	1971	Charles F. Ferguson	1997	Stanley M. Shapshay
1952	Bernard J. McMahon	1977	Gabriel F. Tucker, Jr	2000	Gayle E. Woodson
1955	Edwin N. Broyles	1983	James B. Snow, Jr	2005	C. Gaelyn Garrett
1960	Francis W. Davison	1989	Paul H. Ward	2008	Mark S. Courey
1964	F. Johnson Putney	1994	Ernest A. Weymuller, Jr	2012	C. Blake Simpson
				2016	Dinesh Chhetri

Historian

2010	Robert H. Ossoff	2015	Michael Benninger

DECEASED FELLOWS

Dates indicate original election to the Association

Honorary Fellows

1946	Alonso, Justo M., Montevideo, Uruguay
1992	Aschan, Gunnar K., Linköping, Sweden
1908	Barnhill, John F., Miami Beach, FL
1983	Birkett, Herbert S., Montreal, CN
1878	Bosworth, Francke H., New York, NY
1940	Broyles, Edwin N., Baltimore, MD
1917	Coates, George M., Philadelphia, PA
1925	Clerf, Louis H., St Petersburg, FL
1957	Conley, John J., New York, NY
1960	Daly, John F., Fort Lee, NJ
1818	Dean, Lee Wallace, St Louis, MO
1881	Delavan, D. Bryson, New York, NY
1891	De La Sota y Lastra, Ramon, Seville, Spain
1893	de Roaldes, Arthur W., New Orleans, LA
1923	Fenton, Ralph A., Portland, OR
1879	French, Thomas R., Brooklyn, NY
1936	Galloway, Thomas C., Evanston, IL
1880	Garcia, Manuel, London, ENG
1986	Gould, Wilbur J., New York, NY
1903	Harris, Thomas J., New York, NY
1971	Harrison, Sir Donald F. N., Surrey, England
1943	Hilding, Anderson C., Duluth, MN
1928	Hill, Frederick T., Waterville, ME
1948	Holinger, Paul H., Chicago, IL
1957	Huizinga, Eelco, Groningen, the Netherlands
1907	Jackson, Chevalier, Schwenksville, PA
1878	Johnston, Samuel, Baltimore, MD
1878	Lefferts, George Morewood, Katonah, NY
1914	Levy, Robert, Denver, CO
1918	Lewis, Fielding O., Media, PA
1933	Lierle, Dean M., Iowa City, IA
1883	Mackenzie, John N., Baltimore, MD
1881	Mackenzie, Sir Morell, London, ENG
1910	Masser, Ferdinand, Naples, Italy
1904	Mosher, Harris P., Marblehead, MA
1910	Moure, J. J. E., Bordeaux, France
1937	Nager, F. R., Zurich, Switzerland
1930	Negus, Sir Victor E., London, ENG
1818	Oliver, H. K., Boston, MA
1957	Ono, Jo, Tokyo, Japan
1906	Pierce, Norval Harvey, San Diego, CA
1937	Portmann, Georges, Bordeaux, France
1924	Proetz, Arthur C., St Louis, MO
1957	Ruedi, Luzius, Zurich, Switzerland
1932	Schall, LeRoy A., Boston, MA
1909	Semon, Sir Felix, Great Missenden, England
1878	Solis-Cohen, J., Philadelphia, PA
1973	Som, Max L., New York, NY
1889	Swain, Henry L., New Haven, CT
1914	Thomson, Sir St Clair, London, ENG
1903	Tilley, Herbert, London, ENG
1914	Wagner, Clinton, New York, NY
1948	Williams, Henry L., Rochester, MN
1951	Woodman, DeGraaf, New York, NY
1890	Wright, Jonathan, Pleasantville, NY

Corresponding Fellows

1978	Arauz, Juan Carlos, Buenos Aires, Argentina
1972	Arslan, Michele, Padua, Italy
1942	Batson, Oscar V., Philadelphia, PA
1938	Blair, Vilray P., St Louis, MO
1892	Browne, Lennox, London, England
1968	Cawthorne, Sir Terence, London, England
1964	Cleves, Carlos, Bogota, Colombia
1940	Colledge, Lionel, London, England
1901	Collier, Mayo, Kearsney Abbey, Kent, England
1893	Desvernine, Carlos M., Havana, Cuba
1966	Dohlman, Gösta, East Bradenton, FL
1943	Eggston, Andrew A., New York, NY
1930	Emerson, Francis P., Franklin, MA
1961	Faaborg-Anderson, Kund, Nykobing, Denmark
2007	Fonseca, Rolando, Buenos Aires, Argentina
1936	Fraser, John S., Edinburgh,UK
1887	Gougenheim, A., Paris, France
1901	Grant, Sir James Dundas, London, England
2017	Hirano, Minoru, Kurume, JAPAN
1984	Holden, Edgar, Newark, NJ
1970	Hutcheon, Jack R., Brisbane, Australia
1985	Inouye, Tetsuzo, Saitama, Japan
1919	Kelly, Adam Brown, Helensburgh, Scotland
1978	Kleinsasser, Oskar, Marburg, Germany
1881	Labus, Carlo, Milan, Italy
1950	Larsell, Olof, Portland, OR
1931	LaSagna, Francesco, Parma, Italy
1926	Law, Frederick M., New York
1921	LeMaitre, Ferdinand, Paris
1902	Lermoyez, Marcel, Paris, France
1897	Luc, H., Paris, France
1970	Macbeth, Ronald G., Oxford, England
1896	MacDonald, Greville, Haslemere, England
1894	MacIntyre, John, Glasgow, Scotland
1903	McBride, P., York, England
1920	McKenzie, Dan, London, England
1919	McKernon, James F., New Canaan, CT
1880	Meyer, Wilhelm, Copenhagen, Denmark
1896	Mygind, Holger, Copenhagen, Denmark
1950	Neil, James Hardie, Auckland, New Zealand
1919	Paterson, Donald Rose, Cardiff, Wales
1941	Patterson, Norman, Herts, England
1971	Rethi, Aurelius, Budapest, Hungary
1919	Rogers, John, Jr, New York, NY
1894	Sajous, C. E. DeM., Philadelphia, PA
1924	Schaefer, J. Parson, Philadelphia, PA
1896	Schmiegelow, Ernst, Copenhagen, Denmark
1946	Segura, Eliseo, Buenos Aires, Argentina
1940	Soto, E. Fernandez, Havana, Cuba
1881	Thornton, Pugin, London, England
1913	Turner, A. Logan, Edinburgh, UK
1936	Vialle, Jacques, Nice, France
1880	Whistler, W. McNeil, London, England
1901	Wingrave, Wyatt, Lyme Regis, England
1894	Wolfenden, R. Norric, Kent, England

Deceased Fellows

Emeritus Fellows

2018 Alford, Bobby, Houston, TX
1962 Arnold, Godfrey E., Clinton, MS
1969 Ausband, John R., Beaufort, SC
1936 Ballenger, Howard C., Winnetka, IL
1923 Barlow, Roy A., Nova Scotia, Canada
1915 Barnes, Hharry Aldrich, Kingston, MA
1944 Beatty, Hugh G., Columbus, OH
1928 Beck, Joseph C., Chicago, IL
1921 Berry, Gordon, Worcester, MA
1975 Biller, Hugh,
1944 Boies, Lawrence R., Minneapolis, MN
1975 Boles, Roger
1955 Bordley, John E., Baltimore, MD
1941 Bowers, Wesley C., New York, NY
1901 Brown, J. Price, Toronto, Canada
1955 Brown, Lester A., Atlanta. GA
1891 Bryan, Joseph H., Washington, DC
1963 Bryce, Douglas P, Toronto Canada
1913 Butler, Ralph, Philadelphia, PA
1930 Campbell, Edward H., Philadelphia, PA
1945 Campbell, Paul A., San Antonio, TX
1942 Canfield, Norton, Miami, FL
1959 Cardwell, Edgar P., Newark, NJ
1897 Clark, J. Payson, Boston, MA
1968 Chandler, J. Ryan, Miami, FL
1899 Cobb, Frederick C., Bradenton, FL
1939 Cocke, Edwin W. Jr., Memphis, TN
1964 Cody, Claude C., Jr, Houston, TX
1905 Cody, Claude C. III, Houston, TX
1957 Coffin, Lewis A., New York, NY
1893 Converse, John Marquis, New York, NY
1959 Coolidge, Algernon, Boston, MA
1937 Cracovaner, Arthur J., New York, NY
1941 Crowe, Samuel H., Baltimore, MD
1913 Cunning, Daniel S., New York, NY
1951 Dabney, Virginia, Washington, DC
1882 Davison, Francis W., Danville, PA
1966 De Blois, Thomas Amory, Boston, MA
1968 Devine, Kenneth, Rochester, MN
1941 DeWeese, David D., Portland, OR
1947 Dixon, Fred W., Shaker Heights, OH
1952 Eagle, Watt W., New Bern, NC
1892 Erich, John B., Rochester, MN
1964 Farlow, John W., Boston, MA
1963 Fearon, Blair W., Don Mills, Canada
1930 Ferguson, Charles F., Sarasota, FL
1955 Figi, Frederick A., Rochester, MN
1922 Fitz-Hugh, G. Slaughter, Charlottesville, VA
1933 Forbes, Henry H., New York, NY
2010 Foster, John H., Houston, TX
1905 Frazer, John, Rochester, NY
1977 Frederickson, John, Vancouver, BC CANADA
1956 Freer, Otto T., Chicago, IL
1932 Friedberg, Stanton A., Chicago, IL
1940 Furstenberg, Albert C., Ann Arbor, MI
1928 Gatewood, E. Trible, Richmond, VA
1880 Gittins, Thomas R., Sioux City, IA
1959 Gleitsmann, Joseph W., New York, NY
1922 Goldman, Joseph L., New York, NY
1898 Goldsmith, Perry G., Toronto, Canada
1940 Goodale, Joseph L., Ipswich, MA
1965 Goodale, Robert L., Ipswich, MA
1932 Goodyear, Henry M., Cincinnati, OH
1906 Graham, Harrington B., San Francisco, CA
1917 Greene, D. Crosby, Jr, Boston, MA
1950 Greene, Joseph B., Asheville, NC
1970 Hall, Colby, Encino, CA
1905 Halliday, Sir George C., Sydney, Australia
1965 Halsted, Thomas H., Los Angeles, CA
Hanckel, Richard W., Jr, Florence, SC
1940 Hansel, French K., St Louis, MO
1896 Hardie, Thomas Melville, Chicago, IL
1896 Hardie, Thomas Melville, Chicago, IL
1960 Harris, Herbert H., Houston, TX
1959 Hart, Verling K., Charlotte, NC
1915 Hastings, Hill, Los Angeles, Ca
1944 Havens, Fred Z., Rochester, MN
1942 Heatley, Clyde A., Rochester, NY
1959 Henry, G. Arnold, Lagoon City, Canada
1955 Jerome A. Hilger, St. Paul, MN
1888 Hinkel, Frank Whitehill, Buffalo, NY
1944 Hoople, Gordon D., Syracuse, NY
1895 Hopkins, Frederick E., Springfield, MA
1930 Houser, Karl M., Ardmore, PA
1927 Hubbard, Thomas, Toledo, OH
1919 Hurd, Lee Maidment, Rowayton, CT
1920 Imperatori, Charles J., Essex, NY
1904 Ingersoll, John Marvin, Miami, FL
1952 Ireland, Percy E., Toronto, Canada
1983 Jako, Geza, Melrose, MA
1928 Jarvis, DeForest C., Barre, VT
1939 Johnston, William H., Santa Barbara, CA
2010 Kashima, Haskins, Lutherville, MD
2018 Kelly, James, Baltimore, MD
1942 Kelly, Joseph D., New York, NY
1918 Kenyon, Elmer L., Chicago, IL
1921 Kernan, John D., New York, NY
1965 King, James T., Atlanta, GA
1929 Kistner, Frank B., Portland, OR
2011 Kirchner, John A., New Haven, CT
1950 Kline, Oram R., Woodbury Heights, NJ
1885 Knight, Charles H., New York, NY
1984 Krause, Charles W., Minneapolis, MN
1975 Krichner, Fernando
1939 Large, Secord H., Cleveland, OH
1963 Lathrop, Frank D., Pittsford, VT
1939 LeJeune, Francis E., New Orleans, LA
1894 Leland, George A., Boston, MA
1961 Lewy, Robert B., Chicago, IL
1922 Lillie, Harold I., Rochester, MN
1943 Lincoln, William R., Cleveland, OH
1949 Lindsay, John R., Evanston, IL
1976 Lingeman, Raleigh E., Indianapolis, IN
1973 Loré, John M., Buffalo, New York, NY
1927 Lukens, Robert M., Wildwood Crest, NJ
1928 Lyman, Harry Webster, St Louis, MO
1886 MacCoy, Alexander W., Philadelphia, PA
1928 MacPherson, Duncan, New York, NY
1941 Martin, Robert C., San Francisco, CA
1896 Mayer, Emil, New York, NY
1966 McCabe, Brian F., Iowa City, IA
1952 McCall, Julius W., Shaker Heights, OH
1951 McCart, Howard W. D., Toronto, Canada
1939 McCaskey, Carl H., Indianapolis, IN
1943 McCullagh, Samuel, New York, NY
1963 McGovern, Francis H., Danville, VA
1951 McHenry, Lawrence C., Oklahoma City, OK
1923 McKinney, Richmond, Memphis, TN
1933 McMahon, Bernard J., St Louis, MO
1931 McNally, William J., Montreal, Canada
1952 Miller, Alden H., Glendale, CA
1965 Miller, Daniel, Boston, MA
1964 Montgomery, William W., Boston, MA
1954 Moore, Paul McN., Delray Beach, FL
1957 Munoz-MacCormick, Carlos E., Santurce, PR
1953 Murtagh, John A., Hanover, NH
1939 Myers, John L., Kansas City, MO
1927 Myerson, Mervin C., New York, NY
1901 Myles, Robert C., New York, NY

1937	Nash, C. Steward, Rochester, NY
1922	New, Gordon, B., Rochester, MN
1923	Newhart, Horace, Minneapolis, MN
1958	O'Keefe, John J., Philadelphia, PA
1903	Packard, Francis R., Philadelphia, PA
1961	Pang, Lup Q., Honolulu, HI
1961	Pastore, Peter N., Richmond, VA
1972	Pennington, Claude Jr., Macon, GA
1948	Phelps, Kenneth A., Burlington, NC
1878	Porter, William, Ocean Springs, MA
1942	Potts, John B., Omaha, NE
1951	Priest, Robert E., Edina, MN
2004	Putney, F. Johnson, Charleston, SC
1951	Rawlins, Aubrey G., San Francisco, CA
1963	Reed, George F., Syracuse, NY
1903	Renner, W. Scott, Buffalo, NY
1897	Rhodes, John Edwin, Chicago, IL
1884	Rice, Clarence C., New York, NY
1905	Richards, George L., South Yarmouth, MA
1956	Richardson, John R., Searsport, ME
2010	Ritter, Frank, Ann Arbor, MI
1878	Robinson, Beverly, New York, NY
1938	Salinger, Samuel, Palm Springs, CA
1959	Sanders, Sam H., Memphis, TN
1921	Sauer, William E., St Louis, MO
2018	
1934	Schenck, Harry P., Philadelphia, PA
2010	Schild, Joyce, Alburquerque, NM
1923	Sewall, Edward C., Palo Alto, CA
1930	Seydell, Ernest M., Wichita, KS
1907	Shambaugh, George E., Chicago, IL
1558	Simonton, Kinsey Macleod, Ponte Vedra Beach, FL
1937	Simpson, W. Likely, Memphis,TN
2006	Sisson, George, Chicago, IL
1987	Skolnik, Emanuel M., Chicago, IL
1950	Smith, Austin T., Philadelphia, PA
1908	Smith, Harmon, New York, NY
2004	Soboroff, Burton, Chicago, IL
1995	Sofferman, Robert, Burlington, VT
1954	Sooy, Francis A., San Francisco, CA
1923	Spencer, Frank R., Boulder, CO
1963	Tabb, Harold C., New Orleans, LA
1947	Theobald, Walter H., Chicago, IL
1954	Thornell, William C., Cincinnati, OH
1927	Tobey, Harold G., Boston, MA
1963	Tolan, John F., Seattle, WA
1989	Toohill, Robert, Elm Grove, W I
1950	Tremble, G. Edward, Montreal, Canada
1925	Tucker, Gabriel, Haverford, PA
2016	Tucker, John A., Avalon, NJ
1943	Van Alyea, Oliver E., Chicago, IL
1984	Vaughn, Charles W., Hingham, MA
1941	Violé, Pierre, Los Angeles, CA
1892	Wagner, Henry L., San Francisco, CA
1974	Ward, Paul H., Pauma Valley, CA
1892	Watson, Arthur W., Philadelphia, PA
1948	Whalen, Edward J., Hartford, CT
1922	White, Francis W., New York, NY
1971	Williams, Russell I Jr., Madison, WI
1939	Wilson, J. Gordon, Old Bennington, VT
1905	Wood, George B. Wynnewood, PA
1935	Woodward, Fletcher D., Charlottesville, VA
1953	Work, Walter, Green Valley, AZ

1878	Adams, George L., Excelsior, MN
2006	Alfaro, Victor R., Washington, DC
1958	Allen, Harrison, Philadelphia, PA
1880	Andrews, Albert H., Jr, Chicago, IL
1969	Arrowsmith, Hubert, Brooklyn, NY
1917	Asch, Morris J., New York, NY
1879	Ashley, Rae E., San Francisco, CA
1942	Atkins, Joseph P., Philadelphia, PA
1958	Babbitt, James A., Philadelphia, PA
1923	Ballenger, William L., Chicago, IL
1906	Bean, C. E., St Paul, MN
1880	Beck, August L., New Rochelle, NY
1949	Berens, T. Passmore, New York, NY
1904	Bigelow, Nolton, Providence, RI
1924	Blassingame, Charles D., Memphis, TN
1938	Bliss, Arthur Ames, Philadelphia, PA
1893	Boyden, Guy L., Portland, OR
1951	Boylan, J. E., Cincinnati, OH
1895	Brown, John Mackenzie, Los Angeles, CA
1932	Brown, Moreau R., Chicago, IL
1892	Buckley, Robert E., New York, NY
1933	Canfield, R. Bishop, Ann Arbor, MI
1915	Carmack, John Walter, Indianapolis, IN
1934	Carmody, Thomas E., Denver, CO
1924	Casselberry, William E., Chicago, IL
1889	Chamberlain, C. W., Hartford, CT
1883	Chamberlin, William B., Cleveland, OH
1917	Chapman, S. Hartwell, New Haven, CT
1882	Chappell, W. F., New York, NY
1896	Coakley, Cornelius G., New York, NY
1902	Coffin, Rockwell C., Boston, MA
1913	Cox, Gerald H., New York, NY
1918	Cushing, E. W., Boston, MA
1880	Cutter, Ephraim, West Falmouth, MA
1878	Daly, W. H., Pittsburgh, PA
1880	Davis, F. H., Chicago, IL
1878	Davis, Warren B., Philadelphia, PA
1941	Dennis, Frank Lownes, Colorado Springs, CO
1926	Dickerman, E. T., Chicago, IL
1901	Dickinson, John T., Pittsburgh, PA
1969	Donaldson, Frank, Baltimore, MA
1935	Equen, Murdock S., Atlanta, GA
1919	Eves, Curtis C., Philadelphia, PA
1914	Faulkner, E. Ross, New York, NY
1901	Fetterolf, George, Philadelphia, PA
1995	Fisher, Samuel, Durham, NC
1917	Freeman, Walter J., Philadelphia, PA
1897	Friedberg, Stanton A., Chicago, IL
1940	Frothingham, Richard, New York, NY
1909	Fuchs, Valentine H., New Orleans, LA
1907	Getchell, Albert C., Worcester, MA
1940	Gibb, Joseph S., Philadelphia, PA
1878	Gill, William D., San Antonio, TX
1913	Glasgow, William Carr, St Louis, MO
1905	Goldstein, Max A., St Louis, MO
2001	Gray, Steven D., Salt Lake City, UT
1934	Grayson, Charles P., Philadelphia, PA
1995	Grove, William E., Milwaukee, WI
1988	Gussack, Gerald S., Atlanta, GA
1933	Hanson, David G., Chicago, IL
1957	Harkness, Gordon F., Davenport, IA
1878	Harrill, James A., Winston-Salem, NC
1945	Hartman, J. H., Baltimore, MD
1879	Hickey, Harold L., Denver, CO
1907	Holden, Edgar, Newark, NJ
1882	Holmes, Christian R., Cincinnati, OH
1893	Hooper, Franklin H., Boston, MA
1938	Hope, George B., New York, NY
1939	Hourn, George E., St Louis, MO
1901	Hunt, Westley Marshall, New York, NY
1925	Hyatt, Frank, Washington, DC
1878	Iglauer, Samuel, Cincinnati, OH
1882	Ingals, E. Fletcher, Chicago, IL
1938	Ives, Frank L., New York, NY
1880	Jackson, Chevalier L., Philadelphia, PA
1878	Jarvis, William C., New York, NY
1879	Johnson, Hosmer A., Chicago, IL
1960	Johnson, Woolsey, New York, NY
1961	Johnston, Kenneth C., Chicago, IL
1944	Jones, Edley H., Vicksburg, MS
1979	Jones, Marvin F., New York, NY
1964	Kealhofer, R. H., St Louis, MO
1954	Keim, W. Franklin, Montclair, NY
1942	King, Edward D., North Hollywood, CA
1901	King, Gordon, New Orleans, LA
1878	Knight, Frederick Irving, Boston, MA
1965	Knight, John S., Kansas City, MO
1993	Komisar, Arnold, New York, NY
1898	Kyle, D. Braden, Philadelphia, PA
1880	Langmaid, Samuel W., Boston, MA
1953	Lederer, Francis L., Chicago, IL
1878	Lincoln, Rufus P., New York, NY
1911	Lockard, Lorenzo B., Denver, CO
1913	Loeb, Hanau W., St Louis, MO
1897	Logan, James E., Kansas City, MO
1935	Looper, Edward A., Baltimore, MD
1888	Lowman, John H., Cleveland, OH
1919	Lynah, Henry L., New York, NY
1952	Lynch, Mercer G., New Orleans, LA
1915	Lynch, Robert Clyde, New Orleans, LA
1914	Mackenty, John E., New York, NY
1881	Major, G. W., Montreal, Canada
1898	Makuen, G. Hudson, Philadelphia, PA
1985	Mathog, Robert, Southfield, MI
1948	Maxwell, James H., Ann Arbor, MI
1879	McBurney, Charles, New York, NY
1927	McGinnis, Edwin, Chicago, IL
1936	McGregor, Gregor, Toronto, Canada
1913	McKimmie, O. A., Washington, DC
1945	McLaurin, John G., Dallas, TX
1885	McSherry, Clinton II, Baltimore, MD
1954	Meltzer, Philip E., Boston, MA
1958	Montreuil, Fernand, Montreal, Canada
1881	Morgan, E. C., Washington, DC
1950	Morrison, Lewis F., San Francisco, CA
1940	Morrison, William W., New York, NY
1886	Mulhall, J. C., St Louis, MO
1925	Mullin, William V., Cleveland, OH
1914	Munger, Carl E., Waterbury, CT
1892	Murray, T. Morris, Washington, DC
1881	Mynter, H., Buffalo, NY
1893	Newcomb, James E., New York, NY
1895	Nichols, J. E. H., New York, NY
1961	Ogura, Joseph H., St Louis, MO
1927	Orton, Henry B., Newark, NJ
1894	Park, William H., New York, NY
1892	Porcher, W. Peyre, Charleston, SC
1927	Porter, Charles T., Boston, MA
1954	Pressman, Joel J., Los Angeles, LA
1908	Randall, B. Alexander, Philadelphia, PA
1882	Rankin, D. N., Allegheny, PA
1934	Richards, Lyman G., Wellesley Hills, MA
1902	Richardson, Charles W., Washington, DC
1930	Ridpath, Robert E., Philadelphia, PA
1945	Robb, James M., Detroit, MI
1953	Roberts, Sam E., Kansas City, MO
1881	Robertson, J. M., Detroit, MI

1879	Roe, John O., Rochester, NY
1948	Whalen, Edward J., Hartford, CT
1922	White, Francis W., New York, NY
1939	Wilson, J. Gordon, Old Bennington, VT
1935	Woodward, Fletcher D., Charlottesville, VA
1953	Work, Walter, Green Valley, AZ
1913	Roy, Dunbar, Atlanta, GA
1878	Rumbold, T. F., St Louis, MO
1879	Seiler, Carl, Philadelphia, PA
1928	Shea, John Joseph, Memphis, TN
1893	Shields, Charles M., Richmond, PA
1909	Shurly, Burt R., Detroit, MI
1878	Shurly, E. L., Detroit, MI
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1892	Simpson, William Kelly, New York, NY
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1928	Sonnenschein, Robert, Chicago, IL
1911	Staut, George C., Philadelphia, PA
1924	Stein, Otto J., Chicago, IL
1934	Stevenson, Walter, Quincy, IL
1934	Suchs, Oliver, W., Austin, TX
1879	Tauber, Berhard, Cincinnati, OH
1924	Taylor, Herman Marshall, Jacksonville, FL
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1925	Tucker, Gabriel F. Jr., Philadelphia, PA
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