

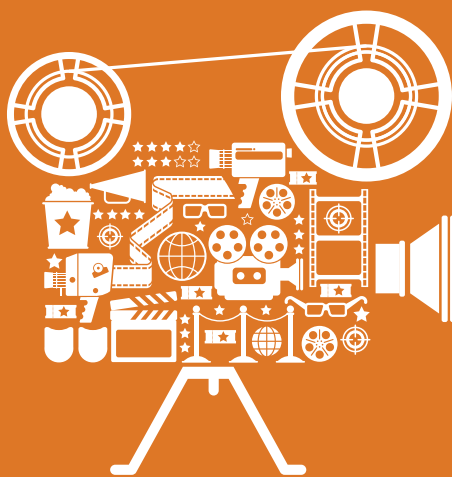


PROGRAM GUIDE

ARS 67th Annual Meeting

October 1-2, 2021 | Millennium Biltmore Hotel, Los Angeles, CA

The ARS Welcomes the
AAO-HNS Guest Countries
Australia, Brazil, Ghana,
New Zealand, Poland, and
ARS Guest Country - South Korea



FALL FILM FESTIVAL

The ARS will again be featuring the **Fall Film Festival** - a **video seminar** featuring the most educational, unique and impressive videos of cases, complications and challenges submitted by the membership.

The videos were reviewed by an appointed committee and rated equally on rarity of pathology, technical complexity, novelty of procedure, educational value, and production quality. The top-rated videos (time-permitting) will be showcased at the meeting with an opportunity for the video editors to introduce each clip and respond to questions from the audience.



JOSEPH K. HAN, MD, FARS

Presidential Welcome

On behalf of the American Rhinologic Society, it is my pleasure to welcome you to Los Angeles and the 67th ARS Annual Meeting. In July, we had a successful and well-attended in-person Summer Sinus Symposium in Austin despite the persistent pandemic. The American Rhinologic Society is committed to providing first class educational meetings and materials for our members, and I am confident that you will be very pleased with our Annual Meeting program. I want to recognize and thank Rodney Schlosser, the President-Elect and Program Chair, along with the program committee who have put together a fantastic scientific program that features the best scientific abstracts, interesting keynote speakers, and several informative and clinically relevant panels. Also, a very special thank you to Wendi, Susan, and Tammy for their tirelessly work behind the scenes, during these challenging times that continue to be ever-changing.

During these difficult times, we have become more aware and appreciative of the blessings we have in our lives. I want to thank all our ARS members for your continued support during this unusual thim the past couple of years. I would also like to acknowledge and thank our many corporate sponsors who have continued to generously support our society that is focused on rhinologic, allergic, and skull base diseases. Without their partnership, we would not be able to bring such high quality virtual and in-person meetings for our members. During our meetings, please visit them in the exhibit hall to express our appreciation for their support.

With the arrival of our annual meeting, my presidency is coming to an end. It has been an honor and pleasure to serve our wonderful society. We have a wonderful group of volunteer physicians that make our society great. Also, our society provides an environment full of friendship and camaraderie as well as provide a platform for discussing the most up to date scientific information. The current tough times will pass, and I am certain our organization will continue to achieve enormous things in the future. I want to thank you for the chance to serve as a steward of such a wonderful organization.

I look forward to seeing you in Los Angeles!

Joseph K Han, MD, FARS

President, American Rhinologic Society



RODNEY SCHLOSSER, MD, FARS

Welcome from the Program Chair

Join us!

Shake off the COVID blues as the American Rhinologic Society plans to resume IN PERSON gatherings at our Annual Meeting in Los Angeles this October! We have a great program planned and the highlight of the meeting will be TWO David W. Kennedy Lecturers....

In honor of David's retirement from operating, we are pleased to announce that he will be giving a keynote address reflecting upon more than three decades of experience in the world of rhinology. We will also be joined by Louis Shipley for our 2nd Kennedy Keynote Lecture. Louis is a technology CEO and lecturer at Harvard Business School and MIT Sloan School of Management. He will be discussing "Leveraging disruptive technology in a post-pandemic world".

Our wide variety of panels will include an ARS/ AAOA panel on the Burden of rising healthcare costs – A case study of CRSwNP, Role of the rhinologist in sleep disorders, Rhinology worldwide, Building a successful rhinology practice, Digital patient engagement, and Omics and biomarkers: Impact upon patient care. This year we welcome our Guest Countries' colleagues from South Korea. In addition, the ARS' welcomes the AAO-HNS' Guest Countries, Poland, Ghana, Australia, Brazil, and New Zealand. All of this is in addition to the many original research presentations that we are used to seeing at ARS meetings. Please come out and

enjoy the company of your fellow rhinologists! As part of this specialty-wide celebration, the Academy will be holding a Combined President's Reception this year, on Saturday night October 2nd, which will be co-hosted by the Presidents of the Academy, ARS, AOS, and ANS. We are honored and pleased to join the AAO-HNS for this event. AAO-HNS Meeting registrants will receive an event ticket with their paid registration. The ARS is pleased to offer significantly discounted tickets to the Red Carpet Event via the ARS registration page. There is no limit on ticket purchases. Registration and Housing are now OPEN. On behalf of myself, the Program Committee, and the Board of Directors, we are looking forward to seeing you in Los Angeles. Additional questions, please contact our Executive Administrator, Wendi Perez at Wendi@american-rhinologic.org or 973-545-2735.

Thank you.

Rodney Schlosser, MD, FARS
President-Elect/Program Chair



Welcome from the Executive Vice President



MICHAEL G. STEWART,
MD, MPH, FARS

Thank you for your support of the ARS during these challenging times. All ARS members should be very proud of the remarkable efforts of so many of our members and leaders to continue the mission of the Society.

I want to recognize ARS President Joseph Han, MD, and ARS President-Elect and Program Chair Rodney Schlosser, MD, who have done tremendous work to keep the Society on track and to allow us to hold the 67th Annual Meeting live and in person in Los Angeles. The ARS actually hosted, this summer, perhaps the first significant in-person meeting in our specialty since the pandemic started, with the Summer Sinus Symposium in Austin, TX. The course co-directors – Drs. Greg Davis, Marc Dubin and Doug Reh – did an

amazing job of coordination and management and we had a very successful meeting with great education and great fellowship, and no Covid related issues. Also of course our ARS Administrative Staff of Wendi Perez, Susan Arias and Tammy Lorimer are indispensable to the Society as well!

This year's meeting program contains a rich combination of new research, invited lectures and panel discussions, and we are excited to bring it to you.

Welcome to Los Angeles and I hope you enjoy the 67th Annual Meeting!

Michael G. Stewart, MD, MPH, FARS
Executive Vice President



American Rhinologic Society Executives - 2021



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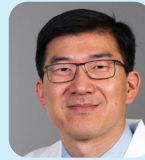
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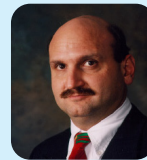
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ARS Mission Statement

The American Rhinologic Society's mission is to serve, represent and advance the science and ethical practice of rhinology. The Society promotes excellence in patient care, research and education in Rhinology and Skull Base Disorders. The American Rhinologic Society is dedicated to providing communication and fellowship to the members of the Rhinologic community through on-going medical education, patient advocacy, and social programs. The ARS continuing medical education activities serve to improve professional competence, performance, and promote research.

Business/ACCME

Continuing Education

Accreditation Statement

The American Rhinologic Society (ARS) is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

Credit Designation Statement

The ARS designates this live activity for a maximum of *16.75 AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

How to Obtain Your CME Certificate

Go to ARS.CmeCertificateOnline.com and click on "ARS 67th Annual Meeting" link. On the site, you will be asked to evaluate the overall conference. A certificate will be made available for you to print. Questions? Email Certificate@AmedcoEmail.com

Learning Objectives

Upon completion of this session, participants should be able to:

- Discuss the current evidence-based recommendations regarding the medical and surgical management of acute rhinosinusitis and chronic rhinosinusitis and be able to implement new strategies into clinical practice
- Comprehend both benign and malignant neoplastic disease involving the nose and paranasal sinuses as well as current strategies for clinical surgical management and long-term surveillance
- Describe the pathophysiology, clinical presentation, diagnostic testing and management of patients with allergic and immunologic disorders
- Cite current evidence-based recommendations regarding the clinical and surgical management of pediatric patients with chronic rhinosinusitis
- Identify and implement new strategies for the management of functional and cosmetic disorders of the nose



Meeting WiFi

Network: Biltmore Special Events
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ARS 2021 FRIENDS IN RESEARCH DONORS

Thank you to all donors who have helped get the 2021 Friends in Research Campaign off to a great start! We thank you for your generosity! With the monies donated over the past few years the ARS has been able to continue the Friends in Research sponsored grant which is in addition to our traditional CORE efforts! New this year the ARS is also offering a three-year, multi-site Con-sortium Grant.

With your support, we can continue to fund the studies that provide clinical insights valuable to the care of our patients. This work not only advances the care of our patients through scientific innovation, but also generates important data establishing the efficacy and cost effectiveness of our care. In the current financial landscape, this is equally important to ensure that our patients have access to the treatment necessary to address their complaints. We thank you again for your help in this worthy endeavor!

Visit american-rhinologic.org and join us in our 2022 year campaign.

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1987 - 1988	Alvin Katz, MD	2018 - 2019	James Palmer, MD, FARS
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*Deceased

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2016 - Present	Pete Batra, MD, FARS
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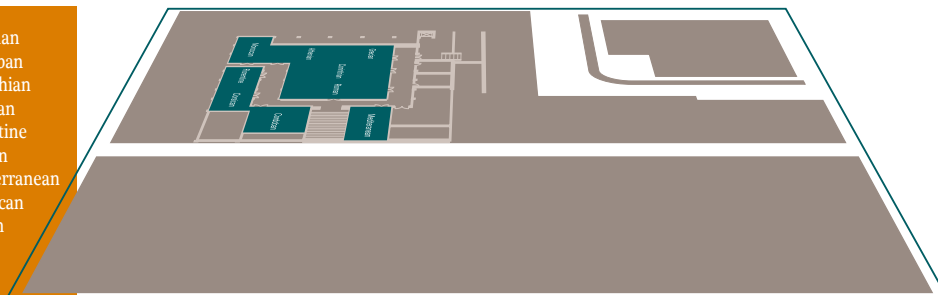
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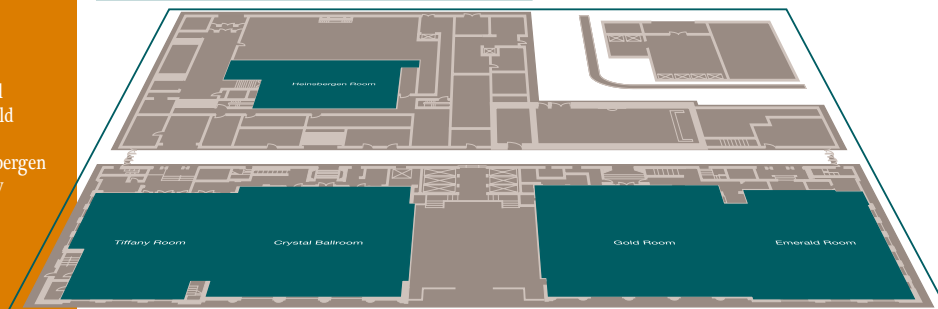
Meeting Room Locations

Athenian
Cordoban
Corinthian
Corsican
Florentine
Greecian
Mediterranean
Moroccan
Roman



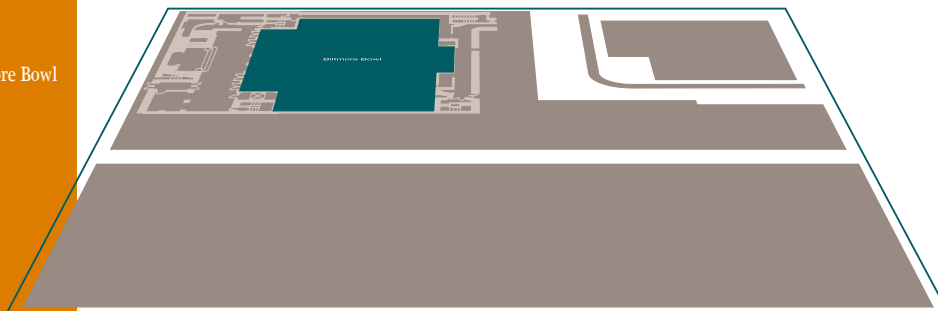
Mezzanine Level/Main Galleria Level

Crystal
Emerald
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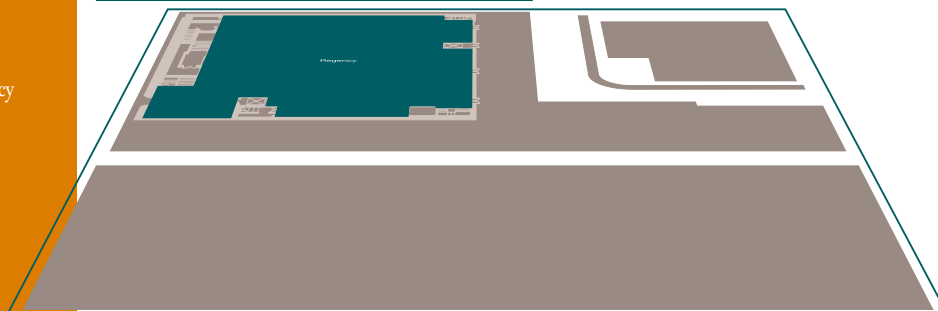
Main Galleria Level

Biltmore Bowl



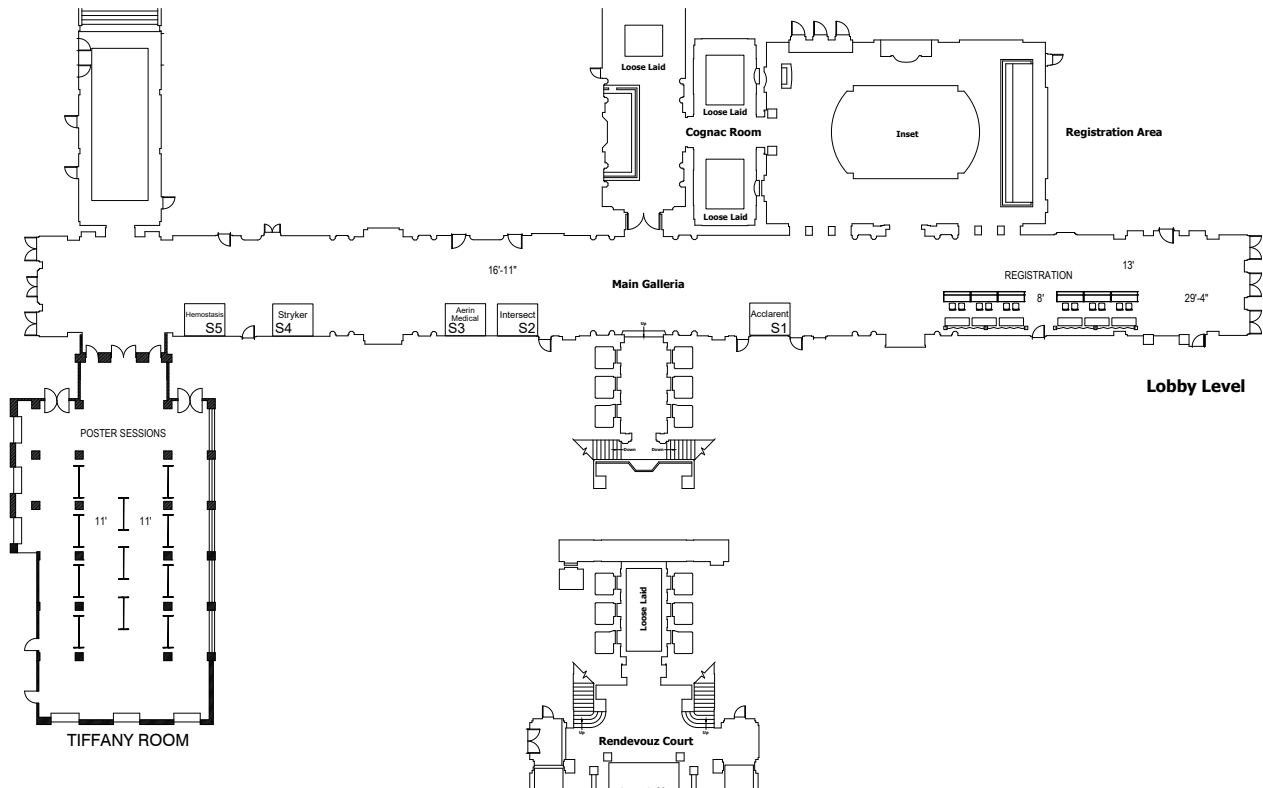
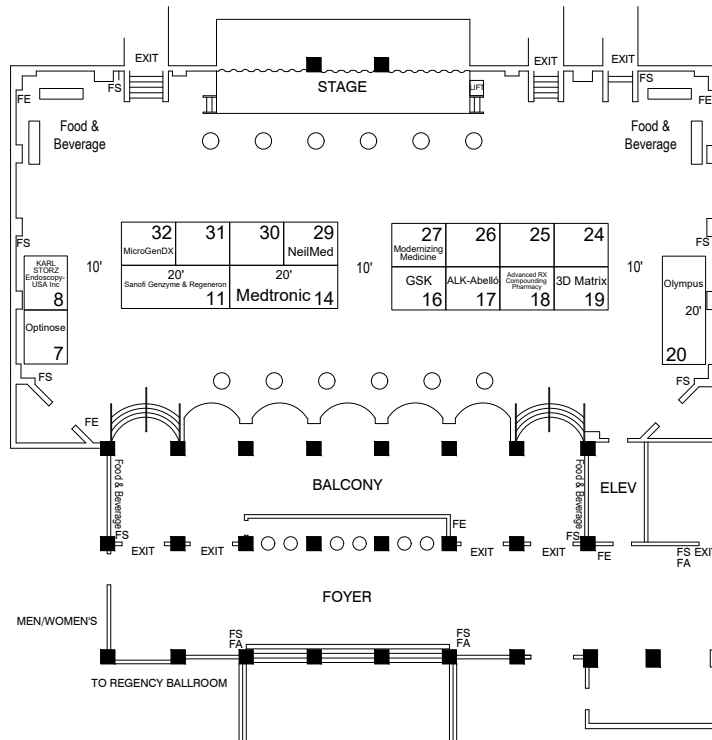
Biltmore Bowl Level/South Galleria

Regency



Regency Level/South Galleria

Exhibit Hall & Main Galleria



PROGRAM AT A GLANCE

Thursday, September 30, 2021

7:00 am – 1:00 pm
Residents Course – Didactic Session
Tiffany Ballroom
By Invitation Only

1:30 pm – 4:20 pm
Residents Dissection Lab
Emerald Ballroom
By Invitation Only

5:30 pm – 7:00 pm
Residents Reception
John F. Kennedy Penthouse

Friday, October 1, 2021 7:00 am – 1:00 pm

7:00 am - 8:00 am
Board of Directors Breakfast
Emerald Ballroom

8:00 am - 12:00
Board of Directors Meeting
Emerald Ballroom

Friday, October 1, 2021 1:00 pm – 5:00 pm General Session Crystal Ballroom

1:00 pm - 1:15 pm
Presidential Address & Welcome
Joseph Han, MD, FARS

1:15 pm - 2:00 pm
17th Annual David W. Kennedy Lecture
Introduction: Rodney Schlosser, MD, FARS
Guest Speaker: N. Louis Shipley, Harvard
Business School
"Leveraging disruptive technology in a post
pandemic world"

2:00 pm - 2:15 pm
Awards Ceremony: Robert Kern, MD, FARS;
Benjamin Bleier, MD, FARS; Jivianne Lee, MD,
FARS; Jean Kim, MD, FARS

Top Clinical Abstracts

*Moderators: Dana Crosby, MD, FARS; Jean Kim,
MD, FARS*

2:15 pm - 2:22 pm
PK evidence of consistent drug release from long-
acting implantable corticosteroid matrices for CRS
Randall A. Ow, MD

2:22 pm - 2:29 pm
Outcomes of Dupilumab treatment versus FESS
for CRSwNP
Harish Dharmarajan, MD

2:29 pm - 2:36 pm
CRS-PRO and SNOT 22 correlations with type 2
inflammatory mediators in chronic rhinosinusitis
Samuel Racette, MD

2:36 pm - 2:43
Dupilumab and ASA desensitization CEA
Michael Yong, MD, MPH, MBA

2:43 pm - 2:50 pm
Predicting malignant transformation of inverted
papilloma using image-based machine learning
Angela Yang, BS

2:50 pm - 3:00 pm
Q&A

3:00 pm - 3:30 pm
BREAK

Top Basic Science Abstracts

*Moderators: Stella Lee, MD; Cecelia Damask,
DO; Justin Turner, MD, FARS*

3:30 pm - 3:37 pm
LPS decreases CFTR open probability and
mucociliary transport through ROS
Do-Yeon Cho, MD

3:37 pm - 3:44 pm
Transcriptional changes in chronic rhinosinusitis
with asthma
Amarbir Gill, MD

3:44 pm - 3:51 pm
Cystatin-induced coagulation and fibrinolysis
pathway derangements in a murine model of
CRSwNP
Alan Workman, MD, MTR

3:51 pm - 3:58 pm
Steroid responsive and steroid resistant cytokines
in AERD
Michael Kohanski, MD, PhD

3:58 pm - 4:05 pm
A human paranasal sinus model of SARS-CoV-2
infection
Wesley Stepp, MD, PhD

4:05 pm - 4:15 pm
Q&A

4:15 pm - 5:00 pm
Panel: "Lessons Learned: Reflections of
Seasoned Rhinologists"
Moderator: Eugenia Vining, MD
Panelists: Marilene Wang, MD, FARS; James
Stankiewicz, MD, FARS; Michael Setzen, MD,
FARS; Donald Lanza, MD, FARS

5:15 pm - 7:00 pm
President's Reception and Poster Reception
Tiffany Room

PROGRAM AT A GLANCE

**Saturday,
October 2, 2021
8:00 am – 12:00 pm
Breakout Room A
Gold Room**

Biomarkers

Moderators: Andrew Lane, MD, FARS; Victoria Lee, MD; Bruce Tan, MD

8:00 am - 8:07 am

Chronic rhinosinusitis mouse model
John Lee, MD

8:07 am - 8:14 am

Urinary leukotriene E4 as a biomarker for chronic rhinosinusitis clinical subtypes
Beau Idler, BA

8:14 am - 8:21 am

Central compartment atopic disease and allergic rhinitis have similar allergen patterns
Bianca Rullan Oliver, MD

8:21 am - 8:28 am

Biomarker model for predicting type 2 in patients diagnosed with CRS
Austin Heffernan, MD Candidate

8:28 am - 8:35 am

Tissue eosinophilia association with obesity
Lindsey Ryan, MD

8:35 am - 8:45 am

Q&A

8:45 am - 9:30 am

Panel: "Digital patient engagement for the rhinologist:
Moderator: Martin Citardi, MD, FARS
Panelists: Alexander Farag, MD, FARS; Chirag Patel, MD, FARS

9:30 am - 10:00 am

BREAK

Cystic Fibrosis

Moderators: Do-Yeon Cho, MD; Michael Kohanski, MD

10:00 am - 10:07 am

Pseudomonas isolates from CRS with CF develop increased virulence under anaerobic conditions
Do-Yeon Cho, MD

10:07 am - 10:14 am

CF olfaction before and after elexacaftor-tezacaftor-ivacaftor
Daniel Bacon, BS

10:14 am - 10:21 am

Comparison of endoscopic sinus surgery timing in lung transplant patients with Cystic Fibrosis
Joseph Johnson, ScB

10:21 am - 10:28 am

Topical antibiotics in chronic rhinosinusitis: A prospective pilot study
Christopher Low, MD

10:28 am - 10:35 am

Olfactory dysfunction in people with Cystic Fibrosis
Daniel Beswick, MD, FARS

10:35 am - 10:45 am

Q&A

Miscellaneous Rhinology

Moderators: Alissa Kanaan, MD; Thomas Higgins, MD, FARS; Jordan Teitelbaum, MD

10:45 am - 10:52 am

Transnasal endoscopic management of frontal sinus anterior table fractures improves cosmetic quality
Natalie Derise, MD

10:52 am - 10:59 am

Clinical features and diagnoses of patients with primary complaints of facial pain
Andrea Plawecki, MD

10:59 am - 11:06 am

Outcome of immunoglobulin replacement therapy in children with rhinosinusitis
John Behnke, MD

11:06 am - 11:13 am

Contralateral sinonasal symptoms following unilateral ESS
Kevin Hur, MD

11:13 am - 11:23 am

Q&A

Diet and Drip

Moderators: Nicholas Rowan, MD; Angela Donaldson, MD, FARS; Edward McCoul, MD, FARS

11:23 am - 11:30 am

Otolaryngic sensory loss as a measure of frailty among older U.S. adults
Nicholas Rowan, MD

11:30 am - 11:37 am

Dietary habits and rhinitis
Darren Cheng, MS

11:37 am - 11:44 am

Diagnostic workup of patients with primary complaint of post-nasal drip
Hector Perez, MD

11:44 am - 11:51 am

Histopathologic features of chronic rhinosinusitis in diabetic patients
Vidit Talati, MD

11:51 am - 12:00 pm

Q&A

PROGRAM AT A GLANCE

**Saturday,
October 2, 2021
8:00 am – 12:00 pm
Breakout Room B
Crystal Ballroom**

Healthcare Economics

Moderators: Jonathan Ting, MD, FARS; Joshua Levy, MD, FARS; Kara Detwiller, MD, FARS

8:00 am - 8:07 am
Resource utilization analysis after PPSV23 vaccination in antibody deficient CRS and RABS patients
Nrusheel Kattar, MD

8:07 am - 8:14 am
Rhinology Medicare reimbursements have not been keeping up with inflation
Sina Torabi, MD

8:14 am - 8:21 am
Impact of gender on outcomes and cost in pediatric acute rhinosinusitis management
Vraj P. Shah, BS

8:21 am - 8:28 am
Impact of operative time on endoscopic sinonasal surgery
Ariel Omiunu, BS

8:28 am - 8:35 am
Procedural and geographic variation in price markup of common rhinology procedures
Rahul A. Patel, Medical Student

8:35 am - 8:45 am
Q&A

Adjunct Therapies for CRS

Moderators: Lauren Roland, MD; Christine Franzese, MD, FARS; Daniel Beswick, MD, FARS

8:45 am - 8:52 am
Long-acting implantable corticosteroid matrix for CRS: LANTERN study 6-month post-treatment outcomes
Joanne Rimmer, MBBS, MA

8:52 am - 8:59 am
The Effect of EDS-FLU on objective and subjective outcomes for patients with CRSwNP
Randall Ow, MD, FARS

8:59 am - 9:06 am
The potential for cortisol suppression with high dose mometasone irrigations
Hannah Brown, BS

9:06 am - 9:13 am
Type 2 inflammation decreases in CRSwNP after ESS with mometasone-eluting stent placement
Bruce K. Tan, MD

9:13 am - 9:20 am
Six months of aspirin therapy acts as an indicator of long-term outcomes in AERD
Siddhant H. Tripathi, BS

9:20 am – 9:27 am
Real world effectiveness of Dupilumab in CRSwNP
Yi Zhang

9:27 am - 9:35 am
Q&A

9:30 am - 10:00 am
BREAK

10:00 am - 10:45 am
Panel: "Omics and biomarkers: How they can impact patient care"
Moderator: Justin Turner, MD, FARS
Panelists: Bruce Tan, MD; Amber Luong, MD, PhD, FARS; Benjamin Bleier, MD, FARS

Miscellaneous Rhinology

Moderators: Kristine Smith, MD; Christian Soneru, MD; Sanjeet Rangarajan, MD, FARS

10:45 am - 10:52 am
Practice patterns and provider satisfaction in a virtual rhinology and skull base surgery clinic
Emily Papazian, Medical Student

10:52 am - 10:59am
Post-operative sinus polyp scale (POPS)
Dhruv Sharma, MD

10:59 am - 11:06 am
Modeling observed nasal nitric oxide levels
Dennis Shusterman, MD, MPH

11:06 am - 11:13
The role of extraoral taste receptors in chronic rhinosinusitis: A systematic review
Nicholas Rowan, MD

11:13 am - 11:23
Q&A

Complications

Moderators: Theodore Schuman, MD, FARS; Jeffrey Suh, MD, FARS; Stacey Gray, MD, FARS

11:23 am - 11:30 am
Systemic corticosteroids-related adverse outcomes in chronic rhinosinusitis with nasal polyposis
Greg Davis, MD, FARS

11:30 am - 11:37 am
Avascular necrosis and oral corticosteroid use
David Poetker, MD, FARS

11:37 am - 11:44 am
Odontogenic sinusitis causing extra-sinus complications
Jennifer Douglas, MD

11:44 - 11:51 am
Correlation of symptoms by sinus subsite
Arthur Wu, MD, FARS

11:51 am - 12:00 pm
Q&A

PROGRAM AT A GLANCE

Saturday, October 2, 2021 8:00 am – 12:00 pm Breakout Room C Emerald Ballroom

Skull Base Malignancies

Moderators: Kent Lam, MD, FARS; Jose Mattos, MD; Jeremiah Alt, MD, PhD, FARS

8:00 am - 8:07 am
Treatment facility volume and esthesioneuroblastoma outcomes
Khodayar Goshtasbi, MS

8:07 am - 8:14 am
Effect of hospital safety-net burden on survival of sinonasal squamous cell carcinoma
Christopher Tseng, BS

8:14 am - 8:21 am
Sociodemographic factors in patients with esthesioneuroblastoma
Ariel Omiunu, BS

8:21 am - 8:28 am
Length of stay after surgery as a predictor of survival for sinonasal squamous cell carcinoma
Jeff Gao, BS

8:28 am - 8:38 am
Q&A

Patient Demographics

Moderators: Charles Riley, MD; Naweed Chowdhury, MD; Marc Dubin, MD, FARS

8:38 am - 8:45 am
Demographic variations of participants in rhinitis clinical trials
Neil Mehta, BS

8:45 am - 8:52 am
Effect of race in epistaxis treatment
Avneet Randhawa, BS

8:52 am - 8:59 am
Characterization of biologics patients
Matthew Lelegren, MD

8:59 am - 9:06 am
Demographics in chronic rhinosinusitis subtypes
Cheng Ma, BS

9:06 am - 9:16 am
Q&A

9:16 am - 10:00 am
Panel: "The Role of the Rhinologist in Sleep Disorders"
Moderator: Andrew Goldberg, MD, FARS
Panelists: Jolie Chang, MD; Maria Suurna, MD; Ilene Rosen, MD

10:00 am - 10:30 am
BREAK

Olfaction

Moderators: Carol Yan, MD; David Poetker, MD, FARS

10:30 am - 10:37 am
Population differences between COVID-19 and post-viral olfactory dysfunction: Case-control study
Nikita Chapurin, MD, MHS

10:37 am - 10:44 am
Chemesthesis compensates for decreased flavor sensation due to chemosensory dysfunction in COVID-19
Sameer Kini, MD

10:44 am - 10:51 am
Measurement of healthy utility state values in COVID-19 related anosmia
Mena Said, MD

10:51 am - 10:58 am
Cognitive impairment and awareness of olfactory dysfunction: NHANES 2013–2014
Srivats Narayanan, Medical Student

10:58 am - 11:05 am
Parosmia and health utility state values for COVID-19 related olfactory loss
Sophie Jang, Research Fellow

11:05 am - 11:15 am
Q&A

Nasal Valve, Perforation and Empty Nose

Moderators: David Jang, MD, FARS; Arthur Wu, MD, FARS; Jayakar Nayak, MD

11:15 am - 11:22 am
Temperature-controlled RF treatment of the NV for NAO: A randomized controlled trial
Stacey Silvers, Dr.

11:22 am - 11:29 am
Temperature-controlled RF treatment of nasal valve for nasal airway obstruction
William Yao, MD, FARS

11:29 am - 11:36 am
Endoscopic techniques for nasal septal perforation repair: A systematic review
Arron Gravina, DO

11:36 am - 11:43 am
Surgical repair of nasal septal perforations
Janmaris Marin, MD

11:43 am - 11:50 am
Mental health burden of empty nose syndrome
Meredith Meyer

11:50 am - 12:00 pm
Q&A

Saturday, October 2, 2021 8:00 am – 12:00 pm Breakout Room D Bernard's Room

Rhinology Malignancies

Moderators: Garret Choby, MD, FARS; Nyall London, MD, FARS

8:00 am - 8:07 am
Nasal endoscopy and aerosol generation
Amarbir Gill, MD

8:07 am - 8:14 am
Surgical approach is associated with complication rate in sinonasal malignancy: A multi-center study
Daniel Beswick, MD, FARS

PROGRAM AT A GLANCE

8:14 am - 8:21 am

Determinants of survival in sinonasal and skull base chondrosarcoma
Ryan Rimmer, MD

8:21 am - 8:28 am

Healthcare expansion and rhinologic malignancies
Alexandria L. Itrace

8:28 am - 8:38 am

Q&A

Rhinology Workforce

Moderators: Douglas Reh, MD, FARS; Erin O'Brien, MD, FARS; Mathew Geltzeller, MD, FARS

8:38 am - 8:45 am

Gender gap among rhinology and skull base surgeons
Patricia Johnson, MD

8:45 am - 8:52 am

Socioeconomic trends in rhinology and endoscopic skull base surgery in 2020
Sara Sun, MD

8:52 am - 8:59 am

Predictors of academic career placement and scholarly impact in fellowship-trained rhinologists
Nicholas Rowan, MD

8:59 am - 9:06 am

A geospatial analysis of the rhinologist workforce in the United States
Samir Hassanin, BA

9:06 am - 9:16 am

Q&A

Rhinology Outcomes

Moderators: Waleed Abuzeid, MD; Joshua Levy, MD, FARS; Zara Patel, MD, FARS

9:16 am - 9:23 am

Factors associated with postoperative outcomes in pituitary surgery
Khodayar Goshtasbi, MS

9:23 am - 9:30 am

Ecological momentary assessment of sinonasal outcomes
Victoria Lee, MD

9:30 am - 9:37 am

Endoscopic sinus surgery in patients with comorbidities
Ariel Omiunu, BS

9:37 am - 9:44 am

A cross-sectional analysis of patient information and education on sinusitis
Kolin Rubel, MD

9:44 am - 9:51 am

The use of SN-5 to differentiate chronic rhinosinusitis and chronic adenoiditis in children
Norman Orabi, MD

9:51 am - 10:00 am

Q&A

10:00 am - 10:30 am

BREAK

Skull Base

Moderators: Corinna Levine, MD, FARS; Benjamin Bleier, MD, FARS; Raj Sindwani, MD, FARS

10:30 am - 10:37 am

Outcomes of endoscopic resection of pediatric craniopharyngiomas
Tapan Patel, MD

10:37 am - 10:44 am

Occult nodal involvement in sinonasal squamous cell carcinoma
Samer Elsamna, BA

10:44 am - 10:51 am

Race, ethnicity, and socioeconomic status in esthesioneuroblastoma outcomes
Rahul Sharma, BS

10:51 am - 10:58 am

Impact of distant metastasis in sinonasal squamous cell carcinoma
Samer Elsamna, BA

10:58 am - 11:05 am

Nasal cavity squamous cell carcinoma
Blaine Smith

11:05 am - 11:15 am

Q&A

Skull Base Reconstruction

Moderators: Edward Kuan, MD, FARS; Eric Wang, MD, FARS; Bradford Woodworth, MD, FARS

11:15 am - 11:22 am

Endoscopic repair of anterior encephaloceles: A cost-effective alternative to craniotomy
Matthew Wu, BS

11:22 am - 11:29 am

The role of fascia lata in complex skull base reconstruction: Emergence of a new workhorse
Firas Sbeih, MD

11:29 am - 11:36 am

False negative rate of intrathecal fluorescein in CSF leak repair
Jeffrey Radabaugh, MD

11:36 am - 11:43 am

Systematic review of olfactory preservation techniques in nasoseptal flap harvest
Suat Kilic, MD

11:43 am - 11:50 am

Endoscopic endonasal eustachian tube obliteration for cerebrospinal fluid rhinorrhea
Ryan Rimmer, MD

11:50 am - 12:00 pm

Q&A

12:00 pm - 1:00 pm

(Heinsbergen Room)

Women in Rhinology / Residents & Fellows / Mentorship Lunch Program

Guest Speaker: Nina Shapiro, MD; Professor of Head and Neck Surgery, David Geffen School of Medicine at UCLA

Director of Pediatric Otolaryngology, Mattel Children's Hospital UCLA

"Medical Communication to the Non Medical Audience: Something We All Need to Practice"

PROGRAM AT A GLANCE

Saturday, October 2, 2021 1:00 pm – 4:20 pm General Session Crystal Ballroom

1:00 pm - 1:40 pm

Panel: "Building a successful rhinology practice"

Moderator: Thomas Higgins, MD, FARS

Panelists: Greg Davis, MD, FARS; Winston Vaughan, MD, FARS; Danielle Warner, MD; Marc Dubin, MD, FARS; Douglas Reh, MD, FARS

1:40 pm - 2:20 pm

Rhinology Worldwide Panel

Jivianne Lee, MD, FARS; David Gudis, MD, FARS; Brent Senior, MD, FARS; Kibwei McKinney, MD; Angela Donaldson, MD, FARS; Jose Mattos, MD

2:20 pm - 3:00 pm

An ARS/AAOA Panel: "The US burden of rising health care cost - A case study in CRSwNP treatment"

Moderator: Michael Stewart, MD, FARS

Panelists: Lauren Roland, MD; Joshua Levy, MD, FARS; Michael Platt, MD

3:00 pm - 3:30 pm

BREAK

3:30 pm - 3:40 pm

Business Meeting and Presidential Citation

Joseph Han, MD, FARS, Michael Stewart, MD, FARS

3:40 pm - 4:20 pm

David W. Kennedy Lecture

Introduction: Rodney Schlosser, MD, FARS

Guest Speaker: David W. Kennedy

"The introduction of endoscopic sinus surgery and the evolution of rhinology as a specialty"

6:00 pm - 8:00 pm

ARS Co-Sponsor of the 125th Anniversary Celebration of the AAO-HNS Red Carpet Joint Specialty Society President's Reception at the Xbox Plaza in the heart of L.A. Live

POSTERS

Poster A001

70-degree endoscope in maxillary antrostomy
Firas Hentati, MD

Poster A002

Acute exacerbations, a CRS patient's perspective
Katie Phillips, MD

Poster A003

Balloon septoturbintomy
Alexander Farag, MD, FARS

Poster A004

Baseline blood eosinophil level is not a biomarker for CRSwNP severity or response to dupilumab
Claus Bachert, MD

Poster A005

Caffeine consumption and rhinitis
Michael DeBakey, MS

Poster A006

Canine endoscopic sinonasal surgery
Charles Riley, MD

Poster A007

CFTR mutations in patients with CRS: A systematic review
Michael Yong, MD, MPH, MBA

Poster A008

Chronic rhinosinusitis with nasal polyposis patients receiving monoclonal antibody therapy
Mohamad Babi, MD

Poster A009

Differences in clinical presentation for patients with frontal sinus mucoceles
Dhruv Sharma, MD

Poster A010

Dupilumab improves sense of smell in CRSwNP patients with 0, 1, 2, or ≥3 prior surgeries
Joaquim Mullol, MD, PhD

Poster A011

Endoscopic oro-antral fistula repair
Yu-Hsuan Lin, MD

Poster A012

Endoscopic removal of a nasal septal pleomorphic adenoma: A case report and literature review
Hannah Case

Poster A013

ENT visits and procedures in COVID recovered
Dennis Tang, MD

Poster A014

Epistaxis in CPAP patients
Theodore Klug, MD, MPH

Poster A015

Impact of asthma status on outcomes and cost in pediatric acute rhinosinusitis management
Vraj Shah, BS

Poster A016

Impact of asthma status on outcomes and cost in pediatric nasal polyp management
Vraj Shah, BS

Poster A017

Impact of comorbidities on 30-day outcomes after TSS
Sudeepti Vedula, BS

Poster A018

Impact of Cystic Fibrosis on outcomes and cost in pediatric nasal polyp management
Vraj P. Shah, BS

Poster A019

Incidence and implications of HPV tumor status in non-squamous cell carcinoma sinonasal malignancies
Jason Lee, MD

Poster A020

Internal carotid artery pseudoaneurysm and blow-out secondary to chronic invasive fungal sinusitis
Camilo Reyes, MD, FARS

Poster A021

Intranasal budesonide delivered by nasal nebulizer compared to a sinus rinse
Marc Nagel, H.BSc

Poster A022

MicroRNA-29a promotes the allergic rhinitis by down-regulating FOS
Zhiyuan Tang, PhD

Poster A023

Nasal nitric oxide as a biomarker in the diagnosis and treatment of sinonasal inflammatory diseases
Matthew Lelegren, MD

Poster A024

Nasopharyngeal pedicled pituitary mass: A case report
Madison Colcord, BS

All information was taken from the original abstract submission

PROGRAM AT A GLANCE

Poster A025

National analysis on the inpatient management of chronic rhinosinusitis in the pediatric population

Bryan Le, BS

Poster A026

Navigation-assisted intradural skull base surgery

Ariel Omiunu, BS

Poster A027

Performance and safety of image guided sinus dilation system in revision endoscopic sinus surgery

Joseph Han, MD, FARS

Poster A028

Preoperative laboratory testing in low risk ambulatory ESS

Sudeepti Vedula, BS

Poster A029

Prevention of frontal sinus ostium stenosis after modified Lothrop (Draf III) frontal sinus surgery

Yasuyuki Hinohira, MD, PhD

Poster A030

Progressive improvement of severe CRSwNP with dupilumab: Post-hoc analysis of two Phase 3 studies

Claus Bachert, MD

Poster A031

Qualitative study of disease control in CRS

Katie Phillips, MD

Poster A032

Respiratory epithelial adenomatoid hamartoma in a 76-year-old female

Haroon Alam

Poster A033

Seropositivity to microbial proteins in CRS using high throughput microarray technology

Devyani Lal, MD, FARS

Poster A034

Severity of loss of smell and paranasal sinus opacification

Stella Lee, MD

Poster A035

Shortening the learning curve: Virtual reality rhinoplasty

Janmaris Marin Fermin, MD

Poster A036

Sociodemographic disparities and patterns of care in sinonasal adenocarcinoma

Sudeepti Vedula, BS

Poster A037

The impact of PROPEL® Implant during sinus surgery on healthcare resource utilization

Kathleen Mortimer, ScD, MPH

Poster A038

Topical anesthesia in nasal endoscopy: To use or not to use?

Prithwijit Roychowdhury, BS

Poster A039

Treatment of recurrent frontoethmoid mucocele

Lindsey Ryan, MD

Poster A040

Unilateral Vidian main neurectomy on moderate to severe allergic rhinitis

Zhiyuan Tang, PhD

Poster A041

Vibration therapy in sinonasal disease

Pooya Roozdar, MD, MPH

Poster A042

Woakes' Syndrome: A case series

Alexander Dickie, MD

PROGRAM ABSTRACTS

Thursday, September 30, 2021

7:00 am – 1:00 pm
ARS Annual Residents Dissection Course – Didactic Session
Tiffany Ballroom
By Invitation Only

1:30 pm – 4:20 pm
ARS Annual Residents Dissection Course – Lab Session
Emerald Ballroom
By Invitation Only

5:30 pm – 7:00 pm
ARS Annual Residents Dissection Course - Reception
John F. Kennedy Penthouse

Friday, October 1, 2021 7:00 am – 1:00 pm

7:00 am - 8:00 am
Board of Directors Breakfast
Emerald Ballroom

8:00 am - 12:00
Board of Directors Meeting
Emerald Ballroom

Friday, October 1, 2021 1:00 pm – 5:00 pm General Session Crystal Ballroom

1:00 pm - 1:15 pm
Presidential Address & Welcome
Joseph Han, M, FARS

1:15 pm - 2:00 pm
17th Annual David W. Kennedy Lecture
Introduction: Rodney Schlosser, MD, FARS
Guest Speaker: N. Louis Shipley, Harvard Business School
“Leveraging disruptive technology in a post pandemic world”

2:00 pm - 2:15 pm
Awards Ceremony: Robert Kern, MD, FARS; Benjamin Bleier, MD, FARS; Jivianne Lee, MD, FARS; Jean Kim, MD, FARS

Top Clinical Abstracts

Moderators: Dana Crosby, MD, FARS; Jean Kim, MD, FARS

2:15 pm - 2:22 pm
PK evidence of consistent drug release from long-acting implantable corticosteroid matrices for CRS
Randall A. Ow, MD, FARS
Yina Kuang, PhD
Steven Shotts, MD
Venkata Kakarlapudi
John McIntyre
Changcheng You
Alexander Pappas
Lindsay Brayton, Clinical Project Manager
Lyra therapeutics, Inc

Background:
LYR-210 is an implantable matrix designed to provide consistent local delivery of mometasone furoate (MF) to sinonasal mucosa for up to 24 weeks in surgically-naïve chronic rhinosinusitis (CRS) patients who failed previous medical management. In the LANTERN study, LYR-210 (7500µg) achieved clinically relevant improvement in CRS cardinal symptom composite scores, SNOT-22, ethmoid opacification, and rescue treatment use at 24 weeks vs. control. LYR-210 pharmacokinetics were evaluated up to 56 days in a clinical study.

PROGRAM ABSTRACTS

Methods:

Twenty-four surgically-naïve adult CRS subjects with and without nasal polyps enrolled in an open-label multicenter study and underwent in-office bilateral administration of LYR-210 (2500µg) (n=12 subjects) or LYR-210 (7500µg) (n=12 subjects) into the middle meatus. Plasma MF concentrations 1-hour post-placement (day 1), and days 2, 3, 7, 14, 21, 28, 42, and 56 were determined by LC-MS/MS. MF on matrices removed at day 56 was measured by HPLC-UV.

Results:

Both LYR-210 doses were well-tolerated with no serious adverse events. Systemic MF levels were dose-dependent and in line with reported values of other MF products. Plasma MF concentrations showed steady drug release from LYR-210 that persisted through 56 days. At day 56, 18.3±5.2% and 19.1±4.7% of the total MF dose was released from LYR-210 (2500µg) and LYR-210 (7500µg) matrices, respectively, with >80% remaining for 4 additional treatment months. Matrix retention rate at day 56 was 98%.

Conclusions:

This study reports the first evidence of a sinonasal treatment achieving continuous local MF delivery with low systemic levels at a steady rate for months from one administration.

2:22 pm - 2:29 pm

Outcomes of Dupilumab treatment versus FESS for CRSwNP

Harish Dharmarajan, MD
Oluleke Falade
Stella Lee, MD
Eric Wang, MD, FARS

Background:

Outside of the SINUS-24 and SINUS-52 trials, there is limited data on the utility of Dupilumab in patients with chronic rhinosinusitis with nasal polyps (CRSwNP). The objective was to compare the outcomes of Dupilumab treatment and functional endoscopic sinus surgery (FESS) in CRSwNP patients regarding change in nasal polyp score and SNOT22 score.

Methods:

A retrospective matched cohort study compared 56 CRSwNP patients treated with Dupilumab to 56 CRSwNP patients who underwent FESS with both cohorts utilizing topical corticosteroids. Patients were matched based on age, gender, ethnicity, Lund-Mackay CT score, and baseline nasal polyp score. The primary endpoints were change in nasal polyp score, change in overall SNOT22 score, and change in individual SNOT22 survey domains. Dupilumab patients were followed on average for 6.9 months and FESS patients for 16.6 months.

Results:

FESS patients had a greater improvement in nasal polyp scores (5.34±1.91) compared to Dupilumab patients (4.08±2.08, p<0.0057). Dupilumab patients had greater improvement in the extra-nasal rhinologic SNOT22 domain scores (4.78±3.75) compared to FESS patients (3.09±4.10, p<0.0255). There was a greater improvement in the SNOT22 olfaction scores for Dupilumab patients (2.33±2.17) as compared to FESS patients (1.43±2.19, p<0.0322). There was no significant difference in terms of the change in overall SNOT22 score, rhinologic, ear / facial, psychological, and sleep SNOT22 domains between the 2 groups.

Conclusions:

FESS patients had a greater reduction in polyp burden compared to Dupilumab patients. Dupilumab patients reported improved olfaction, cough, post-nasal drainage, and thick nasal drainage as compared to FESS patients.

2:29 pm - 2:36 pm

CRS-PRO and SNOT 22 correlations with type 2 inflammatory mediators in chronic rhinosinusitis

Samuel Racette, MD
Alexander Schneider, Rhinology Fellow
Caroline Price, Senior Research Study Coordinator
Samuel Rodeghiero, Research Study Assistant
Robert Kern, MD, FARS
Northwestern University

Background:

The SNOT-22 and 12-item Patient Reported Outcomes in Chronic Rhinosinusitis (CRS-PRO) are validated patient reported outcomes measures in CRS. We assesses the correlation of these outcome measures with type 2 cytokines prior to and following sinus surgery.

Methods:

Middle meatal mucus was collected and SNOT-22 and CRS-PRO were administered to 123 patients (71 CRSsNP, 52 CRSwNP) with CRS prior to and 6-12 months after undergoing ESS. Type 2 mediators (IL-4, -5, -13, and ECP) were measured using a multiplex flow cytometric assay and ELISA. The pre- and post-operative patient reported SNOT-22 and CRS-PRO outcomes were correlated to type 2 mediators.

Results:

Pre-ESS CRS-PRO correlated with two mediators (IL-13 p=.023; ECP p=.018) compared to zero for SNOT-22. Post-ESS CRS-PRO correlated with two mediators (IL-5 p=.003; IL-13 p=.0003) compared to one for SNOT-22 (IL-13 p=.019). In CRSwNP pre-ESS the CRS-PRO correlated with two mediators (IL-4 p=.01; IL-5 p=.04) while SNOT-22 correlated with one (IL-4 p=.01). Post-ESS in CRSwNP the CRS-PRO and SNOT-22 each correlated with 3 mediators (IL-5, IL-13, ECP). SNOT-22 Rhinologic subdomain and CRS-PRO

PROGRAM ABSTRACTS

rhinopsychologic subdomain were similar in strength of correlation for all CRS patients. The rhinopsychologic subdomain correlated with three mediators pre-operatively in CRSwNP patients (IL-4 p=.01; IL-5 p=.005; and IL-13 p=.01) compared to one for SNOT-22 (IL-4 p=.05). IL-13 was significantly correlated post-ESS with 8/12 items of the CRS-PRO vs 6/22 items of the SNOT-22.

Conclusion:

The CRS-PRO has a stronger correlation to type 2 inflammatory mediators in chronic rhinosinusitis as a total instrument as well as to greater individual components compared to the SNOT-22.

Dupilumab and ASA desensitization CEA

Michael Yong, MD, MPH, MBA
Yu Qi Wu, BSc
Joel Howlett
Jeromie Ballreich
Evan Walgama, MD
Andrew Thamboo, MD
University of British Columbia

Background:

Chronic rhinosinusitis with nasal polyposis (CRSwNP) in the setting of aspirin-exacerbated respiratory disease (AERD) is a disease that is difficult to treat and prone to recurrence. Dupilumab is a promising treatment for these patients, but its cost-effectiveness has not yet been compared with aspirin (ASA) desensitization.

Objective:

To compare cost effectiveness of ASA desensitization to dupilumab therapy for the treatment of CRSwNP in AERD.

Methods:

Cost-effectiveness, measured in Quality-Adjusted Life Years (QALYs), and cost-utility, measured in number of required revision endoscopic sinus surgeries (ESS), analyses were conducted.

Results:

ASA desensitization following ESS was cost-effective with an incremental cost-effectiveness ratio (ICER) of \$10,363. Adding salvage dupilumab was not cost-effective (ICER \$160,192), and upfront dupilumab therapy was not cost-effective in any scenario (ICER \$325,794). The cost-utility analysis demonstrated that over a 10-year period per patient, appropriate medical management following ESS cost \$20,960.69 and resulted in 2.25 revision ESS, ASA desensitization following ESS cost \$24,448.78 and resulted in 2.02 revision ESS, ASA desensitization with salvage dupilumab cost \$100,453.95 and resulted in 1.68 revision ESS, and upfront dupilumab cost \$171,933.81 and resulted in 1.51 revision ESS.

Conclusions:

Dupilumab for the treatment of severe CRSwNP was not found to be cost-effective as salvage or upfront therapy. Further analysis highlights that the cost-effectiveness of dupilumab was most sensitive to drug price and expected quality of life gains. This suggests that investigation into improving patient population selection and tailoring treatment is needed.

2:43 pm - 2:50 pm

Predicting malignant transformation of inverted papilloma using image-based machine learning

Angela Yang, BS
Zara Patel, MD, FARS
Peter Hwang, MD, FARS
Jayakar Nayak, MD
Nithin Adappa, MD, FARS
Dayoung Kim
George Liu
Andrew Hojel
Diana Voevodsky
Julia Wang
Charles Tong, MD
Stanford University School of Medicine

Background:

Sinonasal inverted papilloma (IP) is a benign tumor that can be identified through imaging. However, it has the potential to undergo malignant transformation to squamous cell carcinoma (IP-SCC), which is often challenging to identify pre-operatively. In this study, we aimed to develop a machine learning model to predict the malignant transformation of IP-SCC from IP based on magnetic resonance imaging (MRI).

Methods:

This retrospective review included 194 patients from two institutions. History of IP was confirmed via pathology reports. After performing image pre-processing and dataset augmentation, a 3D convolutional neural network (CNN) was trained to classify pre-operative MRIs as IP (n=329) or IP-SCC (n=117) scans. The custom-built CNN consists of four convolutional layers with an adaptive average pooling layer and a dropout layer. Weighted binary cross entropy loss was used to evaluate the quality of the models' predicted probabilities of classifying each scan as positive or negative. Prediction accuracy was calculated as the percentage of correctly predicted scans in the test set by the trained model.

Results:

The current model has an overall accuracy of 72%, correctly classifying 52% of the true positive scans and 78% of the true negative scans. The model's average confidence is 71% for true positive scans and 73% for true negative scans.

Conclusion:

Using pre-operative MR imaging alone, the CNN model

PROGRAM ABSTRACTS

is able to identify signs of malignancy within IP. The accuracy of the CNN will continue to improve with an ever-increasing radiologic dataset.

2:50 pm - 3:00 pm

Q&A

3:00 pm - 3:30 pm

BREAK

Top Basic Science Abstracts

Moderators: Stella Lee, MD; Cecelia Damask, DO; Justin Turner, MD, FARS

3:30 pm - 3:37 pm

LPS decreases CFTR open probability and mucociliary transport through reactive oxygen species

Do-Yeon Cho, MD

Shaoyan Zhang, PhD

Ahmed Lazrak

Daniel Skinner, BS

Harrison Thompson, BS

Jessica Grayson, MD

Steven Rowe, MD

Zsuzsanna Bebok

Eric Sorscher

Sadis Matalon

Bradford A. Woodworth, MD, FARS

UAB

Background:

Chronic rhinosinusitis (CRS) associated with gram-negative bacteria (GNB) are particularly recalcitrant to treatment. The objectives of the current study were to identify the mechanisms by which lipopolysaccharide (LPS) permits GNB to persist in the sinuses.

Methods:

Mammalian airway epithelial cells (AEC) exposed to LPS were subjected to Ussing chamber, and whole-cell patch-clamp analysis, and measurements of functional microanatomy. Total and surface cystic fibrosis transmembrane conductance regulator (CFTR) protein expression, and carbonylation from reactive oxygen species (ROS) were assessed. Nasal potential difference (NPD) was performed in mice after in vivo exposure.

Results:

LPS reduced (CFTR)-mediated short-circuit current in AEC in Ussing chambers and abrogated CFTR single channel activity in patch clamp studies, effects of which were blocked with toll-like receptor (TLR)-4 inhibitor. Unitary conductance and single-channel amplitude of CFTR were unaffected, but open probability and number of active channels were markedly decreased.

LPS increased cytoplasmic and mitochondrial ROS resulting in CFTR carbonylation. Glutathione (GSH) eliminated effects of exposure. Functional microanatomy in vitro, including mucociliary transport were also decreased, but restored when co-incubated with GSH/TLR-4 inhibitor. In vivo measurements, following application of LPS in the nasal cavities, showed significant decreases in transepithelial Cl⁻ secretion as measured by NPD— an effect that was nullified with GSH/TLR-4 inhibitor.

Conclusion:

These data provide definitive evidence that LPS-generated ROS interfere with CFTR function in vitro & in vivo resulting in CF-type disease. Findings have therapeutic implications for CRS.

3:37 pm - 3:44 pm

Transcriptional changes in chronic rhinosinusitis with asthma

Amarbir Gill, MD

Abigail Pulsipher, PhD

Jeremiah Alt, MD, PhD, FARS

Jorgen Sumison

University of Utah

Background:

Patients with asthma and chronic rhinosinusitis (CRS-A) demonstrate systemic upregulation of genes associated with Th2 inflammation compared to those with CRS without asthma (CRS). Whether these systemic transcriptional changes affect gene expression within the sinuses, however, remains unknown. The objective of this study was to compare the local and systemic transcriptional profiles among patients with CRS-A and CRS.

Methods:

Demographic information was recorded for thirty-four prospectively enrolled patients with CRS-A (n=19) and CRS (n=15). mRNA levels of 594 genes associated with innate and adaptive immunity expressed in anterior ethmoid tissue were quantified by multiplex gene array analysis using NanoString technology. Gene expression ratios (GER) were reported for genes that were significantly and differentially expressed among these cohorts.

Results:

Genes associated with Th2-driven inflammation, including retinoic acid receptor responder protein 3 (RARRES3) and Toll-like receptor 3 (TLR3) were significantly upregulated in the sinuses of patients with asthma and CRS without nasal polyposis (CRSsNP-A) compared to CRSsNP (p<0.04). Compared to patients with CRS with nasal polyposis (CRSwNP), those with asthma (CRSwNP-A) demonstrated significant local upregulation of Th2-associated Fc fragment of IgE, high affinity I, receptor (FCER1A; p<0.03) in sinonasal tissues.

PROGRAM ABSTRACTS

Conclusion:

Patients with CRSsNP-A exhibit upregulation of genes associated with Th2 inflammation at both the local and systemic level. This observation contrasts with the typical Th1/Th17 inflammation seen in patients with CRSsNP, suggesting that the presence of asthma may lead to inflammatory profile switching in CRSsNP-A.

3:44 pm - 3:51 pm

Cystatin-induced coagulation and fibrinolysis pathway derangements in a murine model of CRSwNP

Alan Workman, MD, MTR
Angela Nocera
Mansoor Amiji, PhD
Benjamin Bleier, MD, FARS
Harvard

Background:

CST1, a cysteine protease inhibitor, has been recently identified as one of the most highly overexpressed proteins in CRSwNP mucosa and is capable of driving downstream type 2 inflammation. Coagulation cascade derangements resulting in excess fibrin deposition with simultaneous impairments in fibrinolysis have been shown to contribute to the development and maintenance of hyperplastic nasal polyp tissue. We therefore developed a murine model to determine if CST1 exposure could induce aberrations in downstream coagulation cascade and fibrinolysis-related proteins with resultant polypoid change.

Methods:

Wild-type C57BL/6 mice were separated into four groups and dosed intranasally with CST1 or control solution for 5 or 18 days. Animals were sacrificed at the end of the exposure period and nasal tissue was harvested and digested, followed by quantification of several coagulation and fibrinolysis-related proteins with subsequent analysis of expression differences between groups.

Results:

Significant upregulation in thrombin and fibrinogen was observed in nasal tissue from mice exposed to CST1 for 18 days as compared to control mice (n=7,7, p=0.035, 0.019). Significant upregulation in alpha-2-antiplasmin was observed in mice exposed to CST1 for 5 days (n=7,7, p<0.0001). Conversely, a downregulation in plasminogen occurred in mice exposed to CST1 for a 5-day period (n=9,9, p=0.038).

Conclusions:

Our animal model suggests that CST1 may be a proximal cause of downstream polyp formation and perpetuation of disease through aberrations in coagulation-related proteins and impairment of fibrinolysis. CST1 may serve as an upstream target in the genesis of CRSwNP, allowing for more effective treatments to be developed.

3:51 pm - 3:58 pm

Steroid responsive and steroid resistant cytokines in AERD

Michael Kohanski, MD, PhD
Cailu Lin
Tiffany Tan
Heather Ungerer, Research Assistant
Ankur Kumar
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
John Bosso, MD
Danielle Reed
Noam Cohen, MD, PhD, FARS
Perelman School of Medicine, University of Pennsylvania

Background:

Chronic rhinosinusitis has a complex inflammatory spectrum. Aspirin exacerbated respiratory disease (AERD) has a mixed inflammatory milieu of type 1, type 2, and type 3 cytokines. Elevated type 1 cytokines are associated with steroid-resistant asthma, however, the role of type 1 cytokines in AERD is unknown. We measured cytokine levels in AERD patients with or without prednisone treatment.

Methods:

22 patients (15 steroid naïve, 7 steroid treated) with aspirin challenge-confirmed AERD were included. Samples for cytokine analysis were acquired from 3 sources: 1) ethmoid secretions, 2) epithelial brushings from polyps, and 3) biopsies of polyps. 16 analytes (IL-6, CCL20, IL-33, IL-5, IL-4, IL-13, IL-10, IL-25, IL-2, GM-CSF, IL-17A, IL-22, TSLP, TNF α , IL-1 β , IFN- γ) were assessed using a luminex platform. Correlations among sampling methods and comparisons between the steroid-naïve and treated groups were assessed.

Results:

Robust protein levels were measured for IL-6, IL-5, IL-13, IL-33, IL-10, CCL20, and TNF α . Low signal was detected for IL-1 β , IL-22, IL-4 and IFN- γ . Except for IL-5, there was no correlation among all 3 sampling methods. Among the epithelial brushings IL-5, IL-33, CCL20, and IFN- γ were significantly decreased in the steroid-treated group, whereas TNF α , IL-1 β , IL-6 and IL-22 were not significantly different.

Conclusions:

Mucosal cytokine levels should be analyzed within the cellular and functional context of the specific mucosal compartment (secretions, epithelium, full thickness mucosa). In the epithelial compartment, only type 2 cytokines and IFN- γ were responsive to prednisone. This work serves as a basis to assess therapeutic-induced mucosal cytokine responses in AERD

PROGRAM ABSTRACTS

3:58 pm - 4:05 pm

A human paranasal sinus model of SARS-CoV-2 infection

Wesley Stepp, MD, PhD
 Rhianna Lee, Graduate Student
 Justin Morse, Fellow
 Craig Miller, Fellow
 Brian Thorp, MD, FARS
 Adam Zanation, MD
 Charles Ebert, Jr., MD, FARS
 Brent Senior, MD, FARS
 Adam Kimple, MD, FARS
 University of North Carolina Hospitals

Background:

Severe Acute Respiratory Syndrome coronavirus-2 (SARS-CoV-2) has infected over 150 million people and resulted in 3 million deaths. Infection is dependent on the presence of host angiotensin-converting enzyme-2 (ACE-2) receptor and host proteases, primarily TMPRSS2. While SARS-CoV-2 can readily infect the sinonasal mucosa, little is known about the expression of critical host co-factors along the upper aerodigestive tract and no primary human tissue model currently exists.

Methods:

Mucosal tissue from the paranasal sinuses, nasopharynx or lung tissue were obtained under IRB protocol 03-1396 approved by the UNC-CH IRB. For infections, SARS-CoV2 was applied to explanted tissue grown on GelFoam and incubated for 72h. Control and infected tissue total RNA was assayed for TMPRSS2 and ACE-2, and well as for the presence of SARS-CoV-2 RNA.

Results:

Paranasal sinus mucosa expresses TMPRSS2 at levels 4.4- and 5.5-fold higher than mucosa from the nasal airway or nasopharynx, respectively. ACE2 expression is also significantly elevated in the sinus mucosa compared to the nasal airway and nasopharynx and 9.2-fold higher than ACE2 in the lungs. We also demonstrated a viable, 3D-explant model for ex-vivo infection with SARS-CoV-2.

Conclusions:

SARS-CoV-2 infection is dependent on host proteins for entry and initiation of viral replication. Our data suggests the highest concentration of these cofactors are present in the mucosa of the paranasal sinuses and could represent the initial site of infection by SARS-CoV-2. Our study is the first to demonstrate the expression of these critical cofactors throughout the airway, and is also the first ex-vivo mucosal culture model to demonstrate successful SARS-CoV-2 infection.

4:05 pm - 4:15 pm

Q&A

4:15 pm - 5:00 pm

Panel: "Lessons Learned: Reflections of Seasoned Rhinologists"

Moderator: Eugenia Vining, MD
 Panelists: Marilene Wang, MD, FARS; James Stankiewicz, MD, FARS; Michael Setzen, MD, FARS; Donald Lanza, MD, FARS

5:15 pm - 7:00 pm

President's Reception and Poster Viewing
 Biltmore Bowl

Saturday, October 2, 2021 8:00 am – 12:00 pm Breakout Room A Gold Room

Biomarkers

Moderators: Andrew Lane, MD, FARS; Victoria Lee, MD; Bruce Tan, MD

8:00 am - 8:07 am

Chronic rhinosinusitis mouse model

John Lee, MD
 Amr Hamour, MD, MBT
 Ewa Poduch
 Eric Monteiro
 Lakshmi Kotra
 Allan Vescan
 University of Toronto

Background:

Eosinophilic CRS is often recalcitrant to conventional treatment. In order to develop targeted treatment modalities, the creation of a reproducible animal model is necessary. This study aimed to optimize and validate an existing ovalbumin (OVA)-induced murine model of eosinophilic CRS.

Methods:

Fifteen female and fifteen male Balb/c mice (n=30), aged 6 weeks old, were included in the eight week protocol. In the first week, experimental animals (n=20) received intraperitoneal sensitization with ovalbumin and adjuvant (aluminum hydroxide gel) in phosphate-buffered saline (PBS). Control animals (n=10) received PBS injection only. Between weeks 2-8, intranasal OVA with aspergillus oryzae protease in PBS was administered to experimental animals. Complete blood count with differential, peripheral blood smear, IL-4

PROGRAM ABSTRACTS

ELISA of nasal lavage, and histological analysis of nasal cavity mucosa were completed on all animals. Standard safety parameters such as body weight, physical well-being, and behaviour were monitored.

Results:

Histological analysis of experimental animal nasal mucosa revealed significantly higher levels of eosinophilic tissue infiltration and degranulation, hyaline droplets, and Charcot-Leyden crystals compared to control. Prolonged eosinophilia was associated with an increase in respiratory epithelial thickness (43.0 μ m [41.21, 44.79] in week 8, 14.9 μ m [14.17, 15.63] in control). Compared to control, there were increased levels of IL-4 in serum and nasal lavage. Safety parameters were equal between groups.

Conclusion:

This murine model induced substantial local eosinophilic inflammation within sinonasal mucosa and therefore, may be used to evaluate the efficacy of therapeutics designed to target CRS.

8:07 am - 8:14 am

Urinary leukotriene E4 as a biomarker for chronic rhinosinusitis clinical subtypes

Beau Idler, BA

Devyani Lal, MD, FARS

Michael Marino, MD, FARS

Background:

Urinary leukotriene E4 (uLTE4) has been established as a novel biomarker for the aspirin exacerbated respiratory disease (AERD) phenotype of chronic rhinosinusitis (CRS). Elevated uLTE4 is also seen in CRS with comorbid asthma and allergy. This study examines uLTE4 as a biomarker for differentiating clinical subtypes of AERD and non-AERD CRS.

Methods:

Patients presenting to a tertiary rhinology clinic for CRS who underwent uLTE4 testing were studied. Using previously published uLTE4 criteria for categorization, patients were grouped into three cohorts: AERD (>166 pg/mg Cr), eosinophilic CRS (>106 pg/mg Cr; moderately elevated) and normal (<106 pg/mg Cr). Diagnosis of asthma, allergy, aspirin intolerance, nasal polyps as well as baseline SNOT-22 and Lund-Mackay CT scores (LMS) were recorded.

Results:

Ninety-three patients met inclusion criteria. Patients in the highest and moderately-elevated uLTE4 categories were significantly more likely to have co-morbid asthma ($p=0.023$), allergy ($p=0.036$), and nasal polyps ($p<0.001$) than those with normal uLTE4. Patients in the highest uLTE4 group were also more likely to have observable aspirin intolerance ($p<0.001$). LMS was highest for patients with uLTE4 >166 pg/mg Cr ($p<0.001$). Baseline SNOT-22 scores were not

significantly different between the three uLTE4 groups ($p=0.109$).

Conclusions:

Patients with elevated uLTE4 that fell below classic criterion level for AERD demonstrated similar clinical phenotype of nasal polyps, comorbid asthma, and allergy. Dysregulated leukotriene metabolism may be an endotypic underpinning in this group of CRS patients without overt AERD phenotype. uLTE4 could be a potential biomarker for such patients with suspected leukotriene mediated CRS.

8:14 am - 8:21 am

Central compartment atopic disease and allergic rhinitis have similar allergen patterns

Bianca Rullan Oliver, MD

John Bosso, MD

Nithina Adappa, MD, FARS

Michael Kohanski, MD

James Palmer, MD, FARS

Audie Sweis, MD

Tapan Patel, Fellow Physician

Heather Ungerer

Siddhant Tripathi

University of Pennsylvania

Background:

Patients with chronic rhinosinusitis (CRS) can have concomitant allergic rhinitis (AR). Central compartment atopic disease (CCAD) is a distinct phenotype of CRS with nasal polyps (CRSwNP) that may be driven by inhalant allergy. Here we investigate the specific inhalant allergen sensitization patterns of CCAD and other CRS types and compare those with AR.

Methods:

We performed a retrospective review of patients with CRS or AR who underwent inhalant allergy skin testing between 2016 and 2018 at a tertiary academic otorhinolaryngologic allergy clinic. Patients with CRS were further subclassified into CRS without nasal polyps (CRSsNP), Aspirin-Exacerbated Respiratory Disease (AERD), Allergic Fungal Rhinosinusitis (AFRS), CRSwNP not otherwise specified, and CCAD. Inhalant allergen sensitization patterns were studied and compared with those of AR.

Results:

515 patients were identified, 341 diagnosed with CRS and 171 diagnosed with AR. Of the 341 patients with CRS, 24 were diagnosed with CCAD using radiographic criteria. CCAD patients had the highest sensitization to dust mite (63%), followed by grass (54%), weeds (50%), cats (46%), dogs (46%), trees (46%), feather (33%), and minor molds (33%). There was no statistically significant difference in the inhalant allergen sensitization profiles of patients with AR and CCAD, with the exception of a higher prevalence of weed allergy in the CCAD group (OR 2.41; $p = 0.049$).

PROGRAM ABSTRACTS

In contrast, AR sensitization patterns differed markedly from other CRS subtypes.

Conclusion:

Allergen sensitization profiles of CCAD and AR are strikingly similar, further supporting the role of inhalant allergy in CCAD and suggesting CCAD might be a progression of poorly controlled AR.

8:21 am - 8:28 am

Biomarker model for predicting type 2 in patients diagnosed with CRS

Austin Heffernan, Medical Student
Joban Phulka, Medical Student
Andrew Thamboo, MD
University of British Columbia

Background:

Chronic rhinosinusitis (CRS) is an inflammatory disease that may require biological therapy. An indication for biologics is type 2 inflammation defined by elevated serum eosinophil or IgE levels. The objective of this study was to identify variables that predict serum eosinophilia and could serve as indicators for CRS biologic treatment.

Methods:

Patients ≥ 19 years old diagnosed with CRS who had undergone functional endoscopic sinus surgery were included. Demographics, past medical history, preoperative blood work, pulmonary function testing, Lund-Mackay (LM), Lund Kennedy (LK), SNOT-22, and EQ-5D scores were extracted. Descriptive statistics and binary logistic regression analyses were conducted. Model superiority was based on Nagelkerke R2 scores, and p values ($\alpha = 0.05$) generated from -2 Log-Likelihood values.

Results:

Sixty-five patients, average age 49.96 ± 13.59 years, were included. Twenty-nine binary logistic regression models for eosinophilia were created. There were 3 top models tied for highest specificity (73.2%) and PPV (70.8%). One model (IgE, CRSwNP, LM) predicted eosinophilia significantly ($p = 0.040$) better than IgE alone. All three variables used in this model had an approximately equal contribution to output with a Nagelkerke R2 score of 0.263.

Conclusions:

Eosinophilia and type 2 inflammation can be accurately predicted by a model that includes IgE levels ≥ 250 ug/L, CRSwNP, and LM scores ≥ 17 . The addition of LM scoring to biologic guidelines may help identify type 2 patients and improve outcomes for those using biologics targeting type 2 disease.

8:28 am - 8:35 am

Tissue eosinophilia association with obesity

~~Lindsey Ryan, MD~~
~~Diana Bigler~~
Austin Delaney
Aykut Unsal, MD
Camilo Reyes, MD, FARS
Stilianos Kountakis, MD, FARS

Objectives/Hypothesis:

This study seeks to determine the association between patient comorbidities including obesity and sinus mucosal eosinophilia.

Study Design:

Retrospective chart review

Methods:

Review of patient database compiled at a tertiary-referral institution in an academic rhinology practice. Patient comorbidities including obesity, defined as body mass index (BMI) >30 , asthma, aspirin sensitivity, hypertension, and obstructive sleep apnea were compared between eosinophilic CRS patients and non-eosinophilic CRS patients with and without nasal polyposis after surgery. Tissue eosinophilia was defined as an average of >5 eosinophils per high-power field.

Results:

Two hundred-forty total patients were included in the study. One-hundred seventy eosinophilic CRS and seventy non-eosinophilic CRS patients were identified. There was a significant positive association between patient obesity and sinonasal tissue eosinophilia ($p=.0085$). There was also an association between asthma and sinonasal tissue eosinophilia ($p=.049$).

Conclusions:

When evaluating eosinophilic CRS patients, obesity is an important risk factor to recognize, as these eosinophilic CRS patients may have distinct pathophysiology from non-eosinophilic disease and thus respond to different management strategies. Further studies are needed to determine long term surgical outcomes and treatment response in obese patients versus non-obese patients.

8:35 am - 8:45 am

Q&A

PROGRAM ABSTRACTS

8:45 am - 9:30 am

Panel: "Digital patient engagement for the rhinologist:
Moderator: Martin Citardi, MD, FARS
Panelists: Alexander Farag, MD, FARS; Chirag Patel,
MD, FARS

9:30 am - 10:00 am

BREAK**Cystic Fibrosis**

Moderators: Do-Yeon Cho, MD; Michael Kohanski, MD

10:00 am - 10:07 am

Pseudomonas isolates from CRS with CF develop increased virulence under anaerobic conditions

Do-Yeon Cho, MD
Daniel Skinner, BS
Dong Jin Lim, PhD
Shaoyan Zhang, PhD
Jessica Grayson, MD
Ryan Hunter
William E. Swords
Bradford A. Woodworth, MD, FARS
UAB

Introduction:

Genotypic and phenotypic modifications contribute to the virulence and persistence of *Pseudomonas aeruginosa* infections – a common organism in recalcitrant cystic fibrosis (CF) and non-CF chronic rhinosinusitis (CRS). This study aims to compare phenotypic characteristics and gene expression patterns of clinical *P. aeruginosa* isolates from CF and non-CF CRS subjects under aerobic and anaerobic culture conditions.

Methods:

We analyzed 14 phenotypic characteristics of 27 *P. aeruginosa* isolates [23 clinical isolates (8 non-CF CRS and 15 CRS) and 4 laboratory species] grown under aerobic or anaerobic conditions. RNA-seq of selected species (3 isolates per group) was performed to identify transcriptomic signatures of *Pseudomonas* under these environments.

Results:

Swimming motilities were significantly increased in CF compared to non-CF isolates (colony size(mm), Non-CF=6.90+/-0.83, CF=12.00+/-2.50, p=0.025). Solely CF isolates produced protease in anaerobic conditions. Principal component analysis plots from RNA-seq demonstrated that 1)CF isolates were dissimilar to those isolates from non-CF CRS, and 2)CF isolates grown under the anaerobic conditions were dissimilar to those grown aerobically. The following genes were found to be significantly upregulated when grown anaerobically (cut-off: fold change>=+2, p<0.05, q<0.05): PA3913(protease), PA2098(esterase),

PA2128(fimbrial subunit CupA1), PA0355(protease PfpI), PA2086(epoxide hydrolase), PA5475(metalloprotease).

Conclusions:

Clinical isolates from CF-CRS were highly dissimilar compared to CRS, and virulent factors were upregulated under anaerobic conditions. The anaerobic environment of the hypoxic sinus influences the virulence of *P. aeruginosa* in CRS patients with CF.

10:07 am - 10:14 am

CF olfaction before and after elxacaftor-tezacaftor-ivacaftor

Daniel Bacon, BS
Amanda Stapleton
Jennifer Goralski
Charles Ebert Jr., MD, FARS
Brian Thorp, MD, FARS
Seyed Nouraie
Amber Shaffer
Brent Senior, MD, FARS
Stella Lee, MD
Anna Zemke
Adam Kimple, MD, FARS
University of North Carolina

Background:

Olfactory dysfunction (OD) affects 60-95% of patients with Cystic Fibrosis (CF) and is detrimental to safety and quality of life. Elexacaftor/Tezacaftor/Ivacaftor (ETI) was recently FDA approved for DF508 heterozygote or homozygote patients [≥]12 years of age. ETI improves pulmonary function, but its effect on olfaction is unknown.

Methods:

Thirty-four patients with CF completed the University of Pennsylvania Smell Identification Test (UPSIT) before starting ETI, and 28 completed the UPSIT again 6 months later. A score of ≥ 34 and ≥ 35 represents normosmia in males and females, respectively. The minimal clinically important difference is 4. Paired t-test and multiple linear regression was performed for 28 patients who completed both pre and post UPSIT.

Results:

The mean UPSIT score before ETI was 27.62 (95% confidence interval [CI]: 25.1 to 30.1). There was no significant difference after ETI (-0.47, 95% CI: -4.7 to 3.3; p=0.80). At baseline, 26.4% (n=9) patients exhibited normosmia, 17.6% (n=6): mild microsmia, 20.6% (n=7): moderate microsmia, 26.5% (n=9): severe microsmia, 8.8% (n=3): total anosmia. Only 2 patients had clinically meaningful changes in UPSIT score (1 increased and 1 decreased). There were no statistically significant differences among subgroups.

PROGRAM ABSTRACTS

Conclusions:

Prevalence of OD among CF patients is high, and did not improve after ETI. This is surprising given the dramatic improvement seen in pulmonary function after initiating ETI. It is hypothesized that neuronal loss secondary to chronic inflammation may prevent improvement. As ETI indication may expand to younger patients, there is an opportunity to study whether olfaction can be preserved in a younger cohort.

10:14 am - 10:21 am

Comparison of endoscopic sinus surgery timing in lung transplant patients with Cystic Fibrosis

Joseph Johnson, ScB

Peter Hwang, MD, FARS

Jayakar Nayak, MD

Zara Patel, MD, FARS

Stanford University School of Medicine

Background:

No studies have investigated when ESS is best performed in cystic fibrosis (CF) patients. Therefore, we sought to examine the effects of ESS timing on pulmonary health in lung transplant patients with cystic fibrosis.

Methods:

A retrospective review of all adult lung transplant patients with CF who underwent ESS at our academic medical center over a near 25-year period was performed. Patients were split into two groups based on median time from lung transplantation to ESS. Twenty-three patients were included (12 ESS early and 11 ESS delayed). Outcomes included changes in pulmonary function tests (PFTs) from baseline and pre-operative values to post-operative measurements, the number and duration of inpatient hospitalizations for pulmonary exacerbations, and the number of antibiotic courses used to specifically treat pulmonary exacerbations during the 12 months before and after ESS.

Results:

Baseline demographics, operative history, and pulmonary function characteristics were similar between groups. While the ESS early group saw significant improvement from pre-operative percent predicted FEV1 (ppFEV1) at 12 months post-operatively ($P = 0.030$), there were no significant post-operative PFT changes for the ESS delayed group. Post-operative improvement in FEV1 and ppFEV1 at 12 months was significantly higher for the ESS early group relative to the ESS delayed group ($P = 0.043$, $P = 0.025$; respectively). The ESS early group had a significant reduction in the need for total antibiotic courses compared to the ESS delayed group ($P = 0.027$).

Conclusion:

Earlier ESS interventions following lung transplantation may improve pulmonary function and attenuate pulmonary exacerbations in CF patients.

10:21 am - 10:28 am

Topical antibiotics in chronic rhinosinusitis: a prospective pilot study

Christopher Low, MD

Amy Tuchscherer

Martha Smith

Janalee K. Stokken, MD, FARS

Erin O'Brien, MD, FARS

Garret Choby, MD, FARS

Background:

Management of recalcitrant cases of chronic rhinosinusitis (CRS) is challenging. Prior studies investigating topical antibiotic therapy fail to consistently demonstrate benefit. The primary aim of this pilot study was to investigate rates of antibiotic resistance following completion of topical antibiotic therapy. Secondary aims were to assess changes in patient symptoms and endoscopic exam.

Methods:

A prospective single-arm pilot study at a tertiary referral center was designed for patients with refractory CRS and history of previous endoscopic sinus surgery (ESS). Topical antibiotic dosages were determined a priori with input from infectious disease and pharmacy partners and compounded with an in-house pharmacy. Patients underwent 30-days of culture-directed topical antibiotic therapy delivered via nasal saline irrigations. Pre- and post-treatment culture, SNOT-22 and Lund-Kennedy endoscopic exam scores were obtained.

Results:

Seventeen patients completed the study. The most frequent organism cultured was *S. aureus* in 13 patients (76%) followed by *S. pneumoniae* (12%) and *P. aeruginosa* (12%). Ten patients (59%) were prescribed mupirocin, five (29%) were prescribed levofloxacin and one (6%) was prescribed vancomycin. The mean change from pre- to post-intervention SNOT-22 was -16 ($p < 0.05$). The mean change from pre- to post-intervention Lund Kennedy was -4.0 ($p < 0.001$). Upon repeat culture following treatment, 1 patient demonstrated microbial resistance to the topical antibiotic prescribed.

Conclusion:

It appears that topical do not lead to widespread antibiotic resistance. Treatment with topical antibiotics may improve quality of life and objective measures in patients with refractory CRS after ESS.

PROGRAM ABSTRACTS

10:28 am - 10:35 am

Olfactory dysfunction in people with Cystic Fibrosis

Daniel Beswick, MD, FARS
 Stephen Humphries
 Connor Balkissoon
 Matthew Strand
 Eszter Vadar
 David Lynch
 Jennifer Taylor-Cousar
 University of California Los Angeles

Background:

Olfactory dysfunction (OD) and chronic rhinosinusitis (CRS) are common in people with cystic fibrosis (PwCF). This study evaluated factors that impact olfaction and assessed correlations between measures of olfactory status.

Methods:

Adult PwCF/CRS with genotype F508del/F508del or F508del/minimal function participated in a prospective, observational study. The Smell Identification Test (SIT) was used to define OD. Participant characteristics and disease severity measures were evaluated for associations with OD. Correlations between SIT result, the Questionnaire of Olfactory Dysfunction (QOD) score, and % opacification of the olfactory cleft (%OCO) on sinus computed tomography (CT) were assessed.

Results:

30 PwCF/CRS completed olfactory assessments. On average, the cohort was hyposmic with mean SIT score 30.6. Comparisons of SIT scores to normative data categorized 19 individuals with OD and 11 people with normal olfaction. F508 heterozygosity (OR 0.16, 95% CI 0.03-0.61, $p=0.045$) and CF-related diabetes (CFRD) (OR 0.06, 95% CI 0.01-0.56, $p=0.014$) were independently associated with worse odds of normal olfaction. However, a stepwise selection model incorporating multiple variables demonstrated that only CFRD was associated with differential (worse) odds of normal olfaction (OR 0.016, 95% CI $<0.001-0.44$, $p=0.017$). SIT scores were correlated with QOD scores ($r=-0.46$, $p=0.01$) and trended towards correlation with %OCO ($r=-0.33$, $p=0.07$). %OCO was correlated with total sinus opacification on CT ($r=0.44$, $p=0.014$).

Conclusions:

The majority of PwCF/CRS have OD. CFRD is associated with greater likelihood of OD. Olfactory-specific quality of life and olfactory cleft opacification are useful metrics of olfactory status in PwCF.

10:35 am - 10:45 am

Q&A**Miscellaneous Rhinology**

Moderators: Alissa Kanaan, MD; Thomas Higgins, MD, FARS; Jordan Teitelbaum, MD

10:45 am - 10:52 am

Transnasal endoscopic management of frontal sinus anterior table fractures improves cosmetic quality

Natalie Derise, MD
 Jessica Grayson, MD
 Bradford A. Woodworth, MD, FARS
 Beau Vandiver
 Do-Yeon Cho, MD
 UAB

Background:

Traditional management of frontal sinus anterior table fractures includes coronal or direct open approaches through skin incisions to perform open reduction/internal fixation (ORIF). The objective of the current study is to compare cosmetic quality of life (QOL) outcomes between transnasal endoscopic repair and ORIF.

Methods:

A retrospective, case-control study was performed. The FACE-Q questionnaire was provided to subjects repaired endoscopically or with ORIF to assess cosmetic outcomes. Overall cosmetic satisfaction was the primary outcome variable. Data was collected regarding demographics, mechanism of injury, co-morbidities, cosmetic QOL satisfaction, adverse events, and complications.

Results:

Patients with anterior table fractures were matched for similarity by the two senior authors according to area, degree of displacement, and amount of comminution on the preoperative CT scans. Ten subjects were selected for inclusion in each cohort based upon nearly identical injuries. The validated FACE-Q questionnaire was then administered to assess cosmetic QOL. There was no statistically significant difference according to age, gender, mechanism of injury, or concomitant fractures. Forehead cosmetic QOL (96.5 ± 8.9 vs. 81.3 ± 32.3 ; $p=0.17$) was increased and adverse events were decreased in the endoscopic group (13.1 ± 3.1 vs. 18.3 ± 8.0 ; $p=0.07$), although this was not statistically significant. However, overall cosmetic QOL was significantly superior in the endoscopic group (98.7 ± 4.1 vs. 81.9 ± 23.5 ; $p<0.05$).

Conclusion:

Transnasal endoscopic management of anterior table fractures provides improved cosmetic QOL when compared to ORIF and should become part of the standard management algorithm for frontal sinus trauma.

PROGRAM ABSTRACTS

10:52 am - 10:59 am

Clinical features and diagnoses of patients with primary complaints of facial pain

Andrea Plawecki, MD
 John Craig, MD, FARS
 Ed Peterson, Senior Biostatistician
 Frederick Yoo, MD
 Henry Ford Hospital

Background:

Patients presenting to otolaryngologists primarily for facial pain represent a diagnostic challenge, and the roles of radiographic imaging, nasal endoscopy, and earlier Neurology evaluation in this population should be investigated.

Methods:

This was a retrospective review of prospectively collected data from 134 patients presenting to a rhinology clinic between 2016 and 2019 with a primary complaint of facial pain. Data examined included cardinal sinusitis symptoms, SNOT-22 scores (and item #12 score), pain location, nasal endoscopy, CT and MRI findings, and neurologic headache diagnoses.

Results:

Facial pain patients had negative nasal endoscopies in 91% of cases. Compared to those with positive endoscopies, patients with negative endoscopies were significantly less likely to report nasal obstruction (39% vs. 77%, $p=0.016$) or smell loss (8% vs. 38%, $p=0.003$). The majority of patients with primary facial pain complaints were ultimately diagnosed with migraine (50.8%) or tension (21.1%) headache, and other non-sinogenic diagnoses. CT findings by sinus location demonstrated poor agreement with facial pain location (all kappa values <0.3). Negative nasal endoscopy showed high concurrence with negative CT findings (88-93%). Additionally, there was substantial agreement between CT and MRI findings in patients who underwent both imaging modalities ($n=51$, kappa values 0.6-0.84).

Conclusions:

Patients presenting with prominent facial pain generally have non-sinogenic headache diagnoses and can be evaluated by nasal endoscopy followed by Neurologic evaluation, rather than by upfront CT. MRI may eventually be indicated according to headache diagnostic criteria, which would also demonstrate sinus pathology, if present.

10:59 am - 11:06 am

Outcome of immunoglobulin replacement therapy in children with rhinosinusitis

John Behnke, MD
 Perla Jimenez-Herrera, Medical Student
 Brian Peppers, Assistant Professor
 Hassan Ramadan, MD, FARS
 Chadi Makary, MD, FARS
 West Virginia University

Objective:

To evaluate the outcome of immunoglobulin (IG) replacement therapy in pediatric patients with rhinosinusitis and primary humoral immunodeficiency disorders (PID).

Materials and methods:

Retrospective chart review of pediatric patients (17 years and younger) who are currently on IG for PID and chronic (CRS) (>12 weeks) or recurrent acute (RARS) (>3 times/year) rhinosinusitis, and with minimum of 6 months follow up. Demographic data, associated conditions, and duration of treatment were reviewed. Number of yearly sinus infections and sinus CT Lund-Mackay (LM) score were reviewed before and after starting IG therapy.

Results:

18 patients were included. Average age was 9.2 years (2-17 years). 55% were female. 14 patients (77%) had hypogammaglobulinemia, 3 (16%) had specific antibody deficiency, and 1 (5%) had common variable immunodeficiency. 83% of patients had allergic rhinitis and 77% had asthma. Average follow up was 23 months (SD 25, 6-119). Pre-treatment CT LM score was 6 (4 patients) compared to 2.5 (2 patients) after starting treatment. Prior to starting IG, 2 patients (11.1%) had greater than 5 sinus infections per year, 10 patients had 3-5 infections (55.6%), and 6 (33.3%) had 1-3 sinus infections per year. After starting IVIG, 12 patients (66.7%) no longer had any sinus infections, and 6 patients (33.3%) had 1-2 sinus infections per year. The overall average number of sinus infections per year decreased from 3.4 infections per year per patient to 0.4 infections per year ($p<0.0001$).

Conclusion:

IG therapy is an effective treatment for CRS and RARS in pediatric patients with humoral immunodeficiency.

PROGRAM ABSTRACTS

11:06 am - 11:13 am

Contralateral sinonasal symptoms following unilateral ESS

Kevin Hur, MD
 Alexander Schneider, MD
 Reeti Gulati
 Caroline Price
 Kevin Welch, MD, FARS
 Northwestern University

Objectives:

To explore the degree to which patients undergoing unilateral ESS experience novel contralateral sinonasal symptoms post-ESS and to identify risk factors associated with contralateral symptomatology following unilateral ESS.

Methods:

97 consecutive patients who underwent unilateral ESS patients were surveyed by phone median 24 months post-ESS. Nasal Obstruction Symptom Evaluation (NOSE) scores were obtained based on contralateral symptomatology at the following time-points: Pre-ESS, 1 month post-ESS, and 3 months post-ESS. Demographics, contralateral symptomatology, and NOSE scores were compared between those with ≤ 2 vs ≥ 3 sinusotomies.

Results:

24% of patients reported contralateral congestion and 12% reported contralateral hyposmia when surveyed a median 24 months post-ESS. Those with ≤ 2 sinusotomies were more likely to feel that they had developed increased contralateral sinus swelling ($p=0.008$). NOSE scores did not vary between the 2 cohorts at any time point. A concurrent septoplasty (27%) was not associated with reduction or development of contralateral symptoms.

Conclusion:

Patients who undergo unilateral ESS for CRS may experience contralateral symptoms following surgery. Patients who undergo unilateral sinus surgery and have 2 or fewer sinusotomies were more likely to report subjective contralateral sinonasal symptoms. A concurrent septoplasty did not affect contralateral symptoms.

11:13 am - 11:23 am

Q&A**Diet and Drip**

Moderators: Nicholas Rowan, MD; Angela Donaldson, MD, FARS; Edward McCoul, MD, FARS

11:23 am - 11:30 am

Otolaryngic sensory loss as a measure of frailty among older U.S. adults

Nicholas Rowan, MD
 Nanki Hura
 Leila Mady
 Isaac Bernstein
 The Johns Hopkins University Medical Center

Introduction:

Frailty is a syndrome characterized by reduced physiologic reserve and increased vulnerability to poor health outcomes. Disruption of sensorineural function appears to serve as a novel biomarker of frailty. Using population-level data, we sought to examine the association of otolaryngic sensory dysfunction with frailty.

Methods:

Cross-sectional analysis of the 2011-2012 U.S. National Health and Nutrition Examination Survey was performed for adults ≥ 40 years ($n=2,138$). Participants were grouped by subjective gustatory dysfunction (sGD), olfactory dysfunction (sOD), hearing loss (sHL), and measured hearing loss (mHL) with pure tone averages (PTA). Frailty was operationalized using a continuous 36-item frailty index (FI) scored 0-1, stratified in 4 categories ("non-frail", "vulnerable", "frail", "most frail").

Results:

All sensory loss groups had significantly higher FI scores than those without sensory loss (sGD 0.15; sOD 0.14; sHL 0.15; low frequency mHL 0.16; high frequency mHL 0.14; all $p<0.007$). "Vulnerable" individuals had increased odds of sOD (OR 1.45; 95% CI 1.05-2.00), while "frail" individuals had increased odds of sOD (OR 1.85; 95% CI 1.26-2.71) and low frequency mHL (OR 4.01; 95% CI 1.27-12.63). "Most frail" individuals had increased odds of sHL (OR 11.72; 95% CI 2.88-47.66) and high frequency mHL (OR 5.10; 95% CI 1.72-15.12). Low and high frequency PTA were directly associated with FI (10.15, 95% CI 1.78-18.51; 19.85, 95% CI 5.19-34.53).

Conclusion:

Otolaryngic sensory loss is associated with increased frailty. sOD and measures of hearing are independently associated with frailty, suggesting that olfactory and hearing screening could identify at-risk individuals with modifiable risk factors.

PROGRAM ABSTRACTS

11:30 am - 11:37 am

Dietary habits and rhinitis

Darren Cheng, MS

Nrusheel Kattar, Postgraduate Research Fellow

Edward McCoul, MD, FARS

Background:

Studies exploring the effects of diet on allergies and rhinitis have mostly originated in Asia, Europe and Latin America. Certain dietary traditions have been anecdotally tied to lower incidence and severity of rhinitis symptoms, suggesting that dietary habits may have a protective role in the development of rhinitis. We aimed to describe associations between dietary habits and sinonasal symptoms in a young adult population in North America.

Methods:

A cross-sectional survey was distributed to young adults at one of two medical schools in the southern United States. Respondents were asked to respond to questions pertaining to consumption of various food groups and a validated questionnaire of rhinitis symptoms. Respondents with self-reported rhinitis were asked to complete the Sinonasal Outcome Test (SNOT-22) questionnaire. Ordinal regression was used to associate variables of interest.

Results:

210 people completed the survey. 66% of respondents were female with 83% of respondents falling in the 20–29-year age range. Greater consumption of dairy products, soy products, candy, alcohol and non-soda carbonated beverages were each associated with total SNOT-22 score statistically significantly greater than individuals who did not consume those products. In contrast, greater consumption of grains, cereal, fruits, eggs and certain vegetables was associated with total SNOT-22 score that was significantly lower than individuals who did not consume those products. Consumption of soda products was associated with higher rhinologic and ear/facial SNOT-22 subdomain scores.

Conclusion:

In a young adult North American population, the severity of sinonasal symptoms may be associated with consumption of specific dietary products.

11:37 am - 11:44 am

Diagnostic workup of patients with primary complaint of post-nasal drip

Hector Perez, MD

Traci Bailey

Nadia Chan

Christopher Church, MD, FARS

Brianna Crawley

Priya Krishna,

Kristin Seiberling, MD, FARS

Loma Linda University Medical Center

Chronic rhinosinusitis (CRS) involves inflammatory changes of the sinus mucosa that may be secondary to infection, allergies, pollutants, or anatomical obstruction. One hypothesized contributory factor to CRS is GERD, and more specifically laryngopharyngeal reflux (LPR). Post-nasal drip (PND) is defined as the drainage of secretions from nose or paranasal sinuses into the pharynx, and is typically diagnosed with patient's expressing rhinorrhea and "dripping in the throat".

The purpose of this cohort study is to present a diagnostic workup into patient's with a primary complaint of post-nasal drip to better identify the most common etiology. 22 patients with a chief complaint of isolated post-nasal drip were enrolled in the study. All patients enrolled underwent nasal endoscopy, flexible laryngoscopy, in-vitro allergy testing, and CT Sinus imaging. Patients were also asked to fill out a SNOT-22 and a Reflux Severity Index (RSI) form. In our cohort of patients the average SNOT score was 43 ± 22 , and the average RSI was 22 ± 7 . 21 of the 22 patients had RSIs consistent with LPR. Reflux Finding Scores as evaluated and averaged between two laryngologists at our institution found that all patients in the cohort met criteria for LPR with an RFS of 12.6 ± 2.1 . 14 of the 22 patients had a positive RAST, with 64% of these patients noted to using steroid nasal sprays prior to testing. Five of the patients in the cohort had CT scans with Lund Mackay scores greater than zero. The average Lund Kennedy score was 0.9 ± 1.4 with 14 of the 22 patients having unremarkable nasal endoscopies. We conclude that patients with isolated PND benefit from a workup focused on allergy and reflux testing prior to considering CT imaging for CRS.

PROGRAM ABSTRACTS

11:44 am - 11:51 am

Histopathologic features of chronic rhinosinusitis in diabetic patients

Vidit Talati, MD
 Hannah Brown, BS
 Young-Jae Kim, BS
 Mary Allen-Proctor, MD
 Paolo Gattuso, MD
 Mahboobeh Mahdavinia, MD, PhD
 Peter Papagiannopoulos, MD
 Pete Batra, MD, FARS
 Bobby Tajudeen, MD, FARS
 Rush University Medical Center

Background:

Diabetes mellitus (DM) is often comorbid with chronic rhinosinusitis (CRS) and potentially increases disease severity. Studies suggest patient factors, such as smoking, may impact sinonasal histopathology. This is the first investigation of the impact of DM on CRS using structured histopathology.

Methods:

A retrospective study of CRS patients who underwent endoscopic sinus surgery from 2015-2020 was performed. Structured 13-variable histopathology reports were generated for intra-operative sinonasal specimens. These variables were compared against demographic factors, comorbidities, cultures, Lund-Mackay (LM) and pre-operative SNOT-22 scores using logistic regression.

Results:

The cohort consisted of 386 patients, including 49 diabetics. DM was associated with higher mean BMI (34.9 vs. 29.2; $p < 0.001$), age (57.8 vs. 48.0; $p < 0.001$), and gram-negative (22.4% vs. 11.3%; $p < 0.030$) and coagulase-negative staphylococcus (28.8% vs. 13.8%; $p = 0.008$) culture rates. Black (24.4% vs. 19.9%) and Hispanic (24.4% vs. 9.2%) races were more common with DM ($p = 0.026$). Gender, smoking, polyp status, and LM and SNOT-22 scores did not differ. DM patients demonstrated more fungal elements (15.4% vs. 3.6%, $P = 0.006$); no other histopathological differences were seen. When controlling for demographic variables and comorbidities, DM independently predicted the presence of fungal elements (HR: 4.38, $p = 0.018$).

Conclusion:

CRS patients with DM had increased presence of fungal elements on structured histopathology. Other histopathological features were unaffected by DM. These findings may have important implications on the medical and surgical management of diabetic CRS patients in which early fungal disease assessment is paramount.

11:51 am - 12:00 pm

Q&A

Saturday, October 2, 2021 8:00 am – 12:00 pm Breakout Room B Crystal Ballroom

Healthcare Economics

Moderators: Jonathan Ting, MD, FARS; Joshua Levy, MD, FARS; Kara Detwiller, MD, FARS

8:00 am - 8:07 am

Resource utilization analysis after PPSV23 vaccination in antibody deficient CRS and RABS patients

Nrusheel Kattar, MD
 Anna Bareiss, Resident
 Edward McCoul, MD, FARS
 Ochsner Clinic

Background:

Streptococcus pneumoniae antibody deficiency has been the subject of limited study in chronic rhinosinusitis (CRS) and has not been studied in recurrent acute bacterial sinusitis (RABS). The 23-valent pneumococcal polysaccharide vaccine (PPSV23) may be given to patients with nonprotective *S. pneumoniae* titers. We hypothesized that both RABS and CRS patients with deficient *S. pneumoniae* titers and subsequent PPSV23 vaccination would have less frequent healthcare encounters for sinusitis and fewer prescriptions for antibiotics or steroids.

Methods: A retrospective cohort study was performed of patient encounters between January 2011 and December 2019 in a large healthcare system. Patients aged between the ages of 18 and 65 who had a diagnosis of CRS or RABS were included. Patients with systemic immunodeficiency and patients with comorbid conditions requiring PPSV23 vaccination before the age of 65 were excluded.

Results:

A total of 942 patients were included, with an average age of 44 years, consisting of 73% females. Nonprotective antibody titers were present in 27% of CRS and 30% of RABS patients before PPSV23 vaccination. Among 196 patients with continuous data from 3 years before through 3 years after PPSV23 vaccination, there was a decreased frequency in the number of encounter diagnoses of acute ($p=0.03$) and chronic sinusitis ($p<0.0001$). Decreases were observed in the frequency of antibiotic ($p=0.07$) and corticosteroid ($p=0.50$) prescriptions.

PROGRAM ABSTRACTS

Conclusion:

The frequency of encounters for acute and chronic sinusitis is decreased after PPSV23 vaccination.

8:07 am - 8:14 am

Rhinology Medicare reimbursements have not been keeping up with inflation

Sina Torabi, MD

Rahul A. Patel, Medical Student

David Kasle, Resident

Kevin Fujita, Resident

Naveen Bhandarkar, MD, FARS

Edward C. Kuan, MD, FARS

R. Peter Manes, MD, FARS

University of California Irvine

Background:

Studies have suggested that physicians are steadily being paid less per Medicare service over time based on inflation-adjusted dollars. The objective was to investigate whether this phenomenon was true for rhinologic procedures.

Methods:

Retrospective analysis of the 2000-2021 CMS Physician Fee Schedule investigating fees for in-office endoscopies (CPTs 31231-31238), in-office balloon ostial dilation (CPTs 31295-31298), in-facility low-RVU surgeries (<10 wRVUs; CPTs 31239-31288 & 61782), and in-facility high-RVU surgeries (>10 wRVUs; CPTs 31290-31294). Total number of and reimbursements for these services was obtained from yearly National Part B Summary Datafiles.

Results:

Between 2000-2021, adjusted reimbursements for low- and high-wRVU rhinologic surgeries decreased 50.0% and 36.1%, respectively. Average yearly adjusted decrease was 3.1% and 2.1%, respectively. Excluding a 76.8% unadjusted reimbursement increase between 2000-2004, endoscopies saw an adjusted reimbursement decrease of 29.4% from 2004 onwards, a yearly average decrease of 2.0%. From 2011 onwards, balloon ostial dilations saw a decrease in adjusted reimbursement of 43.8%. Nevertheless, after inflation-adjustment, National Part B data reveals that Medicare paid more, in total, for these procedures in 2019 than in 2000 due to increasing utilization.

Conclusions:

Medicare reimbursements are complex, are adjusted yearly, and undergo constant federal scrutiny due to the increasing costs of healthcare. These results suggest that, in terms of real dollars, rhinologic procedures have seen a large gradual decrease in Medicare reimbursement, which is important information for policymakers and surgeons alike.

8:14 am - 8:21 am

Impact of gender on outcomes and cost in pediatric acute rhinosinusitis management

Vraj P. Shah, BS

Sean Z. Haimowitz, BS

Chris B. Choi, BS

Christina H. Fang, MD

Christen L. Caloway, MD

Jean Anderson Eloy, MD, FARS

Rutgers New Jersey Medical School

Background:

The objective of this study is to investigate associations between patient gender and management costs and outcomes in pediatric patients hospitalized with acute rhinosinusitis.

Methods:

In a retrospective database review, the 2016 Kid's Inpatient Database (KID) was used to identify pediatric patients hospitalized with acute rhinosinusitis (ICD-10: J01). Orbital and intracranial complications were selected via ICD-10 codes. Statistical associations across patient gender were determined via univariate and multivariate analyses.

Results:

Of the 4,352 patients identified with acute rhinosinusitis, 1,796 were female. Male patients were younger than female patients (Mean 9.37 vs. 10.05 years, $p < 0.001$). Multivariate analysis indicated that males and females had similar total charges (\$71,593.72 vs. \$67,655.85, $p = 0.378$), length of stays (LOS) (5.85 vs. 6.21 days, $p = 0.535$), and time until their first procedure (1.96 vs. 2.17 days, $p = 0.324$). However, male patients underwent more procedures (1.80 vs. 1.54, $p = 0.001$). Moreover, male patients had increased odds for developing orbital complications (OR 1.655, 95% CI 1.380–1.985, $p < 0.001$) and intracranial complications (OR 1.991, 95% CI 1.475–2.687, $p < 0.001$). There was no significant difference in mortality between male and female patients (OR 0.774, 95% CI 0.305-1.964, $p = 0.590$).

Conclusions:

In a cohort of pediatric patients hospitalized with acute rhinosinusitis, male patients undergo more procedures and have increased odds for developing orbital and intracranial complications. However, males and females have similar total charges and length of stays. Our study highlights the difference in management and outcomes across patient gender.

PROGRAM ABSTRACTS

8:21 am - 8:28 am

Impact of operative time on endoscopic sinonasal surgery

Ariel Omiunu, BS
 Sudeepti Vedula, Medical Student
 Christina H. Fang, MD
 Jean Anderson Eloy, MD, FARS
 Rutgers New Jersey Medical School

Introduction:

Prolonged operative time (OT) has been associated with increased perioperative morbidity in various surgical procedures, however its impact in endoscopic sinonasal surgery (ESS) is not yet well understood. The objective of this study is to analyze the relationship between OT and ESS outcomes.

Methods:

Patients who underwent ESS procedures from the ACS-NSQIP 2005-2018 database were identified. Univariate and multivariate analyses were performed to evaluate postoperative outcomes.

Results:

A total of 1629 ESS patients with known OT were identified. The median OT (109 min) was used to subdivide the patients into two cohorts. Among these cohorts, the mean OT in the prolonged OT cohort was 234 min (compared with 61 min). Patients with longer OT were more likely to be older (48.8 ± 16.9 years vs. 43.1 ± 15.9 years, $p < 0.001$), male (55.1% vs. 48.8%, $p = 0.011$), and have American Society of Anesthesiologists classifications III or IV (III: 45.8% vs. 30.0%, IV: 4.0% vs. 2.1%, $p < 0.001$). Univariate analysis of preoperative comorbidities revealed that longer OT was associated with hypertension ($p = 0.001$), disseminated cancer ($p < 0.001$), wound infection ($p = 0.030$), bleeding disorder ($p = 0.002$), prior transfusion ($p = 0.044$), and history of weight loss ($p = 0.030$). Multivariate regression analysis demonstrated that prolonged OT was associated with increased risk of surgical complications (OR=7.57, 95% CI 3.30-17.36, $p < 0.001$) and prolonged hospital stay (>2 days) (OR 7.80, 95% CI 5.16-11.80, $p < 0.001$).

Conclusion:

This study found that prolonged OT is associated with increased incidence of surgical complications and prolonged hospital stay. Further investigation may aid in preoperative planning and optimization of patient outcomes.

8:28 am - 8:35 am

Procedural and geographic variation in price markup of common rhinology procedures

Rahul A. Patel, Medical Student
 Sina Torabi, Medical Student
 David Kasle, Resident
 R. Peter Manes, MD, FARS
 Frank H. Netter M.D. School of Medicine at Quinnipiac University

Background:

Recent trends towards value-based care in medicine have drawn increasing scrutiny to the costs of surgical procedures, which are subject to little regulation. Many non-otolaryngologic surgical specialties have studied price markups to allow for more informed decisions regarding health policy within their specialty. The objective of this study is to evaluate markup ratio and geographic variation for rhinology procedures.

Methods:

This retrospective analysis of the 2018 Centers for Medicare and Medicaid Services: Physician and Other Supplier Public Use File includes data on services and procedures provided to Medicare fee-for-service beneficiaries. 28 HCPCS (Healthcare Common Procedure Coding System) codes commonly used in rhinology were isolated and analyzed through calculation of markup ratio (MUR; submitted charge amount/average Medicare allowed amount) and coefficient of variation (CoV).

Results:

Among all providers, the median MUR was 2.47 (IQR: 1.85-3.69) with significant variation among all procedures (MUR range: 2.11 [Nasal/Sinus Endoscopy]-11.09 [Maxillary Antrostomy]; $p < 0.001$) and large variation within the same procedure (CoV range: 0.35 [Nasal/Sinus Endoscopy via Sinus Puncture]-1.00 [Total Ethmoidectomy]). MUR significantly varied between states (MUR range: 2.38 [MT]- 7.30 [WI]; $p < 0.001$) and within the same state (CoV range: 0.37 [NH]-2.07 [AR]).

Conclusions:

Though significant geographic and procedural variation exists, median MUR in rhinology is lower than that of commonly performed surgical procedures among all specialties, and comparable to that of otology. Our data indicates a need for greater scrutiny of price markup which potentially affects underinsured and uninsured individuals disproportionately.

8:35 am - 8:45 am

Q&A

PROGRAM ABSTRACTS

Adjunct Therapies for CRS

Moderators: Lauren Roland, MD; Christine Franzese, MD, FARS; Daniel Beswick, MD, FARS

8:45 am - 8:52 am

Long-acting implantable corticosteroid matrix for CRS: LANTERN study 6-month post-treatment outcomes

Joanne Rimmer
Anders Cervin, MD, PhD
Agnieszka Wrobel
Yogen Abelak
Lindsay Brayton, Clinical Project Manager
Lyra Therapeutics, Inc.

Background:

LYR-210, an implantable matrix designed to provide sustained local delivery of mometasone furoate to inflamed sinonasal mucosa for up to 24 weeks, is in development for surgically naïve chronic rhinosinusitis (CRS) patients who failed previous medical management. In the LANTERN Phase 2 study, LYR-210 (7500µg) demonstrated clinically meaningful improvement in CRS cardinal symptom composite scores and was superior in subjects achieving the minimal clinically important difference of 8.9 points in SNOT-22 total score at week 24 compared to control (100% vs. 65%). LYR-210 (7500µg) also significantly decreased ethmoid opacification and rescue treatment use at week 24 compared to control. The aim of this presentation is to report long-term outcomes of the LANTERN study that were assessed over an additional 24 weeks post-treatment after matrices were removed.

Methods:

Sixty-seven surgically naïve adult CRS subjects who failed previous medical management were enrolled in a multicenter, blinded, controlled, dose-ranging study. Subjects had moderate-to-severe disease based on SNOT-22 with diagnosis confirmed by nasal endoscopy and MRI. Subjects were randomized (1:1:1) to a sham-procedure plus saline-irrigation only control or bilateral in-office administration of LYR-210 (2500µg) or LYR-210 (7500µg). After removal of LYR-210 matrices at week 24 or earlier, there was an additional 24-week follow-up period assessing long-term safety, durability of efficacy by cardinal symptom score, SNOT-22, SF-36v2, and need for CRS treatment.

Results:

Results of LANTERN study long-term outcomes will be presented at ARS 2021.

Conclusions:

Conclusions of LANTERN study long-term outcomes will be presented at ARS 2021.

8:52 am - 8:59 am

The effect of EDS-FLU on objective and subjective outcomes for patients with CRSwNP

Randall Ow, MD
Harry Sacks, VP, Medical Affairs & Corporate Medical Officer
John McGinnis, Administrative Assistant
Mark Mehle, MD
Sacramento Ear Nose Throat Facial Plastic Surgery

Background:

Exhalation delivery system with fluticasone (EDS-FLU) delivers medication to key anatomical structures in the nasal passages (the ostiomeatal complex, where sinuses ventilate and drain). Although nasal polyp reduction is an objective measure of efficacy, subjective measures of symptom improvement are clinically meaningful for patients with chronic rhinosinusitis (CRS). We analyzed 4 different responder criteria, including patient-reported outcomes, to better characterize patient response to EDS-FLU in patients with CRSwNP.

Methods:

Data were pooled from two randomized, 24-week (16 double-blind+8 open-label), placebo-controlled studies (NAVIGATE I & II). Results for patients receiving EDS-FLU 186µg (n=161), EDS-FLU 372µg (n=160), or EDS-placebo (n=161) twice-daily are described. Responder criteria included nasal polyp reduction (≥1-point), change in SNOT-22 (>9-points), Patient Global Impression of Change (much/very much improved), and congestion score improvement (>0.5-points).

Results:

At week 4, more patients in the EDS-FLU 186- and 372-µg groups had a response as measured by ≥1 criterion compared with those in the EDS-placebo group (82.4% and 86.4% vs 64.4%, respectively). Improvements as measured by ≥1 criterion continued through week 16 (94.7% and 97.2% vs 83.3%, respectively). In addition, at week 16, more patients in the EDS-FLU 186- and 372-µg groups responded to therapy as measured by all 4 criteria than in the EDS-placebo group (36.8% and 34.3% vs 10.6%).

Conclusions:

Meaningful improvements were seen across multiple response criteria with EDS-FLU. These data suggest that the broad treatment effect of EDS-FLU includes objective reduction in polyp grade and improvements in several patient-reported outcomes.

PROGRAM ABSTRACTS

8:59 am - 9:06 am

The potential for cortisol suppression with high dose mometasone irrigations

Hannah Brown, BS
 Michael Eggerstedt
 Ashwin Ganti, MD
 Peter Papagiannopoulos, MD
 Bobby Tajudeen, MD, FARS
 Rush University Medical Center

Background:

Medically refractory CRS is often treated with FESS and high-volume steroid nasal irrigation. While budesonide is the most common steroid irrigation for this indication, mometasone has a superior pharmacokinetic profile, which may allow dose escalation due to low systemic absorption. Mometasone's safety and efficacy at higher concentrations than previously used in treating CRS have yet to be explored.

Methods:

Patients were recruited from a tertiary level clinic between June 2018 and December 2019. Inclusion criteria were: Adults (>18years); CRS diagnosis; Previous FESS; Pre-treatment morning cortisol within a normal range; Minimum of twice daily high-volume sinonasal mometasone irrigations (total dose of 4mg); For 12 weeks; Post-treatment morning cortisol measured two weeks after resolution of steroid irrigations. Patients with potential for endogenous or exogenous disruption of the HPA axis were excluded.

Results:

14 patients were enrolled in this prospective cohort study. In all but one patient, pre- and post-treatment morning cortisol levels were not significantly different and were within normal limits (6.7-25.4µg/dL). Following an uninterrupted 12-week treatment course, no evidence of HPA axis suppression was found (P=0.915). The single patient who was found to have a low (1.3µg/dL) post-treatment morning serum cortisol level reportedly received an intraarticular steroid shot several days prior to the blood draw. She remained asymptomatic and her rechecked serum cortisol was within normal limits at 12.3µg/dL.

Conclusions:

High-volume 2mg twice daily sinonasal mometasone irrigations did not cause HPA axis suppression in patients with refractory CRS post-FESS with normal baseline cortisol levels.

9:06 am - 9:13 am

Type 2 inflammation decreases in CRSwNP after ESS with mometasone-eluting stent placement

Bruce Tan, MD
 Alexander Schneider, MD
 Caroline Price
 Samuel Racette, Resident Physician
 Samuel Rodeghiero, Research Study Assistant
 Robert Kern, MD, FARS
 Northwestern University

Objectives:

To compare the severity of pre- and post-ESS Type 2 (T2) middle meatal (MM) inflammation in CRSwNP with and without intra-operative frontal mometasone eluting stent (MES) placement and explore its relationship with post-ESS disease severity.

Methods:

MM mucus and validated measures of disease severity were collected prior to and 6-12 months post-ESS in CRSwNP patients. Operative findings, MM T2 mediators, and disease severity measures including modified Lund-Mackay (MLM) were compared between those who did and did not receive intra-operative frontal MES.

Results:

Of 52 CRSwNP patients, 33 received frontal MES. Pre-ESS MM IL-13 and ECP were higher in the MES group (p<0.05) and pre-ESS frontal MLM trended higher in the MES group (4.0 vs 7.0, p=0.15). Operative technique and post-ESS medical management were similar between groups while intra-operative allergic mucin was more frequent in the MES group (58% v 11%, p=0.001). T2 mediators decreased in the MES group (IL-5 p<0.05, IL-13 p<0.001) but increased in the non-MES group. Post-ESS IL-4 and IL-13 were higher in the non-MES group vs MES (p<0.05 for both). Frontal MLM decreased by 50% (p<0.05) in the non-MES group but >75% in the MES group (p<0.0001).

Conclusion:

Patients who received frontal MES had significantly worse pre-ESS MM T2 inflammation and higher frontal MLM. Intra-operative findings differed between non-MES and MES groups. Post-ESS, T2 mediators decreased in the MES group, but remained elevated in the non-MES group and were higher than the MES group. Post-ESS frontal MLM became equivalent between the 2 groups. ESS plus MES decreases MM T2 inflammation vs ESS without MES, but the clinical significance of this is unclear.

PROGRAM ABSTRACTS

9:13 am - 9:20 am

Six months of aspirin therapy acts as an indicator of long-term outcomes in AERD

Siddhant Tripathi, BS
Ankur Kumar, BS
John Bosso, MD
Nithin Adappa, MD, FARS
Michael Kohanski, MD
James Palmer, MD, FARS
David Kennedy, MD, FARS
Perelman School of Medicine, University of Pennsylvania

Background:

Aspirin Exacerbated Respiratory Disease (AERD) is an inflammatory condition consisting of eosinophilic asthma, chronic rhinosinusitis with nasal polyps, and respiratory reactions to COX-1 inhibitors. Aspirin therapy after desensitization (ATAD) following endoscopic sinus surgery (ESS) is the most extensively studied treatment paradigm for AERD. We hypothesized that long-term quality of life outcomes of patients on ATAD could be discerned within 6 months of therapy.

Methods:

A retrospective chart review was conducted on patients who underwent ESS followed by ATAD at a single institution and had remained on ATAD for 2 years consecutively. SNOT-22 scores were recorded at the pre-desensitization, 6 months post-desensitization, and 24 months post-desensitization time points. Patients were separated into 2 cohorts based on if their 6-month post-desensitization SNOT-22 score was below (cohort 1) or above (cohort 2) 20. These cohorts were then compared at the 24-month post-desensitization time point.

Results:

Amongst the 76 patients that met the inclusion criteria, 56 belonged to cohort 1 and 21 to cohort 2. There was no significant difference between the 2 cohorts' scores at the pre-desensitization time point. Within cohort 1, 89.29% of patients remained below this 20-point threshold at 24 months post-desensitization. 71.43% of patients in cohort 2 remained above 20 points at the 24-month point. Cohort 1 showed a significantly lower mean SNOT 22 score at the 24-month post-desensitization time point.

Conclusions:

Sino-nasal outcome scores after 6 months of ATAD could serve as a predictor of long-term quality of life outcomes and therefore, a basis for the consideration of alternative therapies in non-responders.

9:20 am – 9:27 am

Real-world effectiveness of dupilumab in CRSwNP

Yi Zhang
Lauren Cohn, MD
Min Yang
Chao Chen
Urvi Mujumdar
Arpita Nag
Scott Nash
Asif Khan
Christopher Carley, Dr.
Jessie Wang
Robert Zeiger
Yale University School of Medicine

Background:

RESPIRE is an ongoing, single-arm, prospective, observational study assessing dupilumab in patients with chronic rhinosinusitis with nasal polyps (CRSwNP) in US real-world practice.

Methods:

Patients (≥ 18 years) completed surveys before dupilumab (baseline), and at regular follow-up; 1- and 3-month data are presented. Patients reported symptom severity, including nasal congestion (NC), runny nose, loss of smell (LoS), and postnasal drip, on a scale of 0–3 (0=no symptoms; 3=severe).

Results:

At the time of analysis, 99 patients had completed baseline surveys (mean \pm SD age: 51.1 \pm 13.1 years; mean \pm SD number of prior lifetime surgeries: 1.8 \pm 1.5; female: 55.6%; prior nasal surgery: 78.8%); 84 and 57 patients had completed 1- and 3-month surveys, respectively. Self-reported comorbidities included asthma (61.6%), allergic rhinitis (38.4%), and atopic dermatitis (9.1%). From baseline to Month 1, mean symptom scores for NC (1.9 vs 1.0), runny nose (1.2 vs 0.8), LoS (2.3 vs 1.2), and postnasal drip (1.7 vs 0.9), and the proportion of patients reporting 'severe' LoS (62.6% vs 16.7%), decreased significantly (all $P < 0.0001$). Improvements were sustained at 3 months (all $P < 0.0001$).

Conclusions:

In RESPIRE interim analyses (the first to report real-world CRSwNP outcomes with dupilumab), key symptoms associated with quality-of-life (including severe LoS) improved within 1 month.

9:27 am - 9:35 am

Q&A

PROGRAM ABSTRACTS

9:30 am - 10:00 am

BREAK

10:00 am - 10:45 am

Panel: "Omics and biomarkers: How they can impact patient care"

Moderator: Justin Turner, MD, FARS

Panelists: Bruce Tan, MD; Amber Luong, MD, PhD, FARS; Benjamin Bleier, MD, FARS

Miscellaneous Rhinology

Moderators: Kristine Smith, MD; Christian Soneru, MD; Sanjeet Rangarajan, MD, FARS

10:45 am - 10:52 am

Practice patterns and provider satisfaction in a virtual rhinology and skull base surgery clinic

Emily Papazian, Medical Student

Christopher Roxbury, MD, FARS

Dara Adams, Resident Physician

Matthew Du, Medical Student

Esther Wang, Medical Student

Jayant Pinto

Louis Portugal

Nadieska Caballero, MD, FARS

Bakhtiar Yamini, Professor of Neurological Surgery

Paramita Das, Assistant Professor of Neurological Surgery

Peleg Horowitz, Assistant Professor of Neurological Surgery

University of Chicago Pritzker School of Medicine

Background:

Telemedicine has increased during the COVID-19 pandemic, potentially impacting access, clinical management, and future care in Rhinology and Endoscopic Skull Base Surgery (ESBS).

Methods:

Retrospective study of 436 new rhinology/ESBS patients at an urban, tertiary care, academic center. Demographic and clinical features were compared between telemedicine and in-office visits. A provider survey assessed telemedicine quality and efficiency on a 5-point Likert scale.

Results:

Telemedicine and in-office patients were similar in age ($p=0.096$), sex ($p=0.401$), insurance ($p=0.166$) and travel required (distance $p=0.694$; time $p=0.778$). Patients seen virtually lived in less disadvantaged areas ($p=0.008$) and were less likely of non-Hispanic Black background ($p<0.001$). Telemedicine patients underwent more sinus computed tomography (CT) ($p=0.023$), received more oral steroids ($p=0.030$) and had shorter time to follow up ($p=0.016$). There was no difference in rate ($p=0.358$) or type of surgery ($p=0.587$) or number of preoperative visits ($p=0.641$) between groups. Physicians were satisfied with

telemedicine in terms of confidence in diagnosis (95.1%), use of diagnostic tests (96.1%), time for visits (88.1%), documentation burden (84.2%), and desire to use telemedicine in the future (99.0%).

Conclusion:

Telemedicine in rhinology/ESBS serves a similar demographic population as in-office, although patients from disadvantaged areas may suffer from reduced access to telemedicine. While inability to perform in-office exams may drive changes in care utilization, including more frequent imaging and steroid prescriptions, access to surgery appears unchanged. High provider satisfaction may lead to ongoing telemedicine practice post pandemic.

10:52 am - 10:59am

Post-operative sinus polyp scale (POPS)

Dhruv Sharma, MD

Thomas Higgins, MD, FARS

Arthur W. Wu, MD, FARS

Akaber Halawi, MD

Elisa Illing, MD, FARS

Philip Chen, MD, FARS

Douglas Reh, MD, FARS

Kent Lam, MD, FARS

Wesley Sublett, Clinical Research Director

Jonathan Ting, MD, FARS

Kentuckiana ENT and University of Louisville SOM

Background:

Current grading scales for nasal polyps are based on direct visualization using nasal endoscopy or anterior rhinoscopy are most useful in unoperated patients and do not characterize paranasal sinus polyposis. After functional endoscopic sinus surgery (FESS), current grading scales are ill-equipped to describe paranasal sinus polyp recurrence or general levels of inflammation in a postoperative sinus cavity.

Methods:

The Snot Force Alliance research and educational nonprofit group sought to create a new, more clinically useful grading scale that can be used effectively for research purposes utilizing a modified Delphi method administered to a group of more than a dozen otolaryngologists, rhinologists, and allergists.

Results:

After three rounds of discussion and surveys, the group came to an agreement on the structure and wording of a scale of severity of paranasal sinus polyposis in the postoperative patient. The scale complements and does not supplant the current nasal polyp scale and operates under the assumption that FESS with at least a partial ethmoidectomy has been performed for CRSwNP and the ability to visualize the middle meatus and ethmoid cavity is present.

PROGRAM ABSTRACTS

Conclusion:

The current nasal polyp grading scales are most useful in unoperated patients but lacks in its ability to describe postoperative paranasal sinus polyp recurrence in operated patients. The proposed PostOperative Sinus Polyp Scale (POPS) is an easy-to-use instrument that reflects a stepwise progression from early recurrence to later and more severe recurrence based on the amount of obstruction to various sinus openings that will hopefully prove useful in future clinical and research situations.

10:59 am - 11:06 am

Modeling observed nasal nitric oxide levels

Dennis Shusterman, MD, MPH

Barak Spector, Student Assistant

Kai Zhao

Upper Airway Biology Laboratory, University of California

Upper airway-derived nitric oxide is physiologically important for its bronchodilatory, vasodilatory, and antimicrobial effects. Nasal NO (nNO) levels typically exceed those measured in exhaled breath (fractional exhaled NO or FeNO), but unlike FeNO, are not a reliable index of airway inflammation. This disconnect derives from the fact that, while the paranasal sinuses act as an NO reservoir, the patency of their connection to the nasal airway can be compromised by inflammatory sinonasal disease. nNO levels have traditionally been modeled using either endoscopic or radiologic (morphometric) data, with special attention to the patency of the ostiomeatal complex. Using data from an earlier study of human subjects, we recently combined individual computer tomography (CT) scans with computational fluid dynamics (CFD) to explain the time course of measured NO during nasal exhalation, with the surprising finding that the ethmoid sinuses (and diffusive process) dominate this process. In this analysis, we expand our analysis from an initial 2 to a total of 10 subjects, comparing modeled and observed nNO levels during the initial 2 second transient ("spike") that typically occurs during nasal exhalation. Taking 20 data points during the initial 2 sec, for each subject (as well as the pooled group), there was a statistically significant relationship between modeled and observed nNO levels, with r2 values ranging from 0.19 - 0.61 (p values ranging from < 0.05 to < 0.0001). While the shape of the individual modeled and observed nNO curves were similar, the scaling (i.e., absolute nNO levels) varied between subjects. Our analysis of this larger dataset reinforces our perception that CFD can serve as a valuable modeling tool for nNO.

11:06 am - 11:13

The role of extraoral taste receptors in chronic rhinosinusitis: A systematic review

Nicholas Rowan, MD

Jonathan Chen

Christopher Song, MD

Nanki Hura

Stella Seal

Johns Hopkins University Medical Center

Introduction:

Bitter (T2Rs) and sweet (T1Rs) taste receptors are involved in the innate immune response of the sinonasal cavity and associated with chronic rhinosinusitis (CRS) pathophysiology. Extraoral taste receptors may represent relevant clinical biomarkers or novel therapeutic targets; however, the current understanding is incomplete. This systematic review sought to synthesize a coherent characterization of the role of taste receptors in CRS.

Methods:

PubMed, Embase, Cochrane, Web of Science, and Scopus were reviewed in accordance with PRISMA guidelines and included studies investigating both genotypic and phenotypic T2R/T1R receptor status in patients with CRS.

Results:

Twenty-four studies with 3941 patients were included, evaluating taste receptor genotype (n=17) and taste phenotype (n=10). Five of 7 investigations examining the haplotype distribution of the T2R, TAS2R38, demonstrated increased nonfunctional diplotypes in CRS cohorts. Phenotypic studies used varied bitter compounds and demonstrated decreased bitter sensitivity in CRS with nasal polyps (CRSwNP) (n=2) and CRS patients without nasal polyps (CRSsNP) (n=3), while studies of sweet sensitivity were mixed. Nonfunctional T2R38 was associated with impaired sinonasal quality of life and the need for sinus surgery in 2 of 3 studies of patients with cystic fibrosis.

Conclusion:

Both genotypic and phenotypic assessments of T2R status suggest a role of T2Rs in the pathophysiology and severity of CRS, particularly in patients with CRSsNP. The available evidence is limited by varied T2R assessments and few studies examining T1Rs. Future investigations should aim to recruit geographically and racially diverse patient populations, and utilize uniform assessments.

11:13 am - 11:23

Q&A

PROGRAM ABSTRACTS

Complications

Moderators: Theodore Schuman, MD, FARS; Jeffrey Suh, MD, FARS; Stacey Gray, MD, FARS

11:23 am - 11:30 am

Systemic corticosteroids-related adverse outcomes in chronic rhinosinusitis with nasal polyposis

Greg Davis, MD, FARS

Robert Zeiger

Benjamin Emmanuel

Yen Chung

Trung N. Tran

Kristin Evans

Stephanie Chen

Rohit Katial

James Kreindler

Joseph Tkacz

Objective:

To compare the incidence of adverse outcomes and healthcare resource utilization/costs between chronic rhinosinusitis with nasal polyposis (CRSwNP) patients with and without systemic corticosteroid (SCS) use.

Methods:

Adult CRSwNP patients with SCS prescriptions (SCS users) or without SCS prescriptions (controls) were identified in the IBM MarketScan databases from 1/2003–6/2019. Continuous enrollment for ≥ 1 year before and after the first SCS prescription, which served as SCS users' index date, or a matched index date among controls was required. SCS users were grouped by 1–3 claims and 4+ claims based on SCS use during the 12-month post-index period. All groups were assessed for post-index per-person-per-year (PPPY) incidence rate of adverse outcomes, healthcare use, and costs. Inverse probability of treatment weights was applied to all comparisons.

Results:

37,740 SCS users (28,870 1–3 claims; 8870 4+ claims) and 7032 controls were included. SCS users were significantly more likely than controls to present adverse outcomes during follow-up: weighted incident rate ratio [IRR]=1.10 (95% CI, 1.05, 1.16), with SCS patients in the 4+ claims group presenting the highest rate vs. controls (IRR=1.24; 1.16, 1.32). SCS users incurred significantly higher PPPY total healthcare costs vs. controls (\$11,622±\$16,957 vs \$7256±\$12,738), with the 4+ claims group presenting the highest costs (\$15,413±\$16,920; $p<0.001$).

Conclusion:

CRSwNP patients with SCS prescriptions presented a higher incidence of adverse outcomes and incurred greater healthcare costs compared with patients without SCS use. Alternate treatment strategies that avoid or reduce SCS use may decrease associated comorbidities and improve health-related quality of life.

11:30 am - 11:37 am

Avascular necrosis and oral corticosteroid use

David Poetker, MD, FARS

Sarah Grond

Ryan Little, MD

David Campbell

Todd Loehrl, MD, FARS

Medical College of Wisconsin

Introduction:

The risk of adverse events, specifically avascular necrosis (AVN), associated with short term corticosteroid use is not well reported in the literature. The aim of this study was to evaluate the prevalence of AVN among patients with prior oral corticosteroid administration.

Methods:

An institutional database query recognized 113,734 adult patients with oral corticosteroid administration between 2006 – May 2017. A temporal query performed on this cohort determined that 789 had a diagnosis of AVN following oral corticosteroid administration. A retrospective review was performed on this cohort. Data collected included demographics, co-morbidities, date of initial oral corticosteroid exposure, and time-to-diagnosis of AVN. Records with insufficient imaging results documenting AVN were excluded from analysis. Patients with cumulative lifetime dosages $> 10,000$ mg prednisone were excluded from analysis.

Results:

789 patients with oral corticosteroid use prior to a diagnosis of AVN were identified. 552 patients were excluded due to insufficient documentation of oral corticosteroid dosage, radiographic evidence refuting the diagnosis of AVN, insufficient data confirming the temporal relationship between oral corticosteroids and AVN, and/or a cumulative dosing of $> 10,000$ mg prednisone. The mean duration of use prior to diagnosis of AVN was 1208 +/- 975 days and mean cumulative dose was 3123 +/- 2958 mg prednisone-equivalents. Mean time between diagnosis of AVN and onset of pathologic fracture was 369 +/- 1009 days.

Conclusion:

For patients receiving low, lifetime cumulative doses of oral corticosteroids for inflammatory conditions steroids are not likely to increase risk of development of AVN.

PROGRAM ABSTRACTS

11:37 am - 11:44 am

Odontogenic sinusitis causing extra-sinus complications

Jennifer Douglas, MD
 Tapan Patel
 Bianca Rullan-Oliver
 Heather Ungerer, Research Assistant
 Lisa Hinh, Research Assistant
 Michael Kohanski
 David Kennedy, MD, FARS
 James Palmer, MD, FARS
 Nithin Adappa
 John Craig
 University of Pennsylvania

Background:

Orbital, intracranial, and osseous extra-sinus complications can occur in the setting of acute or chronic bacterial or fungal sinusitis. Odontogenic sinusitis (ODS) can lead to extra-sinus complications, but its prevalence amongst sinusitis complications remains poorly characterized.

Methods:

A multi-institutional retrospective review was performed to analyze all operative orbital, intracranial, and osseous complications from sinusitis from 2011-2020 due to various bacterial, fungal, or neoplastic etiologies. ODS was diagnosed based on sinus CT, and dental evaluations when available. Demographic information, underlying sinusitis etiology, complication type, and imaging and microbiology findings were analyzed.

Results:

Forty-five patients were included, 56% whom were male with mean age of 55.5 ± 19.9 years. Complications were unilateral in 82% of cases, and 56% were due to unilateral sinusitis. Of the extra-sinus complications, 47.4% were orbital, 28.1% osseous, and 24.6% intracranial. The two most common causes of extra-sinus complications were mucopyocele (40%) and ODS (27%). ODS caused 32% of all unilateral sinusitis-related complications. When fungal and neoplastic etiologies were excluded, 55% of extra-sinus complications were due to ODS. The majority of patients (84%) did not undergo formal dental evaluation or have dental treatments during their hospitalizations (92%).

Conclusion:

ODS caused 55% of extra-sinus complications due to unilateral bacterial sinusitis. Clinicians should consider ODS high on the differential diagnosis of all patients presenting with extra-sinus infectious complications, especially when sinusitis is unilateral and bacterial infection is suspected.

11:44 - 11:51 am

Correlation of symptoms by sinus subsite

Arthur W. Wu, MD, FARS
 Michela Borrelli, Assistant, Sinus and Sleep Apnea Centers
 Dennis Tang
 Martin Hopp, MD
 Cedars-Sinai

Background:

Sinus symptoms have been shown to correlate poorly with severity of CRS according to CT staging systems. However, to our knowledge there has never been investigation into whether specific symptoms correlate more with specific sinus subsites. The purpose of this study was to evaluate whether SNOT-22 subdomain scores, ETDQ-7 scores, and VRQoL (Voice Related Quality of Life) scores correlated with certain sinuses or groups of sinuses.

Methods:

Retrospective chart review was performed of all endoscopic sinus surgeries performed at Cedars-Sinai Medical Center in the last 2 years. 97 patients were found that had preoperative imaging and all patient reported outcome measure scores available for review. Spearman's correlation coefficients were calculated between SNOT-22 subdomains, ETDQ-7, VRQoL, and Lund-McKay CT scores (total and each subsite).

Results:

Rhinologic subdomain scores had the best correlation with Lund-McKay CT scores with significant correlations for all sinus subsites except the OMC and strongest correlations with the sphenoid ($r=0.46$, $p<0.0001$) and Lund-McKay total score ($r=0.41$, $p<0.0001$). The Ear/Facial subdomain had a weak positive correlation with the sphenoid sinus ($r=0.2$, $p=0.045$) and the Sleep subdomain had weak negative correlations to all sites except the sphenoid and frontal. ETDQ-7 and VRQoL scores did not correlate significantly with any Lund-McKay sinus subsite or with the total score.

Conclusion:

Most SNOT-22 subdomains, as well as the ETDQ-7 and VRQoL, do not correlate with the total Lund-McKay score or individual subsite scores. However, the Rhinologic subdomain did have positive correlation across most subsites and the Ear/Facial subdomain had some correlation to the sphenoid subsite.

11:51 am - 12:00 pm

Q&A

PROGRAM ABSTRACTS

**Saturday,
October 2, 2021
8:00 am – 12:00 pm
Breakout Room C
Emerald Ballroom**

Skull Base Malignancies

Moderators: Kent Lam, MD, FARS; Jose Mattos, MD; Jeremiah Alt, MD, PhD, FARS

8:00 am - 8:07 am

Treatment facility volume and esthesioneuroblastoma outcomes

Khodayar Goshtasbi, MS

Milind Vasudev

Sina Torabi

Arash Abiri

Brandon Lehrich

Frank Hsu

Edward Kuan

University of California Irvine School of Medicine

Objective:

This study evaluates the influence of hospital case-volume and facility type on esthesioneuroblastoma (ENB) treatment and overall survival (OS).

Methods:

The 2004-2016 National Cancer Database was queried for patients with ENB receiving definitive treatment. Facility volume thresholds were set to create three cohorts with approximately equal number of patients (~33% per group).

Results:

A total of 1860 patients (41.4% female) with a mean age of 54.0±16.5 years were included. Patients were treated at 534 unique facilities, categorized into 411 low-volume (treating 1-3 patients, total n=601 patients), 97 intermediate-volume (treating 4-13 patients, total n=655 patients), and 26 high-volume (treating 14-53 patients, total n=604 patients) facilities. Patients presenting to higher volume facilities were younger (p=0.007) with higher modified Kadish staging (p=0.004). The proportion of patients receiving surgery, radiotherapy, and chemotherapy were each significantly different between facility volumes (all p<0.001). Kaplan-Meier log-rank analysis demonstrated significantly improved OS with increasing facility volume (p=0.048), but OS was similar between patients at academic (64.0%) and non-academic cancer programs (p=0.112). On multivariate Cox-regression analysis after adjusting for age, gender, Charlson-Deyo comorbidity index, modified Kadish stage, and facility type, receiving treatment at low-volume facility was a risk factor for

mortality compared to a high-volume facility (HR=1.538, 95% CI 1.038-2.280, p=0.034).

Conclusion:

Management and outcomes of ENB appear to be dependent on the treatment facility volume, with high-volume facilities being associated with improved outcomes overall.

8:07 am - 8:14 am

Effect of hospital safety-net burden on survival of sinonasal squamous cell carcinoma

Christopher C. Tseng, BS

Jeff Gao, Medical Student

Gregory Barinsky

Christina H. Fang, Rhinology Fellow

Jordon Grube, DO

Wayne Hsueh, MD

Jean Anderson Eloy, MD, FARS

Rutgers New Jersey Medical School

Objective:

To examine factors associated with hospital safety-net burden, and to determine its impact on survival for sinonasal squamous cell carcinoma (SNSCC) patients.

Study Design:

Retrospective database review.

Methods:

The National Cancer Database was used to identify cases of SNSCC from 2004-2016. Hospital safety-net burden was defined by percentile of uninsured/Medicaid patients treated, namely ≤25% for low burden hospitals (LBH), >25%-75% for medium burden hospitals (MBH), and >75% for high burden hospitals (HBH). Univariate and multivariate analyses were used to investigate demographic and clinical characteristics as well as overall survival.

Results:

6,556 SNSCC cases were identified, with 1,807 (27.6%) treated at LBH; 3,314 (50.5%) at MBH; and 1,435 (21.9%) at HBH. On multivariate analysis, Black race (OR 1.39, p=0.032), maxillary sinus primary site (OR 1.31, p=0.024), treatment at an academic/research program (OR 20.63, p<0.001) or in the West (OR 1.49, p=0.030), and treatment at a higher volume facility (OR 25.10, p<0.001) had increased odds of being treated at HBH. Patients with grade III/IV tumor (OR 0.70, p=0.022), higher income (OR 0.67, p=0.001), receiving treatment modalities other than surgery alone (OR 0.59, p<0.001), or in the Midwest (OR 0.55, p<0.001) had lower odds of being treated at HBH. Survival analysis showed that hospital safety-net burden status was not significantly associated with overall survival (log-rank p=0.727).

Conclusion:

In patients with SNSCC, Black race, lower income, treatment at an academic/research program, and in the

PROGRAM ABSTRACTS

West were associated with treatment at HBH. Hospital safety-net burden status was not associated with differences in overall survival.

8:14 am - 8:21 am

Sociodemographic factors in patients with esthesioneuroblastoma

Ariel Omiunu, BS
Sudeepti Vedula, Medical Student
Christina H. Fang, Rhinology Fellow
Jean Anderson Eloy, MD, FARS
Rutgers New Jersey Medical School

Introduction:

Esthesioneuroblastoma (ENB) is a rare malignant neoplasm of sinonasal origin. Our aim is to identify geographic and sociodemographic disparities in ENB patients using a large population-based study.

Methods:

The National Cancer Database was queried for patients diagnosed with ENB between 2004 and 2012. Treatment patterns and prognostic factors were analyzed and compared between socio-demographic factors (location of residence, age, gender, race). Overall survival (OS) was analyzed using Kaplan Meier survival analysis.

Results:

Of the 1669 ENB cases included in our study, 17.3% were 70 years of age or older. Most patients were white (85.3%) and located in metro areas (83.2%). The most common type of treatment was combined surgery and radiotherapy (37.0%), followed by surgery alone (22.7%). Patients receiving no form of treatment were more likely to be older (11.4% vs. 2.8%, $p < 0.001$), Black (8.3% vs. 4.1%, $p < 0.001$), or Hispanic (6.8% vs. 3.9%, $p = 0.014$). Kaplan Meier analysis showed that treatment type made a significant difference in 5-year OS with patients who received surgery, or a combination of surgery and radiation had the best survival (82.2% and 84.4%, respectively). Those with the worst 5-year OS received either radiation alone, combination of surgery and chemotherapy, or chemotherapy alone (30.7%, 31.3% and 33.9%).

Conclusion:

Our study identified significant differences in the treatments and outcomes of ENB by sociodemographics, with more Blacks, Hispanics, and older patients undergoing no treatment. Further research is recommended, as disparities in care may influence treatment decisions and survival outcomes.

8:21 am – 8:28 am

Length of stay after surgery as a predictor of survival for sinonasal squamous cell carcinoma

Jeff Gao, BS
Christopher C. Tseng
Gregory Barinsky
Christina H. Fang, Rhinology Fellow
Jordon Grube, DO
Wayne Hsueh, MD
Jean Anderson Eloy, MD, FARS
Rutgers New Jersey Medical School

Objective:

To investigate factors associated with prolonged length of stay (LOS) following surgery and the association of prolonged LOS with survival for sinonasal squamous cell carcinoma (SNSCC).

Study Design:

Retrospective database review.

Methods:

The National Cancer Database was queried for SNSCC patients between 2010-2016 who underwent surgery with a LOS of at least 1 day. Cases were stratified into those who did and did not have prolonged LOS. Prolonged LOS was defined as LOS at or greater than the 75th percentile (8 days or more). Univariate and multivariate analyses were used to examine factors associated with prolonged LOS and its association with survival.

Results:

1,381 total cases were included, with 368 having prolonged LOS following surgery. On multivariate analyses, factors significantly associated with prolonged LOS included no insurance (OR 2.06, $p = 0.043$) or government insurance (OR 1.63, $p = 0.004$), surgery at an academic hospital (OR 2.01, $p = 0.007$) or integrated network cancer program (OR 2.14, $p = 0.030$), maxillary sinus primary site (OR 2.60, $p < 0.001$), positive surgical margins (OR 1.49, $p = 0.020$), and open procedure (OR 2.63, $p = 0.001$). Age, sex, race, and clinical stage were not associated with prolonged LOS. Patients with prolonged LOS had significantly lower 5-year overall survival (5YOS) than those without prolonged LOS (39.7% vs 56.0%, $p < 0.001$). Patients with prolonged LOS had significantly higher risk of mortality (HR 1.58, $p < 0.001$).

Conclusion:

Insurance status, treatment facility, primary site, surgical margins, and surgical approach were associated with prolonged LOS in patients with SNSCC treated with surgery. Prolonged LOS was associated with significantly lower 5YOS and increased risk of mortality.

8:28 am - 8:38 am

Q&A

PROGRAM ABSTRACTS

Patient Demographics

Moderators: Charles Riley, MD; Naweed Chowdhury, MD; Marc Dubin, MD, FARS

8:38 am - 8:45 am

Demographic variations of participants in rhinitis clinical trials

Neil Mehta, BS

Cheng Ma

Amar Miglani

David Gudi, MD, FARS

Shaun Nguyen

Rodney Schlosser, MD, FARS

Medical University of South Carolina

Background:

Representative enrollment is critical in appraising clinical trial evidence. For the past two decades, the NIH and FDA have issued guidelines for reporting demographic data in trials. Our aim was to examine the impact of FDA/NIH guidelines on demographic reporting among both allergic and non-allergic rhinitis clinical trials.

Methods:

Clinical trials between 2001-2020 which evaluate pharmacological and nonpharmacological treatments for rhinitis were searched for and selected using the clinicaltrials.gov database. Demographic information and trial characteristics were collected by independent review.

Results:

One hundred clinical trials were collected evaluating 38,148 patients. These studies constituted phase I (4%), phase II (14%), phase III (43%), and phase IV (28%) trials. Nearly half of all trials assessed INCS (46%) followed by INAH (14%) or combined INCS/ INAH (11%). The mean age of enrolled patients was 38.11 years [95% CI, 36.75-39.49]. Females were enrolled nearly twice as often males (63% vs. 37%). Reporting racial demographics increased between 2008-2020. Enrollment of White, Black, and Asians trended toward the national racial prevalence of rhinitis. Ethnicity was unreported in studies prior to 2010 and was infrequently reported in only 27% of trials thereafter.

Conclusion:

The majority of trials evaluating rhinitis treatments fail to report complete demographics despite improvements in reporting racial groups over the past two decades. Patient enrollment in rhinitis trials is approaching national racial prevalence, however further improvements in representative enrollment and demographic reporting are needed.

8:45 am - 8:52 am

Effect of race in epistaxis treatment

Avneet Randhawa, BS

Chris Choi, BS

Christina H. Fang, MD

Jean Anderson Eloy, MD, FARS

Objectives:

To analyze the association between race and adverse outcomes in patients undergoing epistaxis treatment.

Study Design:

Retrospective database review.

Methods:

This retrospective cohort analysis utilized the 2003-2014 National Inpatient Sample. ICD-9 codes were used to identify cases with a primary diagnosis of epistaxis and an associated procedure for its control. Cases with missing data were excluded. Higher total charges and prolonged length of stay (LOS) were indicated by values greater than the 75th percentile. Demographics, hospital characteristics, Elixhauser comorbidity score, and complications were compared amongst race cohorts using chi-square analysis and a one-way ANOVA. The independent effect of race on adverse outcomes was analyzed using logistic regression while adjusting for the aforementioned variables.

Results:

Of the 80,296 cases of epistaxis included, 80.2% were White, 12.5% were Black, and 7.3% were Hispanic. Among the race cohorts, demographics, hospital characteristics, and comorbidities were significantly different. Black patients had increased odds of urinary/renal complications (OR 2.131, 95%CI 1.783-2.545, $p < 0.001$) compared to white patients. Additionally, Blacks experienced higher odds of prolonged LOS (OR 1.228, 95%CI 1.102-1.369, $p < 0.001$) and higher total charges (OR 1.259, 95%CI 1.100-1.428, $p < 0.001$) compared to whites. Hispanics were more likely to experience urinary/renal complications (OR 1.575, 95%CI 1.221-2.032, $p < 0.001$), higher total charges (OR 1.520, 95%CI 1.305-1.772, $p < 0.001$), and prolonged LOS (OR 1.166, 95%CI 1.015-1.340, $p = 0.031$).

Conclusion:

Race is an important factor associated with an increased incidence of complications in patients treated for epistaxis.

PROGRAM ABSTRACTS

8:52 am - 8:59 am

Characterization of biologics patients

Matthew Lelegren, MD

Kent Lam, MD, FARS

T. Blaise Marshall

Joseph Han, MD, FARS

Eastern Virginia Medical School

Objective:

Biologics, such as omalizumab, benralizumab, dupilumab, and mepolizumab, are used to treat nasal polyposis, asthma, atopic dermatitis, and urticaria. We aim to characterize the patients receiving biologics for these type 2 inflammatory diseases from a single tertiary otolaryngology practice.

Materials and Methods:

A retrospective chart review was conducted to identify patients prescribed a biologic between January 2000 and May 2020. Collected data included demographic information, comorbidities, medication usage, and clinical progress. The primary outcome measurements include changes in usage of systemic corticosteroids and antibiotic usage up to 2 years after biologic initiation.

Results:

From an initial 110 patients, 100 patients provided sufficient datapoints and were included for analysis. Sixty-five of the patients were female. The mean age was 50 (range 9-82). Initiation of a biologic agent resulted in reduction in overall systemic corticosteroid requirements: 142,678.00 mg of prednisone were prescribed before biologic use, while 79,490.00 mg of prednisone were prescribed after initiating biologics ($p=0.0408$). 148 total oral corticosteroid prescriptions were written before biologic initiation compared to 84 after biologic initiation ($p=0.0095$). There was also a significant reduction in antibiotic prescriptions after biologic agent initiation (128 before versus 55 after, $p=0.0029$).

Conclusion:

There was a significant decrease in steroid usage after biologic medication prescription. There was also a significant reduction in antibiotic usage after biologic medication prescription.

8:59 am - 9:06 am

Demographics in chronic rhinosinusitis subtypes

Cheng Ma, BS

Neil Mehta

Shaun Nguyen

David Gudis, MD, FARS

Amar Miglani

Rodney Schlosser, MD, FARS

Introduction:

The demographic makeup of chronic rhinosinusitis (CRS) and its subtypes including CRS with (CRSwNP) or without nasal polyps (CRSsNP), aspirin-exacerbated respiratory disease (AERD), and allergic fungal rhinosinusitis (AFRS), are poorly understood. Current demographic estimates are based on survey or database studies with innate methodologic weaknesses. Our aim is to describe CRS demographics by subtype and region.

Methods:

A systematic review for articles reporting United States adult demographics for CRS was performed. Study participants were required to have been diagnosed by an otorhinolaryngologist or allergist using consensus criteria. Data on demographics, geographic region, and CRS subtype were analyzed.

Results:

In total, 31 unique studies representing 8783 patients were assessed. AFRS patients were more likely to be Black (53.8%) and younger (mean age, 24.5 years) than other CRS patients (Black, range 3.5%-11.2%; mean age, range 48.4-50 years). CRSwNP (not otherwise specified) had a higher proportion of males (59.5%) compared to other subtypes (range 44.1%-55.2%). CRSsNP patients were more likely to be White (84.5%) compared to other subtypes (range 44.3%-79.4%). Regionally, the South had more Black (17.7%) and female (52.3%) patients than other regions (Black, range 2.4%-4.2%; female, range 47.8%-48.8%). The West had more Asian (4.5%) and Hispanic (12.3%) patients than other regions (Asian, range 0.4%-1.2%; Hispanic, range 0.8%-3%).

Conclusions:

Significant demographic differences exist in CRS patients based on subtype and region. These descriptive statistics may provide a foundation in guiding representative enrollment in CRS clinical trials, but further high-level demographic studies are needed.

9:06 am - 9:16 am

Q&A

PROGRAM ABSTRACTS

9:16 am - 10:00 am

Panel "The Role of the Rhinologist in Sleep Disorders"
 Moderator: Andrew Goldberg, MD, FARS
 Panelists: Jolie Chang, MD; Maria Suurna, MD; Ilene Rosen, MD

10:00 am - 10:30 am

BREAK**Olfaction**

Moderators: Carol Yan, MD; David Poetker, MD, FARS

10:30 am - 10:37 am

Population differences between COVID-19 and post-viral olfactory dysfunction: Case-control study

Nikita Chapurin, MD, MHS
 Spencer Dennis
 Naweed Chowdhury, MD
 Timothy Trone, MD
 Basil Chaballout, BA
 Justin Turner, MD, FARS
 Rakesh Chandra, MD, FARS
 Vanderbilt University Medical Center

Background:

Persistent olfactory dysfunction (OD) can occur following SARS-CoV2 infection but is not unique since post-viral olfactory dysfunction (PVOD) is a well-established phenomenon. Differences between COVID-associated OD and PVOD remain unclear. In this study, we sought to compare the objective olfactory function and clinical presentation of PVOD and post-COVID patients.

Methods:

Case-control study of patients presenting with PVOD and SARS-COV2 associated hyposmia. Demographic data, clinical factors, and Threshold, Discrimination, Identification (TDI) testing was obtained. The Questionnaire of Olfactory Disorders (QOD) and Beck's Depression Inventory (BDI) were also administered to patients. TDI scores were adjusted for age and sex. Pearson correlations, chi-square, and t-tests were used to identify differences between groups.

Results:

230 patients were included (122 post-COVID; 108 PVOD). Patients in the post-COVID group were significantly younger (mean: 39 vs. 60 y/o) and more likely to be female (67.2% vs 52.8%, $p = 0.011$) than in the PVOD group. COVID patients had substantial olfactory dysfunction, with average TDI scores -2.8 standard deviations below the mean score for each age/sex group. There were no significant differences between normalized TDI ($p = 0.216$); QOD ($p = 0.158$); or BDI ($p = 0.398$) scores between COVID and PVOD patients. BDI scores were positively correlated with QOD scores ($R^2 = 0.381$, $p = 0.0001$).

Conclusions:

There are notable demographic differences between patients presenting with post-COVID and post-viral olfactory dysfunction, with post-COVID patients more likely to be younger and female. However, we did not find significant differences in TDI, BDI and QOD testing between the groups.

10:37 am - 10:44 am

Chemesthesis compensates for decreased flavor sensation due to chemosensory dysfunction in COVID-19

Sameer Kini, MD
 Ahmad Sedaghat
 Katie M. Phillips
 University of Cincinnati

Background:

COVID-19 has been associated with profound chemosensory dysfunction. The literature has focused on quantitative aspects of smell and taste loss. However, the impact of this chemosensory dysfunction on flavor sensation and the nuances of this phenomenon from a patient's perspective, including successful coping mechanisms is of great interest and clinical significance.

Methods:

Qualitative phenomenological study using constant comparative methodology was applied. The research team conducted 5 one-on-one interviews with COVID-19 patients with associated taste and smell loss ranging from 28 to 45 minutes in length. The content of the interview protocol was determined through iterative discussion amongst all authors. The senior author served as a coder and a codebook was created and utilized to identify recurrent themes. The themes were analyzed for meaning and conclusions were summarized.

Results:

Recurring themes included (1) patients were impacted by chemosensory loss via concern for their safety, decreased quality of life (QOL) and loss of interest in eating; (2) compensatory mechanisms for loss of flavor included increasing the chemesthetic sensations in their mouth by increasing the texture, temperature, acidity or carbonation of food or asking a meal partner to describe the food in precise detail; and (3) enhancing chemesthesis associated with a food led to increased patient gratification associated with eating.

Conclusions:

Chemosensory loss in COVID-19 patients has a profound impact on a patient's QOL. The chemesthetic properties of food may provide a means to compensate for the loss of gustatory and olfactory function to increase satisfaction with eating and ultimately improve QOL.

PROGRAM ABSTRACTS

10:44 am - 10:51 am

Measurement of healthy utility state values in COVID-19 related anosmia

Mena Said, MD
 Thanh Luong
 Adam Deconde
 Carol Yan

Background:

The quality-of-life (QOL) impact of COVID-19 associated anosmia has not been established despite significant numbers of patients with temporary or persistent smell loss. This study aims to establish and compare health state utility values (HUV) in patients with COVID-19 associated olfactory dysfunction (OD).

Methods:

This cross-sectional study electronically recruited consecutively diagnosed COVID-19 patients from a single institution and subjects from an online support forum for COVID-19 chemosensory loss to assess measures of health utility and QOL (visual analog scale [VAS] and EuroQol-5Dimension [EQ-5D]). For those with COVID-19 OD, additional direct health utility instruments (time trade-off [TTO] and standard gamble [SG]) were assessed. Intergroup utility scores were compared using the Kruskal-Wallis test.

Results:

490 subjects were enrolled with 33.2% males and a mean±SD age of 38.9±15.2 years. Overall mean±SD health utilities were VAS 0.77±0.19; EQ-5D 0.85±0.14; TTO 0.52±0.36; and SG 0.78±0.32. On subgroup analysis, HUVs differed among those with no COVID-19-smell loss (VAS 0.79±0.17, EQ-5D 0.89±0.13), recovered smell loss (VAS 0.79±0.19, EQ-5D 0.86±0.13), and persistent smell loss (VAS 0.74±0.20, EQ-5D 0.81±0.14) using both VAS (p=0.004) and EQ-5D (p<0.001). Those with persistent smell loss had significantly worse scores on EQ-5D subdomains of activity, pain/discomfort and anxiety/depression (p<0.01). Lower HUVs were reported by subjects recruited from the online forum compared to patients from the medical institution (p<0.001, VAS and EQ-5D).

Conclusions:

Patients who suffer from COVID-19 related OD report HUVs that are typically lower than US population norm. The degree of QOL impact varied by HUV measurement.

10:51 am - 10:58 am

Cognitive impairment and awareness of olfactory dysfunction: NHANES 2013–2014

Srivats Narayanan, Medical Student
 Christopher Roxbury
 Yicheng Bao, Medical Student
 Aman Chishti, Student
 Sandra Lin, MD, FARS
 University of Missouri–Kansas City School of Medicine

Objectives:

Cognitive decline and olfactory dysfunction (OD) are associated in older adults, but many adults have measured OD (mOD) without self-reported OD (sOD) and thus are unaware of OD. This study examined the association between cognitive impairment and unawareness of OD in older adults, and assessed if cognitively unimpaired older adults and middle-aged adults had different likelihoods of unawareness of OD.

Methods:

This study included adults aged ≥40 without sOD in the National Health and Nutrition Examination Survey 2013–2014. mOD was assessed with an 8-item pocket smell test. The outcome variable was binarized as either no mOD nor sOD (lack of OD) or mOD without sOD (unaware of OD). Cognitive assessment included the Animal Fluency Test, the Digit Symbol Substitution Test, and the Consortium to Establish a Registry for Alzheimer's Disease. Multivariable regressions analyzed the effect of cognitive impairment on unawareness of OD in adults aged ≥60 and assessed if cognitively unimpaired adults aged ≥60 and adults aged 40–59 had dissimilar rates of unawareness of OD.

Results:

This study included 1340 adults aged ≥60 and 1974 adults aged 40–59. Cognitive impairment was associated with unawareness of OD in older adults (OR: 4.60 [95% CI: 2.82, 7.51], p=0.009). Cognitively unimpaired older adults and middle-aged adults did not have different rates of unawareness of OD (p=0.451).

Conclusions:

Cognitive impairment and unawareness of OD were associated in older adults. Cognitively unimpaired older adults and middle-aged adults had similar rates of unawareness of OD. This study suggests that objective smell tests are merited for cognitively impaired patients who need olfactory status assessment, even if they have no sOD.

PROGRAM ABSTRACTS

10:58 am - 11:05 am

Parosmia and health utility state values for COVID-19 related olfactory loss

Sophie Jang, Research Fellow
Mena Said, MD
Thanh Luong
Adam Deconde
Carol Yan

Background:

A better understanding of the impact of COVID-19-associated olfactory dysfunction (OD) is critical to prioritizing research and interventions for this new disease state. This study investigates the clinical and disease characteristics that associate with health state utility values (HUV) in subjects with persistent COVID-19 associated OD.

Methods:

Patients with a COVID-19 diagnosis from a tertiary medical center and those recruited from a social media support forum with ongoing COVID-19 related OD were assessed. Clinical characteristics and disease specific symptoms were obtained along with self-reported smell function at 3 timepoints (pre-COVID-19, time of diagnosis, and current) using a visual analogue scale (VAS, 0-10 scale). HUVs were obtained using indirect (EuroQol-5Dimension, [EQ-5D]) and direct measures (VAS, time trade-off [TTO], standard gamble [SG]). Bivariate regression analysis was performed.

Results:

A total of 161 subjects (77.8% female) with persistent OD participated. The mean±SD HUVs varied based on instrument: TTO 0.53±0.35, VAS 0.74±0.20, SG 0.79±0.30, and EQ-5D 0.81±0.14. Mean VAS smell function was 9.71±1.22 pre-COVID-19, 1.10±2.64 at diagnosis, and 2.64±1.89 current. There was no correlation between smell loss severity and health utility level. 85.7% of subjects reported parosmia. Presence of parosmia was a significant predictor of lower HUVs as measured by VAS (0.72 vs 0.83, p<0.001) though not by other assessments. Female gender and a presence of "head fog" also predicted lower VAS and EQ-5D values in this cohort (p<0.02 and p<0.001, respectively).

Conclusion:

Persistent COVID-19 related OD results in health states comparable to other chronic diseases and are worsened by the presence.

11:05 am - 11:15 am

Q&A

Nasal Valve, Perforation and Empty Nose

Moderators: David Jang, MD, FARS; Arthur Wu, MD, FARS; Jayakar Nayak, MD

11:15 am - 11:22 am

Temperature-controlled RF treatment of the NV for NAO: A randomized controlled trial

Stacey Silvers, Dr.
Jon Rosenthal
Chad Mcduffie
David M. Yen, President
Joseph Han, MD, FARS
Madison ENT and Allergy Care

Background:

Nasal valve collapse is one of several causes of nasal obstruction. The safety and efficacy of a temperature-controlled radiofrequency (RF) device for the treatment of the nasal valve for nasal airway obstruction has been established in single-arm studies. The objective of this trial was to compare active device treatment against a sham procedure (control).

Methods:

In a prospective, multicenter, single-blinded, randomized controlled trial, patients were assigned to bilateral temperature-controlled RF treatment of the nasal valve (n=77) or a sham procedure (n=41), in which no RF energy was transferred to the device/treatment area. The device was applied to the mucosa over the lower lateral cartilage on the lateral nasal wall. The primary endpoint was responder rate at 3 months, defined as ≥20% reduction in Nasal Obstruction Symptom Evaluation (NOSE) Scale score or ≥1 reduction in clinical severity category.

Results:

At baseline, patients had a mean NOSE score of 76.7 [95%CI 73.8,79.5] and 78.8 [95% CI 74.2,83.3] (p=.424) in the active treatment and sham control arms, respectively. At 3 months, the responder rate was significantly higher in the active treatment arm (88.3% [95%CI 79.2%,93.7%] versus 42.5% [95%CI 28.5%,57.8%], p<.001). The active treatment arm had a significantly greater decrease in NOSE score (mean, -42.3 [95%CI -47.6,-37.1] versus -16.8 [95%CI -26.3,-7.2], p<.001). Three adverse events at least possibly related to the device and/or procedure were reported, and all resolved.

Conclusion:

This randomized controlled trial shows temperature-controlled RF treatment of the nasal valve is safe and effective in reducing symptoms of nasal airway obstruction.

PROGRAM ABSTRACTS

11:22 am - 11:29 am

Temperature-controlled RF treatment of nasal valve for nasal airway obstruction

William Yao, MD

Henry Barham

Randall Ow

The University of Texas Health Science Center at Houston McGovern Medical School

Objective:

Measure effectiveness of a low-power temperature-controlled radiofrequency (RF) procedure to treat the nasal valve and measure symptomatic improvement in patients with nasal airway obstruction secondary to nasal valve collapse.

Method:

A prospective, single-arm multi-institutional study in patients > 18 years with nasal airway obstruction. Inclusion criteria were patient that responded to nasal valve dilation such as modified Cottle, and a baseline Nasal Obstruction Symptom Evaluation (NOSE) Scale score ≥ 60 . Patients were treated in the nasal valve region with temperature-controlled RF energy and followed up at 3 and 6 months.

Result:

122 adult patients underwent the procedure and 7 patients were lost to follow-up at the 6 months visit. NOSE scale mean total score at baseline was 80.3 (SD 12.6), at 3 months: 32.9 (SD 24.2) and at 6 months: 34.2 (SD 25.9). Mean NOSE score improvement was 47.6 at 3 months and 45.5 at 6 months. There was significant difference when comparing baseline to 6 mos ($p < 0.0001$) and no significant difference between 3mos and 6mos ($p = 0.6082$) scores. At baseline, 100% of subjects' total NOSE scores were in the 'extreme' (score of 80-100) or 'severe' (55-75) categories; at six months post-procedure this decreased to 24.4%. At the six-month visit, 85.2% of the subjects were responders as defined by 1.) 20% improvement in NOSE total score relative to baseline OR 2.) At least one severity category improvement in the NOSE total score.

Conclusion:

Minimally-invasive temperature-controlled RF treatment of the internal nasal valve lead to significant early improvement in NOSE scores maintained at six months. This treatment is efficacious to treat nasal airway obstruction due to valve collapse.

11:29 am - 11:36 am

Endoscopic techniques for nasal septal perforation repair: A systematic review

Arron Gravina, DO

Kavya Pai, BS

Samantha Shave, BS

Jean Anderson Eloy, MD, FARS

Christina H. Fang, Rhinology Fellow

Rutgers New Jersey Medical School

Objective:

Surgical repair of nasal septal perforations (NSPs) is often technically challenging. Advantages associated with endoscopic NSP repair (ENSPR) include enhanced visualization and its minimally invasive nature. This study provides a comprehensive review of clinical features, surgical techniques, and outcomes in patients who underwent ENSPR.

Methods:

A systematic review was conducted using the PubMed/MEDLINE database according to PRISMA guidelines. A manual bibliography search produced additional articles. Studies reporting purely endoscopic approaches for NSP repair were included. Patient demographics, NSP size, etiology, type of repair, incidence of closure, and follow-up were analyzed.

Results:

312 patients from 19 studies were included. The mean age was 37.7 years (range, 8-68) and 53.3% were male. Common etiologies were iatrogenic ($n=163$, 57.6%), trauma ($n=66$, 23.3%), and idiopathic ($n=36$, 12.7%). The mean NSP size was 17.1 mm. Repair techniques included unilateral random pattern flaps ($n=229$, 73.3%), interposition grafts ($n=119$, 38.1%), and unilateral axial pedicled local flaps ($n=75$, 24.0%). 206 patients (66.0%) underwent a 2-layered repair while 69 (22.1%) and 37 (11.9%) patients underwent single and 3-layered repairs, respectively. Successful closure was achieved in 292 patients (93.6%). When stratified by layers of repair, 64 single-layered (92.8%), 188 2-layered (91.3%), and 34 3-layered repairs (91.9%) were successful at a mean follow-up of 17.0 months (range, 0-145).

Conclusion:

ENSPR generally achieves NSP closure with high rates of success among varying types of repair. Further studies are needed to determine how clinical factors and surgical methods impact the likelihood of successful closure.

PROGRAM ABSTRACTS

11:36 am - 11:43 am

Surgical repair of nasal septal perforations

Janmaris Marin, MD
 Roger Bui, MD
 Edward McCoul, MD, FARS
 Jeremiah Alt, MD, PhD, FARS
 Brent Chang, MD
 Michael Yim, MD
 LSU

Objective:

A wide variety of techniques for the surgical repair of nasal septal perforations (NSP) have been described. Surgical management of NSPs can be broadly divided into open versus endonasal approaches, with additional variables involving unilateral or bilateral flaps, use of grafts, and placement of splints. The objective of this study was to compare surgical approaches and their outcomes.

Data sources:

PubMed, EMBASE, and CINAHL Plus databases were examined for patients undergoing NSP repair.

Review methods:

English-language studies reporting surgical management of patients with the primary diagnosis of NSP were included. Outcome measures of interest included perforation size, surgical approach characteristics, and success rate defined as complete closure assessed by surgeon at 3 months postoperatively. The quality of articles was assessed with the MINORS criteria (methodological index for nonrandomized studies). A random-effects model was used to calculate pooled proportions for the different outcomes.

Results:

The electronic database search yielded 1076 abstracts for review. 64 articles met the inclusion criteria, with 1591 patients: 1127 (71%) underwent an open approach and 464 (29%) an endonasal approach. The median (range) MINORS score was 12 (4-15) for noncomparative studies. There was no difference in closure success between open and endonasal approaches (pooled effect size 0.91; 95% CI, 0.89 – 0.93; I² = 42%, p=0.675). Use of bilateral vs unilateral flaps, use of interposition grafts, and use of intranasal splints were not associated with differences in outcomes.

Conclusions:

Nasal septal perforation surgical repair success rates are comparable regardless of technique.

11:43 am - 11:50 am

Mental health burden of empty nose syndrome

Meredith Meyer
 Daniel Bacon
 Princess Onourah, BS
 Abdullah Zeatoun, MD
 Charlese Ebert Jr., MD, FARS
 Brian Thorp, MD, FARS
 Jon Abramowitz
 Adam Kimple
 Brent Senior, MD, FARS

Background:

Empty Nose Syndrome (ENS) is characterized by the paradoxical perception of nasal fullness and obstruction despite patent sinonasal anatomy after surgery. We investigated the relationship between ENS and anxiety, depression, obsessive-compulsive disorder (OCD) and somatoform disorders compared to controls.

Methods:

This was a cross-sectional survey study comparing patients with ENS and Chronic Rhinosinusitis (CRS). 116 patients participated: 58 ENS patients from digital support groups, and 58 CRS patients from rhinology clinic. Study participants completed a total of four validated surveys assessing conditions discussed above. Surveys used include Empty Nose Syndrome 6-Item Questionnaire (ENS6Q), Rhinosinusitis Disability Index (RSDI), Obsessive Compulsive Inventory – Revised (OCI-R), and PRIME MD Patient Health Questionnaire (PHQ).

Results:

ENS patients exhibited a mean RSDI of 78.6, 95% confidence interval [CI] 72.8 to 84.5, compared to 25.2 95% CI 18.6 to 31.8, p<0.0001. This difference was seen across physical, functional and emotional subdomains. Notably, 53% of ENS patients met diagnostic thresholds for somatoform disorder compared to 14% of CRS patients (p<0.0001). ENS patients scored below diagnostic threshold (< 21) on the OCI-R questionnaire assessing OCD, and scores were not significantly higher than in CRS patients (10.9 vs 8.3, p<0.30).

Conclusions:

ENS patients had diminished sinonasal quality of life compared to CRS. As seen previously, we identified a high prevalence of comorbid anxiety and depression among ENS patients, and this was not seen in our control group. Additional studies are needed to assess the role of somatoform disorder in ENS.

11:50 am - 12:00 pm

Q&A

PROGRAM ABSTRACTS

**Saturday,
October 2, 2021
8:00 am – 12:00 pm
Breakout Room D
Bernard's Room**

Rhinology Malignancies

Moderators: Garret Choby, MD, FARS; Nyall London, MD, FARS

8:00 am - 8:07 am

Nasal endoscopy and aerosol generation

Amarbir Gill, MD
Paige Shipman
Kerry Kelly
Kamaljeet Kaur
Jeremiah Alt, MD, PhD, FARS
Marc Error
University of Utah

Objective:

The COVID-19 pandemic has highlighted safety concerns surrounding possible aerosol generating procedures, but comparative data on particles small enough to transmit this virus remain limited. We sought to determine the effect of nasal endoscopy on aerosol generation in the clinic setting, while also evaluating the role of a high-efficiency particulate (HEPA) filter in reducing aerosol concentration.

Methods:

Otolaryngology patients were prospectively enrolled in a cross-sectional study. Demographic information and clinic room characteristics (i.e., room size, temperature, and air exchange rate) were recorded. A scanning mobility particle sizer and GRIMM aerosol monitor measured aerosols 14.3 nm to 34 µm in diameter (i.e., particles smaller than those currently examined in the literature) during (1) nasal endoscopy and (2) no nasal endoscopy encounters. One-way analysis of variance (ANOVA) and Student's t-test were performed used to compare aerosol generation and impact of HEPA filtration.

Results:

49 patients met inclusion criteria (30 nasal endoscopy; 19 no nasal endoscopy). There was no significant difference in age or gender across the two cohorts. Aerosol concentration in the nasal endoscopy cohort was not greater than that generated in the no nasal endoscopy cohort ($p=0.10$, CI 0.18 – 2.11µg/m³). Aerosol concentrations returned to baseline after 8.76 minutes without a HEPA filter vs. 4.58 minutes with a HEPA filter ($p=0.001$, CI 1.87 – 6.49 min).

Conclusion:

Using advanced instrumentation and a comparative study design, aerosol generation was shown to be no greater during nasal endoscopy vs. no endoscopy encounters. HEPA filter utilization reduced aerosol concentrations significantly faster than no HEPA filter.

8:07 am - 8:14 am

Surgical approach is associated with complication rate in sinonasal malignancy: A multi-center Study

Daniel Beswick, MD, FARS
Peter Hwang, MD, FARS
Nithin Adappa, MD, FARS
Christopher Le, MD, FARS
Ian Humphreys, DO, FARS
Anne Getz, MD, FARS
Jeffrey Suh, MD, FARS
Eric Wang, MD, FARS
University of California Los Angeles

Background:

Management of sinonasal malignancy (SNM) often includes surgical resection. Treatment-related surgical morbidity can occur, yet risk factors associated with complications in this population are understudied.

Methods:

Adults with SNM whose primary treatment included surgical resection were prospectively enrolled into an observational, multi-institutional cohort study from 2015 to 2020. Sociodemographic, disease, and treatment data were collected. Complications assessed included cerebrospinal fluid leak, orbital injury, intracranial injury, diplopia, meningitis, osteoradionecrosis, hospitalization for neutropenia, and subsequent chronic rhinosinusitis. Surgical approach was categorized into endoscopic resection (ER) or open/combined resection (O/CR). Associations between factors and complications were analyzed.

Results:

Overall, 142 patients met inclusion criteria for analysis. 23 subjects experienced >1 complication (16.2%). On unadjusted analysis, adjuvant radiation therapy was associated with developing a complication ($p=0.013$). Compared to the ER group ($n=98$), the O/CR group ($n=44$) had a greater percentage of higher T stage lesions ($p=0.004$) and more frequently received adjuvant radiation ($p=0.017$) and chemotherapy ($p=0.038$). Complications rates were similar between the ER and O/CR groups without controlling for other factors. Regression analysis that retained certain factors showed O/CR was associated with increased odds of experiencing a complication (odds ratio 3.34, 95% CI 1.06-11.19).

Conclusions:

Prospective, multi-center evaluation of SNM treatment outcomes is feasible. Undergoing O/CR was associated with increased odds of developing a complication after accounting for radiation therapy.

PROGRAM ABSTRACTS

8:14 am - 8:21 am

Determinants of survival in sinonasal and skull base chondrosarcoma

Ryan Rimmer, MD

Jess Mace, Senior Research Associate

Peter Andersen

Justin Cetas

Olabisi Sanusi

Jeremy Ciporen

Aclan Dogan

Ryan Li

Timothy Smith, MD, FARS

Mathew Geltzeiler, MD, FARS

Background:

Chondrosarcomas are rare, malignant chondroid tumors that can occur in the sinonasal and skull base regions. Surgery is a mainstay of treatment, but complete resection can be challenging due to close proximity of critical neurovascular structures. Due to their rarity and relatively indolent nature, optimal treatment regimens are not established. Our objective was to assess determinants of survival for sinonasal and skull base chondrosarcomas utilizing the National Cancer Database (NCDB).

Methods:

The NCDB (2004-2017) was queried for cases of sinonasal and skull base chondrosarcoma. Multivariate hazard regression modeling was used to identify significant predictors of 60-month and 120-month overall survival (OS).

Results:

736 cases met inclusion criteria. Overall survival for all treatment types was 84.7% [SE±0.02] at 60-months and 75.6% [SE±0.02] at 120-months. Surgery, with or without adjuvant treatment, was found to associate with highest OS at 60 and 120-months. For patients receiving adjuvant radiotherapy (RT), proton therapy was associated with increased OS at 60 (p=0.022) and 120-months (p=0.043) compared to conventional external beam RT. Cox regression modeling identified clinically important cofactors as significantly associated with differences in mortality risk including: age, Charlson-Deyo total score >3, higher M-stage, insurance status/provision, and tumor size.

Conclusions:

Sinonasal and skull base chondrosarcoma are primarily treated with surgery with favorable OS. Adjuvant treatment may be required and proton RT is associated with improved 60- and 120-month survival compared to conventional radiation treatment.

8:21 am - 8:28 am

Healthcare expansion and rhinologic malignancies

Alexandria L. Irace

Rahul Sharma, BS

Jonathan Overdevest, MD, PhD

David Gudis, MD, FARS

Columbia University Irving Medical Center

Background:

State Medicaid expansion as part of the Patient Protection and Affordable Care Act has had broad effects on patient care. We aim to characterize the impact of expansion on stage at diagnosis, survival, and treatment for rhinologic malignancies.

Methods:

Patients with rhinologic malignancies between 2007-2016 were extracted from the Surveillance, Epidemiology, End Results (SEER) registry. Patients were grouped by diagnosis before and after 2014 (when several states had expanded coverage). Of those diagnosed in 2014 or later, patients were categorized based on states that expanded Medicaid vs. those that did not. Logistic regression adjusting for demographics and household income/education was used to examine effects of expansion on stage at diagnosis and treatment. Kaplan-Meier analysis was used to examine disease-specific survival (DSS) by expansion status.

Results:

Analysis included 8,796 patients. Prior to 2014, 4.6% of patients were uninsured, compared to 1.9% after 2014 (p<0.001). Among patients diagnosed after Medicaid expansion (N=2,034), patients in expanded states were less likely to be diagnosed at later stages (regional or distant disease) compared to those in un-expanded states (OR 0.66, 95% CI 0.45-0.96, p=0.030). DSS was not different between patients diagnosed before and after 2014 (p=0.38), or between expanded and un-expanded states (p=0.88). State expansion was not associated with receiving treatment.

Conclusion:

Patients with rhinologic malignancies in states that expanded Medicaid coverage were less likely to present with late-stage disease. Although Medicaid expansion was not associated with survival, it may impact the timeliness in receiving care and improve survival outcomes over the long term.

8:28 am - 8:38 am

Q&A

PROGRAM ABSTRACTS

Rhinology Workforce

Moderators: Douglas Reh, MD, FARS; Erin O'Brien, MD, FARS; Mathew Geltzeiler, MD, FARS

8:38 am - 8:45 am

Gender gap among rhinology and skull base surgeons

Patricia Johnson, MD
Chandala Chitguppi
Kristen Echanique, Resident
Jivianne Lee, MD, FARS
Elina Toskala, MD, FARS
University of Washington

Background:

Many surgical subspecialties have closely evaluated gender inequity amongst their cohorts. We aim to assess current gender gaps in rhinology-skull base surgery.

Methods:

A 58 item-based questionnaire was distributed to 934 members of DocMatter via the American Rhinologic Society.

Results:

The response rate was 12.5% with 75 responses (40% female). In comparison to their male counterparts (M), the female surgeons (F) were more likely to have selected this specialty because of a mentor during residency ($p = 0.007$; M 35% vs. F 76%), more likely to have considered family leave in choosing the current job ($p = 0.01$; M 4% vs. F 33%) and more likely to have considered changing their specialty ($p=0.03$; M 4% vs. F 20%). Gender distribution was comparable in terms of proportion of fellowship-trained surgeons, having a current academic practice, having a professor-level position, and having 10 or more publications in residency and fellowship. Among those in practice for less than 10 years, females were 10 times less likely to be a consultant in a company ($p=0.03$). Among those in practice for 10 years or more, females were 5 times more likely to have a lower compensation ($p=0.02$), 3.5 times less likely to be a consultant in a company ($p=0.04$), 3.5 times less likely to have been invited as a panelist at international conferences ($p=0.04$), and 12 times more likely to be in a dual-income household ($p=0.001$).

Conclusion:

Male and female rhinologists had comparable practice types and titles, training, years of experience, and research productivity. Yet females are less likely to have consulting positions or be invited as panelists, and more likely to have a lower compensation and consider changing specialty.

8:45 am - 8:52 am

Socioeconomic trends in rhinology and endoscopic skull base surgery in 2020

Sara Sun, MD
Joseph Han, MD, FARS
Daniel Trotier
Kent Lam, MD, FARS
Eastern Virginia Medical School

Objectives:

To investigate the demographics and socioeconomic information of physicians in rhinology practices.

Materials and Methods:

Through an electronic survey sent to American Rhinologic Society members, information regarding demographics, education, practice setting, earnings, and satisfaction were gathered.

Results:

A total of 160 responses were received, resulting in a response rate of 18.5%. Of the respondents, 84% of respondents were male, and 48.1% were 50 or younger. The largest age bracket was age 51-60 at 30.6%, followed by age 31-40 at 28.7%. Among rhinologists practicing <5 years, 37.5% were female, compared to 11.2% for those practicing >5 years. 75% of rhinologists practicing <5 years reported practicing in an academic setting, while 32.4% of rhinologists practicing >5 years work in an academic setting. 56.9% of those practicing rhinology completed a rhinology fellowship. 100% of rhinologists in practice <5 years completed a fellowship, but 38.9% of rhinologists in practice >5 years completed a fellowship. For rhinologists practicing <5 years, 95.8% earned \$500,000 or less, and for rhinologists practicing >5 years, 50% earned \$500,000 or less. When asked if rhinologists felt they were fairly compensated compared to their colleagues, 50.6% replied "no."

Conclusions:

There is a growing number of females in rhinology. For early career, the academic setting is more common than other practice settings. Fellowship completion is more common among more recently trained rhinologists. Earnings are lower among newer rhinologists compared to older rhinologists in terms of practice time.

PROGRAM ABSTRACTS

8:52 am - 8:59 am

Predictors of academic career placement and scholarly impact in fellowship-trained rhinologists

Nicholas Rowan, MD

Varun Vohra

Duncan Watley, Resident

Carol Yan

Tran Locke

Joshua Levy, MD, FARS

Johns Hopkins University Medical Center

Introduction:

As rhinology fellowship positions outpace availability of academic rhinology jobs, it is increasingly important to identify characteristics associated with academic career placement. This study evaluated the association of academic characteristics during training with current academic placement and post-training scholarly impact.

Methods:

Rhinology fellows were identified using publicly available data. Bibliometric indices, training institutions, graduate degrees, and job placement data were used in bivariate and multivariable regression analyses to assess for association with predictors and academic trajectory.

Results:

Rhinologists graduating between 1991 and 2020 were included (n=265). Most surgeons (n=185, 70%) held an academic position, while 80 (30%) surgeons worked in a non-academic position; 93.2% had an MD degree and 80.3% were male. Multivariable logistic regression analysis indicated that a designation of MD, compared to DO (OR 5.93, 95% CI [1.97–21.9]), number of publications during fellowship (OR 1.18 [1.02–1.41]) and h-index during training (OR 1.25 [1.07–1.49]) were independently predictive of academic job placement. Meanwhile, number of primary authorships during fellowship (OR 4.85 [2.83–8.26]), h-index during training (OR 1.6 [1.29–2.08]), and PhD (OR 80.6 [3.5–1,840]) were associated with post-training h-index. Medical school ranking, graduate degrees including MS, MBA, and MPH, and research metrics prior to residency were not associated with either academic placement or post-training h-index.

Conclusions:

The predictors of academic job placement in rhinology are unclear, but h-index during training, and research productivity during fellowship may serve as indicators of an academic career.

8:59 am - 9:06 am

A geospatial analysis of the rhinologist workforce in the United States

Samir Hassanin, BA, Medical Student

Rijul Kshirsagar, Resident Physician

Toby Steele, MD

Jonathan Liang, MD, FARS

Kaiser Permanente

Background:

Six percent of practicing otolaryngologists are rhinologists. This is the first study investigating both the distribution of rhinologists in the United States and the sociodemographic characteristics that may predict practice location. We aim to describe the geospatial distribution of rhinologists and analyze sociodemographic characteristics associated with practice distribution.

Methods:

We conducted a cross-sectional study of 662 rhinologists queried from the 2020 American Rhinologic Society database. Rhinologist practice addresses were compared with ZIP code tabulation area (ZCTA) sociodemographic data from the 2010 US Census Bureau and 2014-2018 American Community Surveys. Geospatial mapping and multivariate statistics were employed to analyze which community characteristics were associated with greater densities of rhinologists in ZCTAs.

Results:

The largest and smallest densities of rhinologists were located in coastal areas and in the Central and Midwestern US, respectively. Population characteristics that significantly predicted a higher number of practicing rhinologists included: greater percentage of non-citizens and greater educational attainment (p<0.001). Population characteristics that significantly predicted a lower number of practicing rhinologists included: greater percentage of caucasians, median household income, and greater percentage of population aged 65 or older (p<0.001).

Conclusion:

Disparities in healthcare access in the US is evident and applies to rhinologic care. Through geospatial analysis, we show the distribution of rhinologists and the population characteristics that may be predictive of patients' access to rhinologic care.

9:06 am - 9:16 am

Q&A

PROGRAM ABSTRACTS

Rhinology Outcomes

Moderators: Waleed Abuzeid, MD; Joshua Levy, MD, FARS; Zara Patel, MD, FARS

9:16 am - 9:23 am

Factors associated with postoperative outcomes in pituitary surgery

Khodayar Goshtasbi, MS

Jack Birkenbeuel, Medical Student

Arash Abiri

Frank Hsu

Edward Kuan

University of California Irvine School of Medicine

Objectives:

To assess factors associated with short-term outcomes following minimally invasive pituitary resection.

Methods:

The 2005-2017 ACS-NSQIP database was queried for patients undergoing endoscopic (CPT=62165) or microscopic (CPT=61548) resection of pituitary tumors. Five-item modified frailty index (mFI) included history of diabetes, COPD, CHF, hypertension, and dependent functional status. Patients were binarized according to mean values for age (53.3 years), ASA score (2.59), BMI (31.4) and mFI (0.7).

Results:

A total of 1926 subjects (50.2% female, mean age 53.3±15.9 years) were included. Length of operation was significantly longer in patients with higher ASA class (159.9±83.8 vs. 145.8±82.0 minutes, $p<0.001$) and higher BMI (159.5±81.4 vs. 150.0±84.6 minutes, $p=0.016$). Length of hospitalization was significantly longer in patients with older age (4.8±9.0 vs. 3.9±8.1 days, $p=0.028$), higher ASA class (5.0±10.5 vs. 3.6±5.2 days, $p<0.001$), and higher BMI (4.9±8.1 vs. 4.0±8.9 days, $p=0.014$). Discharge to non-home facility was more common among patients with older age (5.6% vs. 1.6%, $p<0.001$), higher ASA class (5.5% vs. 1.6%, $p<0.001$), and higher mFI (5.2% vs. 2.4%, $p=0.003$). Surgical complications were more common in patients with higher ASA class (3.7% vs. 1.4%, $p=0.002$). Medical complications were more common in patients with older age (6.1% vs. 3.6%, $p=0.013$), higher ASA class (6.3% vs. 3.1%, $p=0.001$), and higher mFI (6.3% vs. 3.6%, $p=0.006$). Reoperation and readmission did not associate with any metric.

Conclusion:

Age, frailty, BMI, and ASA classification should be considered when evaluating and consulting patients for pituitary surgery, given these factors can associate with postoperative outcomes.

9:23 am - 9:30 am

Ecological momentary assessment of sinonasal outcomes

Victoria Lee, MD

Rachel Schusteff, Medical Student

Kamai Eldeirawi

Sharmilee Nyenhuis

University of Illinois at Chicago

Background:

Allergic rhinitis (AR) and chronic rhinosinusitis (CRS) rely on patient-reported symptoms and quality of life measures, which are subject to bias. Ecological momentary assessment (EMA) captures data in real-time through repeated short surveys, thus reducing errors/biases. Its use in sinonasal conditions has not been well-described, and the goal of this study was to examine the literature in EMA and AR/CRS.

Methods:

PubMed and Google Scholar databases were searched using the following search terms: AR, CRS and EMA. Inclusion criteria were multiple symptom entries/participant. Systematic reviews and non-full text articles were excluded. Sinonasal disease, population demographics, type of EMA platform used, type and severity of symptoms reported, medication use and symptom correlation with location/pollen/pollution were collected.

Results:

Eight studies met the inclusion criteria, and all were in AR. All studies were conducted outside the US in both children and adults. Seven studies used an app for reporting symptoms, and one used WeChat surveys. EMA data collection varied, with repetitive survey intervals determined either by patients ($n=6$) or research team ($n=2$). All studies reported sinonasal severity scores while 6 reported additional symptoms (e.g., ocular, pulmonary, sleep, general health). Five collected self-reported allergy medication use. Seven studies correlated symptoms with location, pollen or pollution.

Conclusions:

Few studies in AR and no studies in CRS assessed the use of EMA. EMA should be further explored in AR/CRS as clinicians and researchers rely on patient-reported symptoms to make treatment decisions. A better understanding of the contextual factors associated with these symptoms is also need.

PROGRAM ABSTRACTS

9:30 am - 9:37 am

Endoscopic sinus surgery in patients with comorbidities

Ariel Omiunu, BS
 Sudeepti Vedula, Medical Student
 Christina H. Fang, Rhinology Fellow
 Jean Anderson Eloy, MD, FARS
 Rutgers New Jersey Medical School

Introduction:

Endoscopic sinus surgery (ESS) is routinely performed for patients with various sinonasal conditions. Complication rates after ESS are relatively low, although the presence of comorbid conditions may increase the risk of adverse outcomes. Our aim is to evaluate the effect of common comorbidities on postoperative complications following ESS.

Methods:

The ACS-NSQIP database was queried for patients who underwent ESS procedures between 2005 and 2018. Common patient comorbidities (CHF, smoking, ASA classification of 3 or 4, ascites, COPD, and metabolic syndrome) were identified and analyzed using univariate analyses and multivariate logistic regression analyses.

Results:

There were 1620 cases of endoscopic sinus surgery identified. Of these patients, 890 (54.9%) patients presented with other common comorbid conditions. Patients with comorbidities had an increase in both medical (OR:7.314 [7.276-7.352], $P<0.001$) and surgical (OR:3.954 [3.940-3.969], $P<0.001$) complications. In addition, these patients also had an increased length of stay in the hospital (OR:1.040 [1.039-1.040], $P=0.001$) compared to those with no comorbidities.

Conclusion:

Patients presenting with comorbidities have an increase in both medical and surgical complications, as well as total length of stay in the hospital. When scheduling patients for surgery, this is an important factor to keep in mind as patients with these comorbidities may be better candidates for inpatient as opposed to outpatient surgery. When educating patients with comorbidities who are candidates for ESS, the patient should be informed about the likelihood of developing postoperative complications.

9:37 am - 9:44 am

A cross-sectional analysis of patient information and education on sinusitis

Kolin Rubel, MD
 Vincent Campiti,
 Timothy Shin
 Dhruv Sharma, Resident Physician
 Lauren Howser
 Jonathan Ting, MD, FARS
 Elisa Illing, MD, FARS
 Indiana University School of Medicine

Background:

Previous studies evaluating online educational tools for sinusitis have found poor actionability and understandability of information. There is little to no data available on how patients educate themselves on sinusitis and what prior knowledge they have learned. The purpose of the study was to evaluate new patients seen for sinusitis and to assess how these patients utilize health information.

Methods:

This was a cross-sectional analysis of 75 new patients being seen for sinusitis at a single institution by a Rhinologist. Subjected were provided the Problems Solving in Medicine Questionnaire (PSM), a validated questionnaire used to evaluate patient utilization of health information, and a supplemental 12 question survey on how they prefer to learn medical information and how they've utilized online audio-visual websites.

Results:

The study participants were separated into three groups based on age (18-40, 41-60, >60). The youngest group was found to seek information online more often ($p<0.001$ and $p=0.049$) and sought medical advice from friends and family more often ($p=0.024$ and $p=0.006$) when compared to the middle and older age groups. In-person visits with a physician were the preferred method of receiving information on sinusitis ($n=50$, 65.8%). 19 patients (25%) used online video resources for sinusitis education.

Conclusions:

There are significant differences between patients of different age in how they prefer to learn about sinusitis. For those that use online audio-visual material, there is a desire for more information on treatment options and surgical procedures. Understanding how patients educate themselves is critical in providing actionable and understandable health information.

PROGRAM ABSTRACTS

9:44 am - 9:51 am

The use of SN-5 to differentiate chronic rhinosinusitis and chronic adenoiditis in children

Norman Orabi, MD
Chadi Makary, MD, FARS
Hassan Ramadan, MD, FARS

Objective:

To differentiate chronic rhinosinusitis (CRS) and chronic adenoiditis (CA) based on patients sinonasal symptoms using the Sinus and Nasal quality of life survey (SN-5) in children.

Methods:

Children (age 12 and younger) presenting for chronic sinonasal symptoms were divided into 2 groups based on CT scan sinus findings: CA group were kids with CT LM score <5 and CRS group were patients with CT LM score of 5 and more. SN-5 scores for each group was then compared, and both groups were compared to a control group (children presenting with non-sinonasal complaints). Other demographic data were also collected.

Results:

There were 27 patients in the CA group, 42 patients in CRS group and 14 patients in the control group. Mean age for CA group was 6.9 years, 6.6 years for CRS group, and 6.6 years for the controls ($p=0.67$). The mean SN-5 score for the CA group was 3.4 (SE +/- 0.2) vs 4.5 (SE +/- 0.8) for the CRS group ($p<0.0001$). The control group had mean SN-5 of 1.8 ($p<0.0001$ when compared to both CA and CRS groups). CT LM score for the CA group was 2.7 vs 9.9 for the CRS group ($p<0.0001$). There was no difference in allergic rhinitis between the CA and CRS groups ($p0.459$), whereas asthma was statistically more common in patients with CRS ($p0.009$).

Conclusion:

Children with CRS have higher SN-5 score than children with CA. SN-5 score can be used clinically to help otolaryngologists differentiate between these two clinical entities.

9:51 am - 10:00 am

Q&A

10:00 am - 10:30 am

BREAK**Skull Base**

Moderators: Corinna Levine, MD, FARS; Benjamin Bleier, MD, FARS; Raj Sindwani, MD, FARS

10:30 am - 10:37 am

Outcomes of endoscopic resection of pediatric craniopharyngiomas

Tapan Patel, MD
James Palmer, MD, FARS
Nithin Adappa, MD, FARS
Bianca Rullan-Oliver, MD
Michael Kohanski, MD
Heather Ungerer, Research Assistant
John Lee, MD
Phillip Storm
University of Pennsylvania

Background:

Craniopharyngiomas have traditionally been treated via open transcranial approaches. More recently, endoscopic endonasal approaches have been increasingly used; however, there has been limited evaluation of long-term outcomes for this approach.

Methods:

A retrospective review was performed to analyze pediatric craniopharyngioma patients undergoing endonasal endoscopic resection from 2012-2020. Demographic information, clinicopathologic factors, and outcomes including long-term follow-up and recurrences were analyzed.

Results:

Forty-five patients with mean age of 7.9 years were included. The median follow-up time was 50.3 months. Mean tumor diameter was 4.3 cm. Majority of the tumors had suprasellar (95.6%) and intrasellar (73.3%) components. The most common presenting symptoms were vision changes (70.4%), headaches (55.6%) and increased intracranial pressure (46.7%). Most patients (73.3%) had their presenting symptoms resolved by their first postoperative visit. Vision improved or remained normal in 66.7% of patients. Postoperatively, incidence of panhypopituitarism or diabetes insipidus developed in 77.8% and 53.3% of patients, respectively. The postoperative cerebrospinal fluid leak rate was 8.9%. Recurrence rate was 6.7% at a median follow-up of 50.3 months. The recurrence rate reported in the literature for open transcranial approach ranges from 12-30% at 60 months.

Conclusion:

Endoscopic endonasal resection for pediatric craniopharyngiomas can achieve high rates of resection with low rates of disease recurrence when compared to the outcomes of open transcranial resection reported in the literature. However, hypothalamic-pituitary dysfunction remains a significant postoperative morbidity in both approaches.

PROGRAM ABSTRACTS

10:37 am - 10:44 am

Occult nodal involvement in sinonasal squamous cell carcinoma

Samer Elsamna, BA
 Mohamed Weldali
 Christina H. Fang, Rhinology Fellow
 Soly Baredes
 Jean Anderson Eloy, MD, FARS
 Rutgers New Jersey Medical School

Objectives:

Sinonasal squamous cell carcinoma (SNSCC) is an aggressive malignancy and the most common subtype of sinonasal cancer. While elective neck dissection is not typically performed for SNSCC, occult nodal involvement (ONI) may be present. We therefore sought to evaluate the incidence, predictive factors, and survival impact of ONI.

Study Design: Retrospective study of a national cancer registry.

Methods:

The National Cancer Database was queried for cases of SNSCC from 2004-2016. Data regarding patient demographics, clinicopathology, and treatment were obtained. Univariate and multivariate logistic regression and Kaplan-Meier analyses were conducted to identify predictors of ONI with odds ratios (OR) and survival.

Results:

699 patients met inclusion criteria. Most cases were elderly (>60 years-old) (56.4%), male (66.0%), white (87.0%), and insured with Medicare (43.9%). Cases of SNSCC most commonly involved the paranasal sinuses (67.7%), were T-Stage 4 (47.5%), moderately differentiated (51.0%), and underwent treatment at academic centers (75.4%). ONI was observed in 12.1% of cases. ONI negatively impacted survival to a statistically significant level (Log-rank $p < 0.001$). 3-year overall survival was 64.5% for cases with no ONI and 34.6% for cases of ONI. On univariate analysis, lymphovascular invasion (LVI), facility type, and distance to facility were significant predictors of ONI. On multivariate analysis, LVI was the sole predictor of ONI (OR: 7.29, 95% CI 3.70—14.35).

Conclusion:

Our study suggests ONI is a negative prognostic factor and may be relatively common (12.1%) in cases of SNSCC. Patients with identified LVI may benefit from END.

10:44 am - 10:51 am

Race, ethnicity, and socioeconomic status in esthesioneuroblastoma outcomes

Rahul Sharma, BS
 Alexandria Irace
 Jonathan Overvest, MD, PhD
 Justin Turner, MD, FARS
 Zara Patel, MD, FARS
 David Gudis, MD, FARS
 Columbia University Irving Medical Center

Introduction:

This study uses a national cancer database to explore how patient race, ethnicity, and socioeconomic status (SES) impact esthesioneuroblastoma outcome metrics including 5-year disease-specific survival (DSS), conditional disease-specific survival (CDSS), cancer stage at diagnosis, and treatment course.

Methods:

Esthesioneuroblastomas cases between 1973-2017 were included from the Surveillance, Epidemiology, End Results (SEER) registry. The National Cancer Institute Yost Index, a census tract-level composite score, was used to categorize the SES of patients. Kaplan-Meier analysis and Cox regression were conducted to assess DSS. CDSS was calculated from simplified Cox models. Logistic regression was used to identify risk factors for advanced cancer stage at diagnosis and the likelihood of receiving multimodal therapy.

Results:

Complete data were included for 561 patients. DSS was associated with SES (log-rank, $p < 0.01$) but not race. Using Cox regression, DSS was worse for the lowest SES tertile compared to the highest SES tertile (HR 1.70, 95% CI 1.05-2.75, $p = 0.03$). CDSS estimates demonstrated that prognosis did not improve with increased survival, but was different across SES tertiles. Patients of the lowest SES tertile exhibited an increased risk of advanced cancer stage at diagnosis compared to the highest SES tertile (OR 1.84, 1.06-3.30, $p = 0.035$). Black patients (OR 0.44, 0.24-0.84, $p = 0.011$) were less likely to receive multimodal therapy compared to other racial groups. SES was not associated with receiving multimodal therapy.

Conclusion:

SES significantly impacts DSS and CDSS for patients with esthesioneuroblastomas. Inequalities in access to care and treatment likely contribute to these disparities.

PROGRAM ABSTRACTS

10:51 am - 10:58 am

Impact of distant metastasis in sinonasal squamous cell carcinoma

Samer Elsamna, BA

Nour Fostok

Christina H. Fang, MD

Soly Baredes

Jean Anderson Eloy, MD, FARS

Rutgers New Jersey Medical School

Objectives:

Sinonasal squamous cell carcinoma (SNSCC) is the most common subtype of sinonasal cancer and often presents late in the disease course. The presence of distant metastasis (DM) is a poor prognostic sign. We therefore sought to determine the incidence, predictive factors, and impact on survival of DM at the time of diagnosis.

Study Design:

Retrospective study of a national cancer registry.

Methods:

The National Cancer Database was queried for cases of SNSCC from 2004-2015. Data regarding patient demographics, clinicopathology, treatment, and survival were obtained. Univariate and multivariate logistic regression and Kaplan-Meier analyses were conducted to identify predictors of DM with odds ratios (OR) and survival.

Results:

10,375 patients met inclusion criteria. Overall incidence of DM was 2.3%. 2.1% and 0.6% of cases were determined to have DM clinically and pathologically, respectively. 3-year overall survival was 57.6% for cases without DM and 17.4% for cases with DM (Log rank $p < 0.001$). On univariate analysis, race, insurance status, primary site, grade, T-Stage, and N-Stage were significant predictors of DM. On multivariate analysis, only T-Stage (2, OR: 5.46 [95% CI 1.52-19.57]; 3, OR: 8.02 [2.39-27.61]; 4, OR: 13.68 [4.18-44.82]) and N-Stage (2, OR: 3.50 [2.36-5.18]; 3, OR: 5.51 [1.56-19.47]) were determined to be significant predictors of DM.

Conclusion:

Distant metastasis in cases of SNSCC is rare and has a dismal prognosis. Our study identified T-Stage and N-Stage to be the sole predictors of DM. Given the poor associated prognosis, future studies should attempt to identify other factors associated with DM.

10:58 am – 11:05 am

Nasal cavity squamous cell carcinoma

Blaine Smith

Khalil Issa, MD

Jordan Teitelbaum, MD

Frances Wang

Feras Ackall, MD

Zoukaa Sargi, MD

Nosayaba Osazuwa-Peters

Sanjeet Rangarajan

Sin-Ho Jung

David Jang, MD

Ralph Abi Hachem, MD

Duke University Medical Center

Introduction:

Squamous cell carcinoma of the nasal cavity (NCSCC) is a rare, challenging malignancy. Surgical resection of this tumor can cause significant facial deformity, and indications for adjuvant or organ preservation therapies are not well-described.

Methods:

The National Cancer Database (NCDB) was queried for NCSCC from 2004-2014. Patient demographics, tumor characteristics, and treatment regimen were compared for the entire cohort. Multivariable Cox proportional hazards regression was performed for statistical analysis of treatment regimen and surgical margins on overall survival for early and late-stage disease.

Results:

A total of 1883 NCSCC patients were identified. The overall survival (OS) for the cohort was 83 months, and median age at diagnosis was 65 years. NCSCC patients who underwent surgery followed by adjuvant radiation therapy (RT) had a better OS compared to definitive RT (HR:0.58, $p < 0.001$). In early stage NCSCC (T1/T2, N0), there was no significant difference in OS between patients treated with surgery only or surgery with adjuvant RT compared to definitive RT. In advanced stage NCSCC, surgery with adjuvant RT had a better OS compared to definitive chemoradiation. Having positive margins was shown to predict a worse OS when compared to negative margins in surgical patients despite adjuvant RT or chemoradiation.

Conclusions:

NCSCC appears to be best treated with surgery followed by adjuvant RT in advanced disease whereas in early-stage disease, surgery does not have a superior OS compared with definitive RT.

11:05 am - 11:15 am

Q&A

PROGRAM ABSTRACTS

Skull Base Reconstruction

Moderators: Edward Kuan, MD, FARS; Eric Wang, MD, FARS; Bradford Woodworth, MD, FARS

11:15 am - 11:22 am

Endoscopic repair of anterior encephaloceles: A cost-effective alternative to craniotomy

Matthew Wu, BS
Fuad Baroody, MD, FARS
Christopher Roxbury, MD, FARS
University of Chicago Pritzker/Loyola Stritch

Introduction:

Anterior encephaloceles (AE) are rare neural tube defects, which are managed endoscopically (ES) or through craniotomies. Prior studies suggest that ES-treated AE have few surgical complications, but no studies have compared these approaches. Herein, we aim to assess surgical outcomes and healthcare costs with each approach.

Methods:

The Kids' Inpatient Database, the largest United States (US) public database of pediatric hospitalizations, was used to identify AE treated by craniotomies or ES from 2006-2016. Demographic data, hospital type, rates of perioperative adverse events (PAE), length of stay (LOS), and cost (total hospitalization and daily) were compared between both approaches.

Results:

A total of 72 treated AE were identified (craniotomy, n=47; ES, n=25). The mean age was 6.3±7.0 years. Most patients were male (58.3%) and white (45.8%). Craniotomy patients were significantly younger than ES patients (4.1 years vs 10.4 years; p=.002). Most patients were treated in urban teaching settings (88.9%) and electively admitted (73.6%). Compared to craniotomy patients, ES patients had a lower mean±SD total cost of hospitalization (\$96,297±117,419 vs \$168,989±166,306; p=.003) and lower mean±SD cost per day (\$17,586±12,529 vs \$23151±13886; p=.022). Patients who underwent craniotomies and ES had comparable mean±SD LOS (9±11 days vs 8±11 days, respectively; p=.187). The rates of PAE related to approach were comparable (ES vs craniotomy): infection (20.0% vs 10.6%; p=.301) and respiratory (20.0% vs 23.4%; p=1.000).

Conclusion:

This analysis of a nationally representative sample of patients managed for AE suggests that, compared to craniotomy, ES reduces healthcare expenditure with comparable outcomes and LOS.

11:22 am - 11:29 am

The role of fascia lata in complex skull base reconstruction: Emergence of a new workhorse

Firas Sbeih, MD
Satyan Sreenath, MD
Pranay Soni, MD
Troy Woodard, MD, FARS
Varun Kshetry, Assistant Professor of Neurological Surgery
Pablo Recinos, Associate Professor of Neurological Surgery
Raj Sindwani, MD, FARS
Indiana University

Background:

Multiple methods exist for skull base reconstruction of defects created by expanded endonasal approaches. While the nasoseptal flap (NSF) has been established as one of the workhorses in multi-layered reconstruction, other alternatives exist for initial dural reconstruction including fascia lata (FL), however, its distinct applications remain poorly characterized. We present our experience in utilizing FL, ranging from single or multi-layered avascular graft to vascularized free flap, for the reconstruction of challenging defects.

Methods:

Retrospective review was performed from May 2017 to March 2021 to identify all patients who underwent endoscopic skull base reconstruction using fascia lata.

Results: FL was employed for reconstruction in 43 patients: 25 undergoing primary endonasal skull base surgery and 18 revision cases. A wide range of pathology was treated, with meningioma being the most common. FL was utilized as a "button" graft with NSF (30/43, 69.8%) for multi-layered closure, exclusively single-layer or on-lay repair without NSF (10/43, 23.2%), and as FL free flap (3/43, 7.0%). Defects addressed included tuberculum sella/sphenoid planum (23/43, 53.5%), cribriform/planum (8/43, 18.6%), clivus (7/43, 16.3%), and craniocervical junction (5/43, 11.6%). Successful reconstruction was accomplished in 40/43 FL cases (93%), with only 3 cases (7%) requiring revision for post-op CSF leak. Donor site complications were rare with only 1 case (2.3%) of post-op seroma. Average follow-up was 23.2 months.

Conclusion:

Fascia lata offers a versatile option for the reconstruction of challenging defects with excellent outcomes and minimal morbidity. FL is emerging as the new workhorse in skull base reconstruction.

PROGRAM ABSTRACTS

11:29 am - 11:36 am

False negative rate of intrathecal fluorescein in CSF leak repair

Jeffrey Radabaugh, MD
 Zi Jiang
 Amber Luong, MD, PhD, FARS
 William Yao
 Karim Asi
 Swetha Jayavelu
 Martin Citardi, MD, FARS
 University of Texas Health Science Center at
 Houston: McGovern Medical School

Background:

Since its first description more 30 years ago, endoscopic techniques have become the preferred method for repair of anterior skull base cerebrospinal fluid (CSF) leaks. Intrathecal fluorescein (IF) has gained acceptance as an adjunct for both diagnosis and repair; however, optimal clinical indications for IF are not well described.

Methods:

A retrospective cohort study of 217 consecutive patients who underwent endoscopic CSF leak repair at a single institution. Patients in the IF group received 0.1mL of 100mg/mL fluorescein diluted in 10mL CSF following intubation. Sensitivity, specificity, and false negative rate (FNR) for the presence of fluorescein-stained CSF in the operative field were defined for each cohort. A multivariate analysis assessing disease- and patient-specific factors potentially affecting FNR was performed.

Results:

Of 217 patients who underwent endoscopic endonasal CSF leak repair, 98 utilized IF intraoperatively. IF was found to have a sensitivity, specificity, and FNR of 66.3%, 100%, and 33.4% respectively. Multivariate analysis showed that patients with a traumatic mechanism of injury had a significantly higher FNR when compared with other mechanisms ($p=0.041$, 95% confidence interval [CI], 1.0685-22.7876).

Conclusion:

IF's utility to successfully identify CSF leak location seems to reflect patient-specific factors, including CSF leak etiology. Based upon this information, surgeons may consider more selective use of IF during these procedures.

11:36 am - 11:43 am

Systematic review of olfactory preservation techniques in nasoseptal flap harvest

Suat Kilic, MD
 Satyan Sreenath, MD
 Pablo Recinos, Associate Professor of Neurological
 Surgery
 Varun Kshetry, Assistant Professor of Neurological
 Surgery
 Troy Woodard, MD, FACS
 Raj Sindwani, MD
 Cleveland Clinic

Background:

Several studies have described techniques aimed at mitigating olfactory dysfunction after nasoseptal flap (NSF) harvest for endoscopic skull base surgery (ESBS). No consensus exists as to whether popular methods including using cold-steel (CS) versus electrocautery (EC) or olfactory strip (OS) preservation offer an advantage. This systematic review was performed to examine the impact of these two technical variations of NSF harvest on postoperative olfactory outcomes.

Methods:

Under PRISMA guidelines, Pubmed, Scopus, and Web of Science were searched for articles reporting olfactory outcomes in ESBS cases employing a NSF. Original articles focusing on technique variations of the NSF and reporting at least 1 objective, olfactory measure were included.

Results:

Nine studies comprising 610 patients were included. Various, olfactory testing outcomes were reported, and post-op follow-up ranged from 6 weeks to 12 months. Three studies, 2 of which were RCTs, compared the use of CS and EC in making the superior limb incision of the NSF. No significant difference was found in objective olfactory function ($p>0.05$) when comparing these techniques. Five studies comprising 504 patients reported results from OS sparing. OS sparing technique in NSF harvest demonstrated maintenance of olfactory function (no smell loss) in the post-op setting when compared to pre-op measures ($p>0.05$), however, no direct comparison to non-OS sparing techniques was made.

Conclusions:

Overall, the use of CS as opposed to EC for the superior NSF incision does not appear to confer an advantage in preserving post-op olfactory function. In contrast, OS preservation may be associated with better olfactory outcomes in NSF harvest. Further study is needed.

PROGRAM ABSTRACTS

11:43 am - 11:50 am

Endoscopic endonasal eustachian tube obliteration for cerebrospinal fluid rhinorrhea

Ryan Rimmer, MD
 Jeremy Ciporen
 Justin Cetas
 Kara Detwiler
 Aclan Dogan
 Sachin Gupta
 Timothy Smith, MD, FARS
 Mathew Geltzeiler

Background:

Endoscopic endonasal eustachian tube obliteration (EEETO) is a valuable option for treating refractory cerebrospinal fluid rhinorrhea (CSFR) after lateral skull base surgery in patients without serviceable hearing. Several methods of EEETO are described but data is limited to case reports due to rarity of this complication. Our objective was to summarize available literature on EEETO focusing on technique and factors affecting success. We also contribute a new case series using knotless suture (V-loc™) technique.

Methods:

Retrospective chart review of EEETO using V-loc™ for CSFR at our institution from 2018-2021. Scoping review was performed by searching PubMed for articles on EEETO for CSFR. Patients were pooled for data syntheses.

Results:

Our institutional series contained 7 patients. Two patients (28.6%) required revision, but all were ultimately successful. Six studies were identified in scoping review for a combined total of 23 patients. Most initially underwent translabyrinthine (52.2%) resection of vestibular schwannoma (82.6%). Average time to initial CSFR was 362.6 days [SD ±1034.2, range 0 - 4320 days]. All patients underwent lumbar drain placement and 11 underwent prior surgical attempts. Initial success rate of EEETO was 65.2%. In 8 patients needing revision, EEETO was ultimately successful in 6. There were no differences in demographics or presentation between successful and revision cases. Seven different techniques were described.

Conclusion:

EEETO can treat CSFR following lateral skull base surgery. Revision surgery is common and difficult to predict. Several techniques have been described and V-loc™ suturing is a viable method with comparable success, but without the need for endoscopic knot tying.

11:50 am - 12:00 pm

Q&A

12:00 pm – 1:00 pm

Heinsbergen Room

Women in Rhinology / Residents & Fellows / Mentorship Lunch Program

Guest Speaker: Nina Shapiro, MD
 Professor of Head & Neck Surgery, Davide Geffen
 School of Medicine at UCLA
 Director of Pediatric Otolaryngology, Mattel
 Children's Hospital UCLA
 "Medical Communication to the Non-Medical
 Audience: Something We All Need to Practice"

PROGRAM ABSTRACTS

**Saturday,
October 2, 2021
1:00 pm – 4:20 pm
General Session
Crystal Ballroom**

1:00 pm - 1:40 pm

Panel: "Building a successful rhinology practice"

Moderator: Thomas Higgins, MD, FARS

Panelists: Greg Davis, MD, FARS; Winston Vaughan, MD, FARS; Danielle Warner, MD; Marc Dubin, MD, FARS; Douglas Reh, MD, FARS

1:40 pm - 2:20 pm

Rhinology Worldwide Panel

Jivianne Lee, MD, FARS; David Gudis, MD, FARS; Brent Senior, MD, FARS; Kibwei McKinney, MD; Angela Donaldson, MD, FARS; Jose Mattos, MD

2:20 pm - 3:00 pm

An ARS/AAOA Panel: "The US burden of rising health care cost - A case study in CRSwNP treatment"

Moderator: Michael Stewart, MD, FARS

Panelists: Lauren Roland, MD; Joshua Levy, MD, FARS; Michael Platt, MD

3:00 pm - 3:30 pm

BREAK

3:30 pm - 3:40 pm

Business Meeting and Presidential Citation

Joseph Han, MD, FARS, Michael Stewart, MD, FARS

3:40 pm - 4:20 pm

David W. Kennedy Lecture

Introduction: Rodney Schlosser, MD, FARS

Guest Speaker: David W. Kennedy, MD, FARS

"The introduction of endoscopic sinus surgery and the evolution of rhinology as a specialty"

6:00 pm - 8:00 pm

ARS Co-Sponsor of the 125th Anniversary

Celebration of the AAO-HNS

Red Carpet Joint Specialty Society President's

Reception at X-Box Plaza

in the heart of L.A. Live

POSTERS

Poster A001

70-degree endoscope in maxillary antrostomy

Firas Hentati, MD

Armine Kocharyan, MD

Richard Muller, MD

Jeremy Ruthberg, BA

Claudia Cabrera, MD

Brian D'Anza, MD

Kenneth Rodriguez, MD

Background and Objectives:

Following use of a 0° endoscope, a surgeon may either continue using a 0° endoscope or elect to switch to a 70° endoscope to complete a maxillary antrostomy. Incomplete dissection can lead to recirculation. The purpose of this study is to determine if endoscopic maxillary antrostomy can be completed exclusively with a 0° endoscope.

Methods:

Prospective study of 35 sinuses from 18 patients undergoing Functional Endoscopic Sinus Surgery (FESS) for Chronic Rhinosinusitis (CRS) between 11/1/2020 and 4/30/2021. Two fellowship trained Rhinologists initially performed maxillary antrostomies exclusively using a 0° endoscope, then transitioned to a 70° endoscope. Surgeons completed a survey to assess completion of the antrostomy prior to use of 70° endoscope, sinonasal anatomy, and difficulty of operation. Intraoperative photographs before and after using a 70° endoscope were evaluated by a third-party Rhinologist.

Results:

Of 35 sinuses from 18 patients all 35 sinuses had CRS with 48.5% having nasal polyposis and 42.9% having active infection. Incomplete dissection immediately posterior to the nasolacrimal duct was found in 82.9% of sinuses prior to using a 70° endoscope. The natural drainage pathway was incorporated into the dissection in 71.4% of sinuses before converting to 70° endoscope. Residual uncinat process was noted in 17.1% of sinuses prior to 70° endoscope use. Incomplete dissection with 0° endoscope was not associated with nasal polyposis ($p=0.084$) or uncinat position (0.741).

Conclusion:

Exclusive 0° endoscope use in FESS does not allow for complete dissection immediately posterior to the nasolacrimal duct. Thus a 70° endoscope is necessary for complete maxillary antrostomy.

POSTERS

Poster A002

Acute exacerbations, a CRS patient's perspective

Katie Phillips, MD
 Victoria Walker
 Michal Trope
 Antar Tichavakunda
 Ahmad Sedaghat, MD
 University of Cincinnati

Background:

Acute exacerbations of chronic rhinosinusitis (AECRS) are defined as a transient worsening of symptoms. This phenomenon has been studied from the physician perspective, yet the perspective of a key stakeholder—the patient—is not well elucidated. The objective was to understand AECRS from the patient perspective.

Methods:

Qualitative phenomenological study using constant comparative methodology was applied. Eight, one-on-one interviews with CRS patients ranging from 10 to 55 minutes in length were conducted. The content of the interview protocol was determined through iterative discussion. Two of the authors served as coders and a codebook was created and utilized to identify recurrent themes. The themes were analyzed for meaning and conclusions were summarized.

Results:

Recurring themes included: (1) patients identify with the terms “flare” or “sinus infection” more than “exacerbation”; (2) consistent with the current definition, patients identify AECRS as worsening of sinonasal symptoms, but also associate extranasal symptoms of CRS—including poor sleep, fatigue, lower respiratory exacerbation and malaise—with AECRS; and (3) patients describe AECRS as a significant determinant of decreased quality of life, worse general health and decreased productivity.

Conclusions:

Beyond a transient worsening of symptoms, AECRS are more complex with associated systemic manifestations and functional consequences. AECRS have a significant impact on patients and therefore understanding this component of CRS is pivotal in effectively managing CRS. The present study also demonstrates the utility of employing qualitative inquiry to understand ACERS and the patient experience with greater precision and nuance.

Poster A003

Balloon septoturbinotomy

Alexander Farag, MD, FARS
 Barak Spector, Student Assistant
 Zhenxing Wu, Dr.
 Jillian Krebs
 Jen Malik, PhD
 Kai Zhao, Professor
 Bill Kane
 The Ohio State University

Introduction:

Nasal obstruction often involves nasal septal deformity (NSD) and inferior turbinate hypertrophy (ITH). Herein, we report our experience using the RELIEVA TRACT™ Balloon Dilation System to address nasal obstruction in through central repositioning of the lower nasal septum and full length outfracturing of the inferior turbinates (IT) to increase the intra-nasal cross-sectional diameter in human cadavers.

Methods:

Ten cadavers with NSD underwent bilateral nasal cavity dilation with RELIEVA TRACT™. To assess anatomical alterations post-dilation, endoscopic, CT, and Computational Fluid Dynamic (CFD) were performed both pre and post procedure.

Results:

Anatomic alterations produced in the nasal cavity appear to correlate with an average increase in nasal volume of 35% (26% decrease in nasal resistance). The observed extent of IT outfracture was uniform and complete in 9 of 10 cadavers. The change in the nasal airway was independent of preexisting nasal septal deviation. Of note, 20% (2 of 10) had identifiable high septal/nasal fractures which extended to the skull base.

Conclusion:

The results suggest that using RELIEVA TRACT™ to address nasal obstruction attributed to a computational improvement in nasal obstruction, however the safety and efficacy in human application will need further study.

POSTERS

Poster A004

Baseline blood eosinophil level is not a biomarker for CRSwNP severity or response to dupilumab

Claus Bachert, MD
 Peter Hellings
 Wytse Fokkens, MD
 Larry Borish
 Adam DeConde, MD
 Haixin Zhang
 Scott Nash
 Asif Khan
 Juby A. Jacob-Nara
 Paul J. Rowe
 Yamo Deniz
 Ghent University
 Ghent, Belgium

Background:

IL-4 and IL-13 are key and central drivers of type 2 inflammation, which is often characterised by biomarkers such as eosinophils. This analysis aimed to determine the association between baseline blood eosinophil levels and CRSwNP outcomes at baseline and after dupilumab treatment, in patients with severe CRSwNP from the Phase 3 studies SINUS-24 (NCT02912468) and SINUS-52 (NCT02898454).

Methods:

Blood eosinophils were measured at baseline. CRSwNP severity was assessed using nasal polyp score (NPS, range 0–8), nasal congestion score (NC, 0–3), and University of Pennsylvania Smell Identification Test (UPSIT, 0–40). Associations between blood eosinophil level and CRSwNP outcomes were assessed using Spearman correlation.

Results:

Mean blood eosinophils (giga/L) at baseline were 0.44 in SINUS-24 and 0.43 in SINUS-52. Using pooled data from SINUS-24 and -52, baseline eosinophil levels were very weakly or weakly correlated with baseline NPS (Spearman correlation: 0.045 [dupilumab arm]; 0.144 [placebo]), NC (0.127; 0.072), and UPSIT (-0.209; -0.218). In SINUS-52, baseline eosinophil levels were very weakly correlated with changes from baseline with dupilumab at Week 52 for NPS (Spearman correlation -0.170), NC (-0.182), and UPSIT (0.164); similar results were observed for changes from baseline at Week 24.

Conclusions:

These findings suggest that there was little association between baseline blood eosinophil levels and CRSwNP severity as assessed by NPS, NC, and UPSIT score at baseline or between baseline blood eosinophil levels and change from baseline in these measures of disease over 52 weeks of treatment with dupilumab.

Poster A005

Caffeine consumption and rhinitis

Michael DeBakey, MS
 Nrusheel Kattar, Postgraduate Research Fellow
 Steven Wang, Resident
 Edward McCoul, MD, FARS
 Tulane University School of Medicine

Introduction:

Caffeine has been implicated as an exacerbating factor in numerous medical conditions. Little has been reported about the effects of caffeine on sinonasal symptoms. We sought to describe the association of caffeine consumption with patient-reported sinonasal symptoms.

Methods:

A cross-sectional study was performed on consecutive patients 18 years of age and older who presented to a tertiary rhinology practice between February and April 2021. Each subject completed a caffeine use survey and the Sinonasal Outcome Test (SNOT-22). Quantity and frequency of caffeine consumption, along with demographic information, were obtained. Ordinal regression analysis was used to associate the clinical variables.

Results:

139 patients completed the survey, consisting of 50% females. The mean (standard deviation) age was 54 (16) years. The most commonly consumed caffeinated beverage was coffee (78.9%), followed by tea (58%), sodas (56%) and energy drinks (11.6%). The total SNOT-22 score did not differ by gender, age or ethnicity. Consumption of caffeinated soda less than once a day was associated with lower total SNOT-22 score and SNOT-22 rhinologic subdomain scores compared to greater consumption ($p < 0.05$). Conversely, consumption of caffeinated tea products less than once a day was associated with higher ear/facial, psychologic, and sleep SNOT-22 subdomain scores compared to greater consumption ($p < 0.05$).

Conclusion:

Low consumption of soda and caffeinated tea products may be associated with varying severity of patient-reported sinonasal symptoms. Further study is needed to explore the relationship of caffeine consumption with other aspects of diet and sinonasal health.

POSTERS

Poster A006

Canine endoscopic sinonasal surgery

Charles Riley, MD

Tiffany Kimbrell

Anthony Tolisano

David Gudis, MD, FARS

Walter Reed National Military Medical Center

Background:

In the canine species, olfaction has been harnessed by humans to perform critical tasks including security of our nation's bases and operating posts around the world. This case describes a career-saving endoscopic sinonasal surgery on a military working dog (MWD) performed by a human otolaryngology team in collaboration with a veterinary medicine team.

Methods:

A 6-year-old male Yellow Labrador Retriever MWD refluxed into his nasopharynx upon extubation following routine dental cleaning that resulted in his bomb-sniffing detection rate decreasing from 98%pre-reflux to 60%post-reflux. He was treated with 6-months of medical therapy without improvement. A computed tomography scan showed a non-circumferential cicatrix of the nasopharynx. To save his career, a tertiary otolaryngology team performed a nasal endoscopy with steroid injection, balloon sinus dilation, and placement of a stent that was removed after six weeks. After the procedure, repeat bomb-sniffing detection was 99%. The MWD is back at The Pentagon providing daily security.

Results:

This case represents a unique collaboration between human physicians and veterinarians. The combined medical approach and communication between services was critical. This case discusses many of the challenges and offers recommendations for physicians who may be involved with similar care of animals in the future.

Conclusion:

The success of the surgical treatment of this MWD's career-threatening sinonasal condition required many experts, and application of our knowledge of human sinonasal conditions and anatomy to the canine species. The trust, communication, and teamwork between services allowed successful surgery, which in turn conserved a vital asset for the Department of Defense.

Poster A007

CFTR mutations in patients with CRS: A systematic review

Michael Yong, MD, MPH, MBA

Juan Carlos Hernaiz-Leonardo, Dr.

Marwan Alqunae, Dr.

Bradley Quon, MD

Amin Javer, MD, FARS

University of British Columbia

Background:

Cystic fibrosis is an inherited disorder that can lead to severe airway disease, including difficult-to-control forms of chronic rhinosinusitis. Undetected cystic fibrosis transmembrane regulator (CFTR) mutations, while sometimes not leading to a clinical CF phenotype, may predispose individuals to develop CRS independent of formal CF diagnosis. A formal evaluation of the literature estimating the prevalence of CFTR mutations in patients with CRS has not been previously performed.

Methods:

A systematic search of the literature was performed according to the PRISMA guidelines. Studies had to identify a sample of patients previously diagnosed with CRS but not with CF, and report testing for the prevalence of CF or the CFTR gene mutation in these patients. A formal risk of bias and a meta-analysis of the data were then performed to calculate pooled estimates for the prevalence of any CFTR mutation and for the DF508 mutation.

Results:

6 articles were included in the final analysis. The studies represented four different countries: the US, France, Poland, and Finland. The pooled prevalence of CFTR mutations of any kind in CRS subjects without CF was 5.65% (RE 95% CI 2.99 – 10.41). The overall prevalence for the dF508 mutation was 4.22% (RE 95% CI 1.71 – 10.07). These estimates were significantly higher than the baseline estimated prevalence of CFTR carrier status of 3-4% in the general population.

Conclusion:

Our analysis demonstrates that the prevalence of CFTR mutations among patients diagnosed with CRS is higher than the CFTR carrier status in the general population. A higher index of suspicion for CFTR mutations among CRS patients may be reasonable and may entail a greater shift to a multidisciplinary approach.

POSTERS

Poster A008

Chronic rhinosinusitis with nasal polyposis patients receiving monoclonal antibody therapy

Mohamad Babi, MD
 Thomas Higgins, MD, FARS
 Kathleen Sheeley
 University of Louisville

Introduction:

Chronic rhinosinusitis with nasal polyposis (CRSwNP) can be difficult to treat. Monoclonal antibody therapy is a relatively new treatment option that is not sufficiently studied from a patient population standpoint. This study aims to retrospectively evaluate the characteristics and symptoms of patients that have been chosen to receive monoclonal antibodies in a clinical setting. The goal is to help clinicians gain a better understanding of which patients to start monoclonal antibody therapy on.

Methods:

Case-control study of postoperative CRSwNP patients comparing those treated with monoclonal antibodies to controls that were not. Patient symptoms and characteristics associated with the recommendation of starting monoclonal antibody therapy were identified and compared using a retrospective medical-records and questionnaire review. Multiple quantitative and qualitative variables were collected and IBM SPSS software was used for statistical analysis.

Results:

238 patients with CRSwNP were retrospectively analyzed. 26 of these patients were found to have been placed on a monoclonal antibody for type II inflammation. The biologic group had a significantly higher rate of comorbid asthma (80.8%, OR = 19.9, $P < 0.001$) and aspirin-exacerbated respiratory disease (AERD) (42.3%, OR = 4.4, $P < 0.001$). Age and gender failed to reject the null, but higher mean age and female predominance were evident in the biologic group.

Conclusion:

Our results suggest that patients placed on monoclonal antibody therapy were more likely to have certain co-morbidities such as asthma and AERD when compared to the control group. These findings may have clinical implications when choosing which patients to start monoclonal antibody therapy on.

Poster A009

Differences in clinical presentation for patients with frontal sinus mucoceles

Dhruv Sharma, MD
 Jonathan Tyes
 Thomas Higgins, MD, FARS

Objective:

Paranasal sinus mucoceles occur most often in the frontal sinus. Both frontal sinus mucoceles (FSM) and chronic rhinosinusitis (CRS) can lead to an array of sinonasal symptoms as well as endoscopy and radiographic findings. The purpose of this study is to compare patients with FSM and frontal sinus CRS with nasal polyposis (FS-CRSwNP) to see if there are significant differences in clinical presentation.

Methods:

A retrospective cross-sectional study was conducted. Patients age 18 years or older who were taken to the operating room for frontal sinus surgery and found to have either FSM (N=16) or FS-CRSwNP (n = 27) were included. Pre-operative 22-item SinoNasal Outcome Test (SNOT-22), Lund-MacKay, and Lund-Kennedy Endoscopy scores were compared. Statistical analysis was performed using SPSS Statistics with Mann-Whitney U tests for comparison.

Results:

Patients with FSM had a significantly lower total SNOT-22 (U = 107.5, $P = .017$), Rhinologic subdomain (U = 103.0, $P = .012$), SNOT-22 Extra-Rhinologic subdomain (U = 89.0, $P = .003$), Lund-MacKay (U = 29.0, $P < .001$), and Lund-Kennedy Endoscopy (U = 30.5, $P < .001$) scores. Patients with FSM reported worse headaches with statistical significance (U = 262.0, $P = .01$). There were no significant differences in age, facial pain, facial pressure, facial swelling, and SNOT-22 Ear/Facial Pain, Psychiatric, Sleep subdomain scores between the two groups.

Conclusion:

Patients who undergo surgery for frontal sinus mucoceles and CRSwNP have significant differences in clinical presentation.

POSTERS

Poster A010

Dupilumab improves sense of smell in CRSwNP patients with 0, 1, 2, or ≥ 3 prior surgeries

Joaquim Mullol, MD, PhD
 Claus Bachert, Professor
 Martin Desrosiers, Professor
 Joseph Han, MD, FARS
 Roger Jankowski, Professor
 Nadia Daizadeh
 Shahid Siddiqui
 Nikhil Amin
 Leda P. Mannent
 Asif Khan, Dr.
 Siddhesh Kamat, Mr.
 Hospital Clínic, IDIBAPS, Universitat de Barcelona

Background:

Loss of smell (LoS) is a difficult-to-treat symptom in patients with chronic rhinosinusitis with nasal polyps (CRSwNP).

Methods:

University of Pennsylvania Smell Identification Test (UPSIT; 0-40), daily-assessed LoS score (0-3), and percentage with anosmia (UPSIT ≤ 18) were assessed according to number of prior sinonasal surgeries (SNS) in patients treated with dupilumab 300 mg every 2 weeks or placebo in the pooled phase 3 studies SINUS-24 and SINUS-52 (NCT02912468, NCT02898454).

Results:

At baseline, patients with 0/1/2/ ≥ 3 prior SNS (n=265/254/94/111) had mean UPSIT 16.02/12.87/12.97/12.49, mean LoS score 2.65/2.76/2.81/2.83, and percentage with anosmia was 64.9/83.1/78.7/84.7, respectively. Dupilumab significantly improved UPSIT from the first post-baseline assessment (Week 2 LS mean differences vs placebo: +6.70/+5.38/+5.57/+3.45; all $P < 0.01$), through Week 24 (+10.45/+11.04/+12.13/+8.71; all $P < 0.0001$). Dupilumab also significantly improved LoS (LS mean differences vs placebo -0.28/-0.27/-0.38/-0.32 at Week 2, all $P < 0.05$; and -0.96/-1.14/-0.98/-0.98 at Week 24; all $P < 0.0001$). Percentage of patients with anosmia was reduced with dupilumab to 31.3/47.1/43.6/60.9 at Week 2 and 18.7/30.1/25.5/40.6 at Week 24 vs 57.6/74.3/69.2/83.0 and 64.6/78.2/71.8/87.2 respectively, with placebo.

Conclusions:

Patients with prior SNS had worse sense of smell at baseline. Dupilumab produced rapid and sustained improvement in sense of smell in patients with CRSwNP regardless of number of prior surgeries.

Poster A011

Endoscopic oro-antral fistula repair

Yu-Hsuan Lin, MD
 Yu-Po-Fu Chen
 Ching-Yuan Huang

Oroantral fistula (OAF) is not uncommonly seen after extraction of upper molar tooth. Though several promising techniques were proposed, combined procedures are usually necessary to close fistula as well as to treat sinusitis. However, when most of them mainly focus on transoral approaches with OAF repair, very few studies address single endonasal endoscopic surgery (EES). In this investigation, we report our successful experience using ESS for two OAF cases who had uncontrolled sinusitis and persistent fistula after transoral repairs. The averaged size of OAF is 7.1mm (7.5mm and 6.7mm, respectively). We address the defects through modified endoscopic medial maxillectomy (MEMM) by preserving naso-lacrimal duct and inferior turbinate. After removing the diseased maxillary sinus mucosa, the fistulas were repaired by a free bone graft and a mucoso-osteal graft harvested from medial maxillary wall. Successful closures after a single procedure were achieved in both cases. No complication or recurrence was observed after 4-month follow-up. To conclude, we found single ESS through MEMM is feasible to salvage patients who have small-to-median sized OAF failed prior trans-oral repairs.

POSTERS

Poster A012

Endoscopic removal of a nasal septal pleomorphic adenoma: A case report and literature review

Hannah Case

Angela Donaldson, MD, FARS
Osarenoma Olomu, MD

Pleomorphic adenoma is one of the most common benign tumors of the major salivary glands. Eighty percent of these tumors arise from the parotid gland. Rarely (8%), these adenomas arise from minor salivary glands such as those found in the nasal mucosa. To date, there have been 41 cases of nasal septal pleomorphic adenomas reported in the literature. Excision of nasal septal tumors can be achieved by lateral rhinotomy, mid-facial degloving, transpalatal surgery, and, more recently, endoscopic surgical approaches. The mid-facial degloving technique serves as the gold standard; however, endoscopic excision has been associated with lower morbidity, reduced intraoperative bleeding, reduced hospital length of stay, improved tumor margin visualization, and lower recurrence rates. There are only 3 reports of the use of an endoscopic approach to resect pleomorphic adenomas of the nasal septum. In this case report, we describe our endoscopic technique for the removal of a 6.2 cm pleomorphic adenoma of the nasal septum in a 35-year-old female. We also review the current literature to compare outcomes and complications of mid-facial degloving versus endoscopic surgical techniques in the resection of nasal septal tumors. The endoscopic approach used in this case adds to the previous literature on alternatives to mid-facial degloving for the removal of nasal septal tumors.

Poster A013

ENT visits and procedures in COVID recoveredDennis Tang, MD
Arthur Wu, MD, FARS
Matthew Lee
Cedars-Sinai

Introduction:

The COVID-19 pandemic had severely affected the practice of medicine. The field of otolaryngology was disproportionately affected due to concerns of aerosolization during examinations and procedures in the ear, nose, and throat.¹⁻² Multiple guidelines were published to provide guidance on performing procedures safely in the COVID-19 era.³⁻⁴ However, no study has specifically looked at the timing of visits and procedures in COVID-19 recovered patients. The goal of this study was to observe the timing and safety of otolaryngologic clinic examinations and procedures in COVID-19 recovered patients.

Methods:

A retrospective analysis of all patients seen in a tertiary care otolaryngology clinic between January 1, 2020 and February 28, 2021 was performed. Inclusion criteria included all patients with a previous positive COVID-19 test prior to the clinic visit. Data was collected on timing of the visit, visit complaint, procedures performed, and COVID-19 infection rate of practitioners.

Results:

52 patients were seen in otolaryngology clinic after confirmed COVID-19 test. The numbers of days after the confirmed COVID-19 test and the date of the visit ranged from 10 to 239 days with a median value of 49 days. 11 patients had a positive COVID-19 test within 30 days of the visit. A total of 26 procedures were performed including nasal endoscopies, nasal debridements, and laryngoscopies. Individual practitioners personal protective equipment varied but the majority used N95 or equivalents during procedures. Of the 10 practitioners, 0 practitioners had developed COVID-19.

Conclusion:

Evaluating and performing otolaryngologic procedures on COVID-19 recovered patients is safe as soon as 10 days after a positive COVID-19 test.

POSTERS

Poster A014

Epistaxis in CPAP patients

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Background:

The gold standard of treatment for moderate to severe obstructive sleep apnea (OSA) is continuous positive airway pressure (CPAP). One commonly cited side effect of CPAP use is epistaxis.

Objectives:

To analyze whether or not epistaxis is common in patients undergoing CPAP therapy, report on the overall compliance rate amongst CPAP patients, and compare those patients to non-compliant patients that then receive UAS surgery.

Study Design:

Retrospective chart review at a large tertiary academic center.

Subjects and Methods:

A single-center, retrospective chart review from November 2014 – March 2021 was conducted on all patients seen by the Sleep Medicine service with OSA and cross-referenced with those patients who presented to the Otolaryngology service with a chief complaint of epistaxis. Baseline demographic data, previous medical management, comorbidities, risk factors, anticoagulation status, CPAP use, CPAP settings, and need for UAS surgery were collected on all 546 patients.

Results:

286 patients were placed on CPAP therapy, while 252 patients underwent UAS surgery. After removing all anticoagulated patient and those with a thrombotic disorder, 194 CPAP patients and 158 UAS patients were included in the study. Of the 194 CPAP patients, 7 presented to the Otolaryngology service with epistaxis following CPAP initiation, compared to 0 of the 158 UAS patients ($p < 0.0001$).

Conclusions:

With CPAP usage linked to epistaxis, this study shows that patients using CPAP are at a statistically significant increased risk of experiencing epistaxis compared to UAS patients. Still, only 7 of the 194 CPAP patients (3.6%) experienced epistaxis, indicating the low likelihood of epistaxis occurring following CPAP initiation.

Poster A015

Impact of asthma status on outcomes and cost in pediatric acute rhinosinusitis management

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Background:

To investigate the associations between asthma status and management costs and outcomes in pediatric patients hospitalized with acute rhinosinusitis.

Methods:

Retrospective database review. The 2016 Kid's Inpatient Database (KID) was used to identify pediatric patients hospitalized with acute rhinosinusitis (ICD-10: J01) and asthma status (ICD-10: J45). Orbital and intracranial complications were identified through ICD-10 codes. Statistical associations across asthma status were determined via univariate and multivariate analyses.

Results:

A total of 4,352 patients aged 0-20 years were identified with acute rhinosinusitis, of whom 912 had asthma. Patients with asthma were older than those without (Mean 10.14 vs. 9.52 years, $p = 0.005$). Multivariate analysis indicated that patients with asthma had lower total charges (Mean \$46,344.36 vs. \$76,288.87, $p < 0.001$), shorter length of stays (LOS) (4.97 vs. 6.28 days, $p = 0.003$), and a lower number of procedures undergone (1.36 vs. 1.78, $p < 0.001$). Patients with asthma had a lower risk for developing orbital complications (OR 0.515, 95% CI 0.401–0.662, $p < 0.001$) and intracranial complications (OR 0.587, 95% CI 0.399–0.863, $p = 0.007$). There was no significant difference in mortality between patients with and without asthma (OR 0.443, 95% CI 0.101–1.935, $p = 0.279$).

Conclusions:

In a cohort of pediatric patients hospitalized with acute rhinosinusitis, those with asthma had lower total charges, shorter LOS, fewer number of procedures undergone, and a lower risk of orbital and intracranial complications. Further research is needed to understand the cause of these associations, which may include earlier presentation or more aggressive treatment in patients with asthma.

POSTERS

Poster A016

Impact of asthma status on outcomes and cost in pediatric nasal polyp management

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Background:

To investigate the impact of asthma status on the costs and outcomes in pediatric patients hospitalized with nasal polyps.

Methods:

The 2016 Kid's Inpatient Database (KID) was queried for pediatric patients hospitalized with nasal polyps (ICD-10: J33) and asthma status (ICD-10: J45) in a retrospective database review. Complications were identified through ICD-10 codes. Univariate and multivariate analyses were used to identify statistical associations across asthma status.

Results:

Of the 542 patients identified with nasal polyps, 172 had asthma. Those with asthma were older than those without (Mean 13.47 vs. 12.48, $p=0.037$). Multivariate analysis indicated that patients with and without asthma had similar total charges (\$80,067.39 vs. \$101,863.75, $p=0.217$) and length of stays (LOS) (7.72 vs. 8.89 days, $p=0.365$). Those with asthma underwent a fewer number of procedures (3.30 vs. 4.04, $p=0.017$). Patients with asthma were less likely to undergo an excision procedure within the ear, nose, and sinus (OR 0.599, 95% CI 0.381–0.944, $p=0.027$). Patients with and without asthma had similar odds for developing pneumonia (OR 1.185, 95% CI 0.709–1.981, $p=0.517$) and bronchiectasis (OR 0.729, 95% CI 0.407–1.307, $p=0.289$). Those with asthma had a lower risk for developing acute sinusitis than those without (OR 0.333, 95% CI 0.148–0.751, $p=0.008$).

Conclusions:

In this cohort of pediatric patients hospitalized with nasal polyps, those with asthma underwent fewer procedures and had decreased odds for developing acute sinusitis and for undergoing an excision procedure within the ear, nose, and sinus compared to those without asthma. Further investigation is required to delineate the cause of these associations.

Poster A017

Impact of comorbidities on 30-day outcomes after TSS

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Introduction:

Endoscopic transsphenoidal surgery (TSS) is a common procedure for removal of pituitary and anterior skull base tumors, however data related to adverse outcomes are mostly limited to single-surgeon or single-institution studies. Therefore, our aim is to analyze the impact of common comorbid conditions on 30-day outcomes following TSS using a large national database.

Methods:

The 2005-2018 ACS-NSQIP database was queried for patients undergoing TSS using the CPT codes 62125 and 61548. Common patient comorbidities (CHF, smoking, ASA classification of 3 or 4, ascites, COPD, and metabolic syndrome) were identified and analyzed using univariate analyses and multivariate logistic regression analyses.

Results:

There were 2154 cases of TSS identified. Of these cases, 436 (66.7%) patients met the criteria for having a comorbid condition. Patients with comorbidities had an increase in medical complications (OR:2.371 [2.364-2.379], $P<0.001$). One of most common and significant of these complications was the development of pneumonia (OR7.711 [7.617-7.807], $P=0.048$). In addition, these patients also had an increased rate of surgical complications (OR:2.230 [2.229-2.248], $P=0.023$), specifically bleeding transfusion complications (OR:2.488 [2.475-2.502], $P=0.044$).

Conclusion:

This study showed the increase in medical and surgical complication in patients with underlying comorbidities. When educating patients about the possible post-operative complications of TSS, it is important to account for these factors to help patients better understand their recovery process.

POSTERS

Poster A018

Impact of Cystic Fibrosis on outcomes and cost in pediatric nasal polyp management

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Background:

Cystic fibrosis (CF) is commonly associated with nasal polyps and chronic rhinosinusitis. This study investigates associations between CF and management costs and outcomes in pediatric patients hospitalized with nasal polyps.

Methods:

In a retrospective database review, the 2016 Kid's Inpatient Database (KID) was queried for pediatric patients hospitalized with nasal polyps (ICD-10: J33) and CF status (ICD-10: E84). Complications were also identified via ICD-10 codes. Univariate and multivariate analyses were used to determine statistical associations across CF status.

Results:

542 patients were identified with nasal polyps, of whom 291 had CF. Patients with CF were older than those without (Mean 13.62 vs. 11.83 years, $p < 0.001$), more likely to be female (56.7% vs. 40.6%, $p < 0.001$), and more likely to be white (83.1% vs. 48.0%, $p < 0.001$). Multivariate analysis indicated that those with CF had similar total charges to those without (\$104,184.69 vs. \$84,165.41, $p = 0.311$) and a similar number of procedures undergone (3.99 vs. 3.59, $p = 0.746$). Those with CF had longer length of stays (LOS) (9.91 vs. 6.90 days, $p = 0.039$). Patients with CF had a longer wait until their first procedure than those without (3.29 vs. 1.64 days, $p < 0.001$). Those with CF had decreased odds for developing acute sinusitis (OR 0.214, 95% CI 0.102–0.448, $p < 0.001$).

Conclusions:

In this cohort of pediatric patients hospitalized with nasal polyps, a majority had CF; those with CF had longer LOS, longer wait until their first procedure, decreased odds for developing acute sinusitis but similar total charges and a similar number of procedures undergone. Our results indicate that the management of patients with nasal polyps varies by CF status.

Poster A019

Incidence and implications of HPV tumor status in non-squamous cell carcinoma sinonasal malignancies

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Introduction:

Though some clinical associations have been made between sinonasal squamous cell carcinoma (SCC) and human papilloma virus (HPV), the relationship between HPV tumor status and other sinonasal pathologies is still uncertain. We aimed to use the National Cancer Database (NCDB) to define the incidence and potential survival implications of high-risk HPV subtypes among non-SCC sinonasal tumors.

Methods:

NCDB was queried for sinonasal cavity tumors (C300, C310-319). Patients were included if treated with curative intent and had known histopathology and HPV subtype. The top 10 most prevalent sinonasal histopathologic subtypes were included, while SCC and those of hematopoietic origin were excluded. Tumors were deemed HPV positive if they tested positive for a high-risk subtype, and negative if tested negative or positive for only a low-risk HPV subtype. Prevalence of HPV positivity was assessed, and impact on survival was evaluated by multivariable Cox regression.

Results:

A total of 533 (6.29%) patients out of 8469 in the study cohort underwent some form of HPV testing. The total HPV+ rate was 8.82% ($n = 45$); with highest rates in sinonasal undifferentiated carcinoma (16.47%; $n = 14$), adenoid cystic carcinoma (17.81%; $n = 13$), and carcinoma NOS (12.99%; $n = 10$). No significant differences were observed between the HPV+ and HPV- cohorts in mean age, gender, ethnicity, insurance status, or Charlson Comorbidity Score. In multivariate cox analysis of survival, HPV+ status was not found to be predictive of overall survival (hazard ratio=0.835; 95% CI 0.349-1.996).

Conclusions:

HPV tumor status was not correlated with overall survival among non-SCC sinonasal tumors, and routine testing may not be indicated.

POSTERS

Poster A020

Internal carotid artery pseudoaneurysm and blow-out secondary to chronic invasive fungal sinusitis

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Angioinvasion is a hallmark of zygomycotic infections. Defective host immune responses increase susceptibility to fungal invasion and damage. The proximity of the ICA in the sphenoid sinus predisposes it to injury. In this case report, we present a case of an ICA pseudoaneurysm and blowout due to chronic IFS. A 71-year-old female with poorly controlled diabetes presented with headache and left blurry vision. Sinus CT scan demonstrated a moth-eaten appearance to the central skull base and nasal endoscopy revealed purulent discharge from the sphenoethmoidal recess. FESS found necrotic bone concerning for chronic IFS. IV liposomal amphotericin B and oral isavuconazonium sulfate were started. Hospital course was complicated by a left MCA territory ischemic stroke, and Aspirin and Plavix were started. On postoperative day 17, the patient was readmitted with refractory large volume epistaxis; at this time, DAPT was discontinued. On postoperative day 22, patient was readmitted with acute worsening of LMCA syndrome, and MRI brain showed an increase in ischemic foci. CTA head showed left cavernous ICA pseudoaneurysm. After another episode of massive epistaxis, she was taken to the OR and found to have bleeding from the L ICA that was controlled with a muscle patch. Postoperative cerebral angiogram showed no bleeding. One week later, nasal packing was removed, and muscle patch was healing well with no sign of bleeding. ICA pseudoaneurysm and blow-out is a rare life-threatening complication of chronic IFS with variable mortality rates. Prevention of vascular complications related to IFS in high-risk patients should be focused on early detection, management of comorbidities, and aggressive treatment in the setting of high clinical suspicion.

Poster A021

Intranasal budesonide delivered by nasal nebulizer compared to a sinus rinse

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Introduction:

Budesonide nasal irrigation is used for the management of patients with chronic rhinosinusitis and the therapeutic effectiveness of this treatment has become accepted part of standard care. The objective of this study was to compare the mass of budesonide delivered to a 3D model via high-flow irrigation versus nasal nebulizer, in order to determine how much medication actually arrives at the disease-specific nasal sites.

Methods:

A nasal replica model based on an MRI dataset (Guilmette) of a healthy male was segmented horizontally into 3 sections for measurement of regional deposition. This model was then used to determine the deposition amounts for the nasal nebulizer (NasoNeb® System) and rinse bottle (NeilMed Sinus Rinse™) with a budesonide ampoule (Pulmicort Nebuamp, 500µg/2mL). The ampoule was added directly to the nebulizer but was diluted with 240ml of 0.9% saline for the rinse bottle as directed. Each section of the model was washed with 5ml of methanol and the mass of budesonide determined by HPLC UV-Vis spectrophotometry.

Results:

Budesonide recovery from the 3 model locations (Anterior, Mid-section, Posterior) was significantly higher for the nebulizer (81.4µg, 173.2µg, 39.3µg) compared to the rinse bottle (1.0µg, 2.4µg, 1.1µg).

Conclusions:

The use of the nebulizer system offers an alternative therapy for clinicians to deliver a greater and potentially more effective corticosteroid dose to patients who have been unable to achieve relief with other spray devices. Clinicians should also be aware of the limitations of some commercial nasal irrigation systems to reliably deliver medication to its intended site of action inside the nose.

POSTERS

Poster A022

MicroRNA-29a promotes the allergic rhinitis by down-regulating FOS

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Objective:

To explore the regulation of microRNA-29a (miR-29a) on FOS in human nasal epithelial cells and its molecular mechanism, as well as the effects of miR-29a on the cell proliferation and apoptosis.

Methods:

By cell transfection, gene silencing, quantitative real-time polymerase chain reaction (qRT-PCR), flow cytometry and TUNEL assay (for cell apoptosis), CCK-8 assay (for cell proliferation), dual-luciferase reporter gene assay and Western Blot, it was validated that miR-29a promoted the proliferation of human nasal epithelial cells and inhibited their apoptosis by down-regulating FOS expression in RPMI2650 and HNEpC cell lines.

Results:

□ Compared with healthy controls, miR-29a expression was up-regulated and FOS mRNA expression was down-regulated in the nasal tissues from the patients with allergic rhinitis (AR). □ MiR-29a over-expression promoted the proliferation of RPMI2650 cells and HNEpC cells but inhibited their apoptosis. □ MiR-29a targeted at FOS. □ MiR-29a over-expression and FOS silencing both significantly promoted cell proliferation and inhibited cell apoptosis. After transfection with both miR-29a and FOS, there was a decrease in the proliferation but an increase in the apoptosis of cells. □ MiR-29a promoted the proliferation of human nasal epithelial cells and inhibited their apoptosis by down-regulating FOS expression.

Conclusion:

MiR-29a-FOS axis can be regarded as a potential marker and a new therapy for AR.

Poster A023

Nasal nitric oxide as a biomarker in the diagnosis and treatment of sinonasal inflammatory diseases

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Objective:

To critically review the literature on nasal nitric oxide (NNO) and its current clinical and research applicability in the diagnosis and treatment of sinonasal inflammatory diseases including acute bacterial rhinosinusitis (ABRS), chronic rhinosinusitis (CRS), and allergic rhinitis (AR).

Methods:

A search of the PubMed database was conducted to include relevant articles on NNO and sinonasal diseases such as ABRS, CRS, and AR. Article titles and abstracts from January 2003 to January 2020 were reviewed to assess their relevance to NNO and sinonasal diseases. After selection of relevant manuscripts, full-text reviews were performed to synthesize current understandings of NNO and its applications to the various sinonasal inflammatory diseases.

Results:

A total of 76 relevant studies from an initial 556 articles were identified using our focused search and review criteria. NNO was consistently shown to be decreased in ABRS and CRS with nasal polyps. Although AR was associated with elevations in NNO, cases with higher symptom severity were associated with lower NNO. The obstruction of the paranasal sinuses was proposed to be an important variable in the relationship between NNO and the sinonasal diseases. Treatment of these diseases was associated with improved NNO levels through the reduction of inflammatory disease burden and mitigation of sinus obstruction.

Conclusion:

The most compelling data is for decreased NNO as a clinical tool for ABRS, CRS, and severe AR. NNO may be used as a marker of ostiomeatal complex patency for various sinonasal pathologies. It holds promise as both a diagnostic tool and a means of monitoring disease response to treatment.

POSTERS

Poster A024

Nasopharyngeal pedicled pituitary mass: A case report

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Background:

The differential for a nasopharyngeal mass is broad and includes many rare neoplasms. We report on a large nasopharyngeal mass with a bony pedicle to the sella.

Methods:

Case report

Results:

A 66-year-old female presented for workup of lifelong nasal obstruction with obligate mouth breathing. CT and MRI for an unrelated stroke demonstrated a 2.3 x 2.6 x 1.9 cm nasopharyngeal mass, pedicled on a well-delineated stalk with bony encasement, extending to the sellar floor. Nasal endoscopy revealed a well-circumscribed mass obstructing the entire nasopharynx. The mass and stalk were resected via an endoscopic endonasal approach. During the resection, the bony stalk was noted to extend from the sella with dura encasing the distal aspect of the mass. The mass was removed with preservation of the pituitary gland.

Immunohistochemical stains showed varying levels of positivity for synaptophysin, ACTH, GH, Prolactin, and GATA-3. Histopathology was consistent with ectopic pituitary tissue with a central area of heterotopic bone formation. There was no CSF leak and her postoperative course was uncomplicated. Postoperative labs have shown normal pituitary function.

Conclusion:

We report on a case of pedicled ectopic pituitary tissue causing almost total nasopharyngeal obstruction. While pituitary adenomas have been reported in the nasopharynx[1], to our knowledge this is the first case of pedicled ectopic pituitary tissue. It was effectively treated with an endoscopic endonasal resection.

Poster A025

National analysis on the inpatient management of chronic rhinosinusitis in the pediatric population

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Objectives:

To investigate the inpatient management of chronic rhinosinusitis (CRS) in pediatric patients, including the variations in management by hospital region and the associations between insurance type and outcomes.

Study Design:

Retrospective database review

Methods:

The 2016 Kid's Inpatient Database (KID) was used to identify pediatric patients with CRS using ICD-10 codes. Chi-square tests were used for univariate analysis. Multivariate logistic regression was used to determine association between insurance type and outcomes.

Results:

9,815 pediatric patients diagnosed with CRS were included. Endoscopic sinus surgery (ESS) was performed in 6.7% (N=653) of cases. Univariate analysis showed patients were more likely to undergo ESS if they were treated at hospitals in the West (8.4%) (p=0.001), when compared to those treated in the South (6.4%) (p=0.344), Midwest (6.1%) (p=0.291), or Northeast (5.7%) (p=0.147). On multivariate analysis, treatment at hospitals in the West was associated with the greatest likelihood of ESS performed (OR 1.606, 95% CI 1.321-1.952, p<0.001). All 653 patients who underwent ESS had a primary expected payer recorded. Patients were divided into three cohorts: Medicaid, private insurance, and remaining payers (i.e. Medicare, Other). Insurance type showed no significant association with likelihood of ESS. In addition, on multivariate analysis, there was no significant difference in length of stay (LOS) for patients who underwent ESS among the cohorts.

Conclusions:

This study revealed that patients treated at hospitals in the West were most likely to undergo ESS. There was no significant association between insurance status and LOS or likelihood of ESS.

POSTERS

Poster A026

Navigation-assisted intradural skull base surgery

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Introduction:

Computer-assisted navigation is widely used in skull base surgery. Benefits include enhanced tumor localization and visualization of neurovascular structures. We aim to investigate the impact of navigation usage on 30-day postoperative outcomes after resection of intradural skull base lesions.

Methods:

Patients who underwent intradural resection of the skull base between 2011-2018 were identified in the National Surgical Quality Improvement Program database. CPT codes were used to stratify patients into navigation and non-navigation cohorts. Chi-squared analysis and multivariate regression were used to identify differences in postoperative events between cohorts.

Results:

1,624 cases were included, of which 501 (30.8%) used navigation. Navigated cases were older (54.4 ± 13.8 years vs. 52.6 ± 14.8 years, $P < 0.001$) with higher American Society of Anesthesiologists physical classification (III:64.8% vs. 52.7%, IV:7.0% vs. 4.9%, $P < 0.001$). The navigation cohort had a higher incidence of diabetes (15.8% vs. 10.2%, $P = 0.002$), COPD (3.0% vs. 1.4%, $P = 0.033$), and dyspnea (3.8% vs. 1.5%, $P = 0.004$). On univariate analysis, navigation use was associated with a higher incidence of postoperative bleeding ($P = 0.006$), cerebrovascular accident ($P = 0.005$), sepsis ($P = 0.007$), and prolonged ventilation (>48 hours) ($P = 0.014$). Multivariate analysis revealed a greater likelihood of surgical complications (OR=1.438, $P = 0.025$), medical complications (OR=1.583, $P = 0.005$), and prolonged hospital stay (>6 days) (OR=1.476, $P = 0.021$) in the navigation cohort.

Conclusion:

Use of navigation was associated with increased risk of postoperative morbidity and prolonged hospital stay, possibly secondary to the increased complexity of cases requiring navigation.

Poster A027

Performance and safety of image guided sinus dilation system in revision endoscopic sinus surgery

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Objective:

The purpose of the study was to assess the performance and safety of an image guided (IG) sinus balloon dilation system in CRS subjects with scarred and previously surgically altered sinus anatomy.

Materials and Methods:

This was a prospective, non-randomized, non-blinded, single arm, multicenter study. Eligible subjects were treated in at least one frontal, sphenoid, or maxillary sinus with the IG balloon sinus device. Endoscopic photos were captured for each treated sinus: before and after balloon sinus dilation. Follow-up endoscopic assessment was conducted at 14 days. Any post-operative adverse events were captured.

Results:

51 patients were enrolled in the study. All patient underwent previous sinus surgery, range between 1-12 surgeries. 58% were females. Mean age was 58 years. 121 sinuses were treated with the IG balloon sinus device. 75% of patients had scarring and 35% had altered sinus and nasal anatomy. The device performed as expected in 100% of the 121 treated sinuses, with investigators having the ability to navigate to the desired treatment area and dilate the desired sinus ostium. Number of sinuses treated per patient ranged from 1-6 sinuses, with mean of 2.4. Ten adverse effects were seen in 9 patients during the study, none of which were determined to be device-related.

Conclusions:

The study demonstrated that the IG sinus dilation device can safely and effectively open revision sinus ostium.

POSTERS

Poster A028

Preoperative laboratory testing in low risk ambulatory ESS

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Introduction:

Preoperative laboratory tests (PLTs) are often obtained prior to outpatient surgical procedures. The objective of this study is to examine the current practice of routine PLTs in low-risk patients undergoing ambulatory endoscopic sinonasal surgery (ESS), and to assess whether such testing affects surgical outcomes.

Methods:

Patients undergoing ambulatory ESS were identified from the 2005-2018 National Surgical Quality Improvement Program database. Low-risk patients were defined as ASA class 1 or 2. PLTs were grouped into hematologic, chemistry, coagulation, and liver function tests. Chi-square analyses and unpaired t tests were formed to compare categorical and continuous variables, respectively.

Results:

664 cases met inclusion criteria, of which 245 (36.9%) underwent at least one PLT. Of these, the most frequent PLT was a complete blood cell count (92.4%). Major complications occurred in 1.5% of patients. There were no statistically significant differences in overall postoperative complications between those with and without PLTs ($p=0.264$). Specifically, no significant difference was seen among postoperative bleeding ($p=0.184$), urinary tract infection ($p=0.444$), pulmonary embolism ($p=0.444$), or wound infection ($p=0.701$). Moreover, there was also no difference in readmission rates in patients with or without PLTs ($p=0.444$).

Conclusions:

Our analysis revealed that the use of PLT was not associated with postoperative morbidity. This study supports the current evidence-based guidelines that recommend against the practice, due to lack of direct clinical benefit.

Poster A029

Prevention of frontal sinus ostium stenosis after modified Lothrop (Draf III) frontal sinus surgery

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Objectives:

Endoscopic modified Lothrop (EMLP) (Draf III) frontal sinus surgery for refractory frontal sinus diseases has come to be widely performed. However, postsurgical frontal sinus ostium stenosis may still occur due to tissue scarring and bone regeneration. Various flap techniques to prevent stenosis are reported but they seem to be complicated. We present a simple technique to preserve frontal sinus ostium patency after EMLP using silicon plate with cyanoacrylate glue.

Methods:

This preliminary retrospective report included 8 eosinophilic chronic rhinosinusitis (ECRS) cases with asthma including 6 AERDs. All 8 cases had a history of previous ESS. EMLP was performed on all cases without intraoperative complications. Wedge-shaped silicon plate with slits inserting to frontal sinus ostium was adhered to the exposed bone surface using cyanoacrylate glue. Free mucosal flap was also used in 6 of 8 cases. Calcium alginate as nasal packing was used to support the plate. Calcium alginate was kept left for 1 week, and then was removed. The silicon plate was taken off 3 to 4 weeks postoperatively. Cases continued nasal rinsing, and were periodically followed up.

Results:

7 cases showed wide enough frontal sinus ostium patency without polyp recurrence after surgery. Only 1 case showed stenosis due to early displacement of the silicon plate.

Conclusion:

Cyanoacrylate glue is known as safe and non-biomedical adhesive for closing wounds. Our simple technique using silicon plate with cyanoacrylate glue to preserve frontal sinus ostium patency after EMLP suggested usefulness although still premature.

POSTERS

Poster A030

Progressive improvement of severe CRSwNP with dupilumab: Post-hoc analysis of two Phase 3 studies

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Background:

In the phase 3 SINUS-24 (NCT02912468) and SINUS-52 (NCT02898454) studies in adults with severe chronic rhinosinusitis with nasal polyps (CRSwNP), dupilumab significantly improved the co-primary endpoints of change from baseline (BL) to Week (W) 24 in nasal polyp score (NPS) and nasal congestion (NC) vs placebo. This post hoc analysis investigated progression of improvement over time in NPS and NC in SINUS-24/52.

Method:

Within-patient changes from BL in NPS and NC were assessed for dupilumab 300 mg q2w and placebo through W24 in pooled SINUS-24/52 (N=438/286 dupilumab/placebo) and through W52 in SINUS-52 (N=150/153). NPS (score 0–8) was assessed at scheduled visits and NC (score 0–3) was recorded by patients (pts) daily using an eDiary. NC score was the average of the prior 7 days for the BL score, and 28 days for monthly post-BL scores.

Results:

BL NPS and NC were 5.97 (SD 1.25) and 2.40 (0.58), respectively. NPS improved in 70.6/76.2/78.7% of pts with dupilumab at W8/24/52 compared with 35.7/31.1/28.2% with placebo (all $P < 0.0001$ vs placebo). NPS improved by ≥ 1 point in 59.5/66.9/72.3% pts with dupilumab at W8/24/52 compared with 23.8/16.5/16.2% with placebo. NC improved in 74.6/84.9/86.9% of pts with dupilumab at W4/24/52 compared with 46.7/54.5/50.7% with placebo (all $P < 0.0001$ vs placebo). NC improved by ≥ 1 point in 19.5/65.6/67.6% of pts with dupilumab at W4/24/52 compared with 2.8/24.5/22.9% with placebo. Similar effects were seen regardless of prior sinonasal surgery status.

Conclusions:

Dupilumab produced rapid, continuing, and clinically relevant improvements over time in NPS and NC in the majority of pts with severe CRSwNP in the SINUS studies.

Poster A031

Qualitative study of disease control in CRS

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Background:

Disease control is defined as maintenance of disease manifestations within acceptable limits. The concept of control in chronic rhinosinusitis (CRS) is an active area of study. However, the current literature has not engaged CRS patients in what they constitute as disease control. This study seeks to understand the patient perspective for CRS disease control.

Methods:

Qualitative phenomenological study using constant comparative methodology was applied. The research team conducted 8, one-on-one interviews with CRS patients ranging from 45 to 90 minutes in length. The content of the interview protocol was determined through iterative discussion amongst all authors. Two of the authors served as coders and a common codebook was created and utilized to identify recurrent themes. The themes were analyzed for meaning and conclusions were summarized.

Results:

Recurring themes included (1) the term “control” adequately represents this phenomenon; (2) components of CRS disease control include daily symptomatology, frequency and severity of exacerbations, and CRS impact on comorbid disease and quality of life; and (3) CRS disease control is a goal of treatment for patients—i.e. they are more likely to seek treatment escalation to achieve control.

Conclusions:

CRS patients consider their daily symptoms, their exacerbations, the impact of CRS on their quality of life as well as exacerbation of comorbid disease when self-assessing their CRS disease control. Uncontrolled disease motivates patients to seek further treatment. Physicians should explore these aspects of CRS with their patients when assessing CRS disease control and need for further treatment.

POSTERS

Poster A032

Respiratory epithelial adenomatoid hamartoma in a 76-year-old female

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A 76-year-old female presented with the complaint of long-standing frontal headaches. The patient had no history of inflammatory disease, nasal polyps or other significant rhinological conditions. Physical examination revealed a bilateral, polypoid septal mass. Imaging revealed nonspecific findings other than a bilateral symmetric soft tissue mass in the anterior nasal cavity. An excisional biopsy was performed, which demonstrated respiratory epithelium and small round mucinous containing glands, consistent with respiratory epithelial adenomatoid hamartoma. After removal of the tumor, the patient is now recovering without complaint of her previous symptoms of headaches and post-operative complications. This case report of respiratory epithelial adenomatoid hamartoma is unique, as it presents a rare appearance of this condition in an atypical patient demographic with atypical presenting signs.

Poster A033

Seropositivity to microbial proteins in CRS using high throughput microarray technology

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Background:

Microbial infection and microbiome perturbation have been characterized in chronic rhinosinusitis (CRS) patients by analyzing samples from the sinonasal region. We examined evidence of microbial exposure in subjects by probing serum samples of CRS patients and controls for seropositivity to microbial protein-directed IgG and IgA (the predominant antibodies in sinusitis) using a novel high-throughput microarray protein technology, Nucleic Acid Programmable Protein Array (NAPPA).

Methods:

The study was conducted on serum samples of prospectively enrolled subjects (39 CRS, 79 controls). Surface proteins were identified from 50 bacterial species (approximately 100 per species) and 45 virus strains. Three NAPPA slides of 6500 microbial genes were created. Pooled serum from control and CRS subjects were used to probe NAPPA slides for immunoreactivity to either IgG or IgA antibodies using fluorescently labeled secondary antibodies. Based on differences between CRS and control pooled samples, the most reactive genes (bacteria 1184; virus 366) and negative controls were selected for individual serum sample testing via NAPPA. Signal intensity of each protein was obtained using microarray scanners. A significant difference was inferred if at least 10% of each group's samples was positive for a protein, with Odd's ratio of ≥ 2 or ≤ 0.5 .

Results:

A significant difference in microbe-directed serum IgG and IgA was seen between CRS and control sera. CRS samples had elevated antibodies to *Pseudomonas aeruginosa*, *Streptococcus pneumoniae* TIGR4, *Haemophilus influenzae* Rd KW20, Human herpesvirus 5, Human herpesvirus 4 and Measles strain Ichinose WT.

Conclusions:

CRS and control serum samples show differences in seropositivity to bacter.

POSTERS

Poster A034

Severity of loss of smell and paranasal sinus opacification

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Background:

This post hoc analysis assessed associations between loss of smell and sinus opacification at baseline in patients with chronic rhinosinusitis with nasal polyps (CRSwNP) pooled from the SINUS-24 (NCT02912468) and SINUS-52 (NCT02898454) trials.

Methods:

Smell was measured by the University of Pennsylvania Smell Identification Test (UPSIT), Loss of Smell (LoS) score, and 22-item Sino Nasal Outcome Test (SNOT-22) smell/taste item score. Sinus opacification was quantified using the Lund-Mackay computed tomography (LMK-CT) score. Analyses were done in the intent to treat population with loss of smell (UPSIT $\leq 34/\leq 33$ [women/men]; LoS ≥ 1 ; SNOT-22 ≥ 1).

Results:

Of 724 patients, 688 (95.0%) had loss of smell at baseline, and most reported severe loss of smell (UPSIT [< 19 , anosmia; 31–34/30–33 women/men, mild]: 76.1%; LoS [3; < 2 , mild]: 72.5%; SNOT 22 [5; 1, very mild]: 59.5%). In patients with loss of smell at baseline, least-squares mean total LMK-CT scores were significantly higher for patients with severe loss of smell vs those with mild loss of smell: UPSIT: 19.05 vs 13.88; LoS: 19.01 vs 14.87; SNOT 22 smell/taste: 19.15 vs 14.59 (all $P < 0.001$).

Conclusions:

Loss of smell is associated with increased sinus opacification and can be considered a marker of CRSwNP disease severity as demonstrated by LMK score.

POSTERS

Poster A035

Shortening the learning curve: Virtual reality rhinoplasty

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Rhinoplasty, classified as one of the most complex procedures, continues to be one of the most requested interventions today. According to the International Society of Aesthetic Plastic Surgery, 821,890 rhinoplasties were performed worldwide in 2019, representing an increase of 13.1% compared to the previous year.

The proportions, harmony and symmetry of facial components are considered to be the determinants of the perception of beauty. The nose accounts for a significant percentage in this area. It is therefore essential for facial surgeons to have the best training possible, especially as this is one of the most complex surgeries in our practice.

The learning curve, described in simple terms in our field as “the time and number of procedures that an average surgeon needs to perform a given procedure independently and with a reasonable result”, increases slowly and can be at times a somewhat bumpy experience.

The evolution of technology plays a very important role as learning support, and the medical field has not been exempted from technological advances. Practice truly makes a difference in surgical specialties, in terms of the skills that a surgeon develops in the execution of surgical techniques.

We will be presenting and demonstrating a virtual reality software that simulates with great precision an open approach rhinoplasty to have a better understanding of the different components of the nasal pyramid and to carry out the movement training necessary to perform a rhinoplasty.

The objective of this exhibition is to present a training model that aims to shorten the learning curve for surgeons in training and to encourage continuous practice for experienced surgeons.

Poster A036

Sociodemographic disparities and patterns of care in sinonasal adenocarcinoma

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Introduction:

Sinonasal adenocarcinoma (SNAC) is a rare malignancy with heterogenous histology. We aim to identify potential geographic and sociodemographic factors associated with treatment patterns and survival outcomes in patients with SNAC.

Methods:

This is a retrospective, population-based cohort study using the National Cancer Database to identify patients diagnosed with SNAC between 2004 to 2012. Sociodemographic and geographic variables, including age, gender, race, and location of residence (metro, rural, or urban) were analyzed. The primary outcome was overall survival (OS) calculated using Kaplan Meier Survival Analysis and Cox Proportional Hazards Model.

Results:

738 patients with SNAC were identified, of which 36.4% were 70 years of age or older. Patients were predominantly white (80.9%), Non-Hispanic (89.1%), and lived in metro areas (82.4%). Surgery alone was the most common type of treatment (33.2%), followed by surgery combined with radiotherapy (27.0%). Older patients were more likely to not undergo treatment (13.0% vs. 4.5%, $p < 0.001$). On Kaplan Meier analysis, younger patients had a significantly higher 5 year OS than those over 70 (64.3% vs 36.8%). Patients also displayed difference in 5 year OS based on whether they were from a metropolitan, urban or rural environment (57.5%, 38.8%, 21.2%, respectively; $P < 0.001$). Cox proportional hazards model also showed that Hispanic patients has worse OS (HR:43.3 [1.543-1215.827], $P = 0.023$).

Conclusion:

Our study identified sociodemographic disparities in treatment and survival outcomes among patients with SNAC. Age, race and location of residence were predictive of overall survival.

POSTERS

Poster A037

The impact of PROPEL® Implant during sinus surgery on healthcare resource utilization

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 OM1

Background:

Assessment of the impact of PROPEL® use following sinus surgery on outcomes and healthcare resource utilization (HCRU) using real world evidence (RWE) is needed. Objective: To compare HCRU in adult patients 18 months after functional endoscopic sinus surgery (FESS) or balloon sinuplasty, with and without PROPEL.

Methods:

A retrospective observational cohort study following FESS or balloon sinuplasty from 2014 – 2019 was done using OM1 Real World Data Cloud (OM1, Inc, Boston, MA, USA). Diagnoses of chronic rhinosinusitis with or without polyps (CRSwNP, CRSsNP) and 18 months of data both before and after surgery were required. Cohorts of PROPEL and non-PROPEL patients (n=1,983 each) were propensity score matched on baseline characteristics. Chi-square tests (binary) and ANOVA tests (continuous) were applied to compare outcomes including outpatient and ER visits, sinus-related procedures and repeat surgeries.

Results:

During the 18-month follow-up period, a statistically significantly lower percentage of the PROPEL cohort had at least one all-cause outpatient visit (94.3% vs 96.6%, $p < 0.001$), outpatient otolaryngologist visit (47.3% vs 59.6%, $p < 0.001$), sinus endoscopy (39.1% vs 43.8%, $p=0.003$) and ER visit (9.2% vs 11.8%, $p=0.007$) compared to the non-PROPEL cohort. Although not statistically significant, fewer patients had repeat surgeries in the PROPEL cohort (4.6% vs 5.3%, $p = 0.273$).

Conclusion:

In RWE data, PROPEL patients had significantly less HCRU in 18 months post-surgery compared to non-PROPEL patients, suggesting improved outcomes and economic benefits can be achieved by using PROPEL following FESS and balloon sinuplasty surgery. This information should enhance CRS evidence-based clinical decision making.

Poster A038

Topical anesthesia in nasal endoscopy: To use or not to use?

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Objective:

Topical anesthesia is often used during nasal endoscopy. However, there is little evidence that it reduces patient discomfort or improves surgeon satisfaction during the procedure. Herein, we evaluated whether these metrics were influenced by the use of topical anesthesia and by its delivery method.

Methods:

A double-blinded, randomized controlled trial was performed on 52 adult patients requiring nasal rigid endoscopy at an academic medical center. In addition to a decongestant, patients received either normal saline or lidocaine via either nasal spray or pledgets. The primary outcomes were (1) patient comfort during endoscopy as calculated by the mean score of an adapted Iowa Satisfaction with Anesthesia Scale (ISAS) and (2) surgeon satisfaction with visualization during endoscopy. Secondary outcomes included the degree of patient discomfort upon anesthesia administration, the number of aerosolizing events (sneezes/coughs) during the procedure, and the duration of endoscopy. Statistical differences were assessed via unpaired t-tests ($\alpha = 0.05$).

Results:

This cohort comprised of 28 males and 24 females with a mean age of 53 years (range 18 – 83). Patients receiving lidocaine spray had a higher mean ISAS score (1.9 ± 0.24) than those receiving placebo spray (0.91 ± 0.39); $p = 0.048$. However, no statistical difference in ISAS score was observed between the lidocaine pledget (1.7 ± 0.27) and placebo pledget (1.6 ± 0.19) groups. There were no significant differences in the other primary or secondary outcomes.

Conclusions:

Application of lidocaine spray resulted in greater patient comfort during nasal endoscopy than placebo spray. Additional patient recruitment is underway to strengthen these preliminary findings.

POSTERS

Poster A039

Treatment of recurrent frontoethmoid mucocele

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 Ken Byrd, MD

Background:

Mucoceles occur in any paranasal sinus, most commonly frontal, with involvement of the frontoethmoidal region in 10-14% of cases. Resection of supraorbital mucoceles can be performed endoscopically, with or without combined open approaches. Recurrence of mucoceles occur and are generally related to obstruction of drainage pathway into the nasal cavity.

Case Report:

We present a case of recurrent post-traumatic supraorbital ethmoid mucocele after multiple surgical interventions. The patient suffered traumatic midface fractures and later presented with a left retro-orbital and facial pain. He was found to have a left supraorbital ethmoid mucocele and underwent multiple surgical interventions including FESS followed by orbitotomy with drainage, followed by frontal orbital zygomatic craniotomy. He returned with a recurrent mucopyocele. On imaging, there was obstruction of the supraorbital cell due to medial herniation of orbital contents from the orbital fracture. He underwent a revision left endoscopic approach for drainage of the supraorbital ethmoid cell combined with an orbitotomy with oculoplastic surgery. With adequate lateralization of the orbital contents and rigid fixation with a Medpor Titan implant, the periorbita was removed from the outflow tract. A silastic stent was placed to prevent stenosis. He is doing well on short term follow-up.

Conclusion:

Recurrent post-traumatic mucoceles following surgical intervention occur in 9-20% of patients. While many surgical options for treatment are available, the combined open and endoscopic approach is often necessary for evacuation and marsupialization. Our case demonstrates the importance of maintaining a patent outflow tract to prevent mucocele recurrence.

Poster A040

Unilateral Vidian main neurectomy on moderate to severe allergic rhinitis

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 Dingbo Li
 Xianhai Zeng

Objective:

To evaluate the efficacy of navigation-guided endoscopy Unilateral Vidian main neurectomy in the treatment of Moderate to Severe Allergic Rhinitis(M-S AR) by comparing with septal plasty and bilateral inferior turbinoplasty.

Methods:

40 patients with M-S AR with nasal septum deviation were randomly divided into experimental group(A) and control group(B), 20 cases each. The patients in the A underwent Unilateral Vidian main neurectomy, and the patients in the B underwent nasal septum formation and bilateral inferior turbinate plasty. Quality of life score(RQLQ) and visual analogue scale(VAS) were compared between the two groups of patients before surgery, 6 months after surgery, 1 year and 2 years after surgery.

Results:

VAS and RQLQ at 6 months, 1 year and 2 years after surgery in the 2 groups were significantly decreased compared with that before surgery($P < 0.001$); There was no statistical difference in VAS 6 months after operation between A and B($P > 0.05$); VAS scores one year and two years after surgery were significantly lower in A than in B($P < 0.001$); In the RQLQ scores 6 months, 1 year and 2 years after surgery, the scores in A were lower than those in B($P < 0.01$, $P < 0.05$, $P < 0.05$).

Conclusion:

Both methods can alleviate the symptoms and improve the quality of life in patients with moderate to severe allergic rhinitis with nasal septum deviation. During 2 years of follow-up, endoscopic single lateral canal nerve trunk excision was more effective in alleviating the symptoms of moderate to severe allergic rhinitis than septal plasty plus bilateral inferior turbinoplasty. The application of navigation can more accurately locate the pterygeal nerve and reduce the occurrence of surgical trauma and complications.

POSTERS

Poster A041

Vibration therapy in sinonasal disease

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Background:

Sinonasal diseases are typically addressed with medical therapy and if symptoms are refractory to medical treatment, surgery may be offered. Yet, certain patient populations, either due to refractory disease or desire for alternative treatment, seek another treatment option. Vibrational modalities have become standard of care in certain lower respiratory chronic illnesses and are an active area of study for sinonasal disorders. Our objective was to perform a scoping review of vibration treatment used in sinonasal disease.

Methods:

A search of Embase, Pubmed and CINAHL databases, as well as the gray literature, was performed in April 2020. Of the 2862 returns, 26 articles met inclusion criteria by offering vibrational treatment as a means of treating sinonasal pathology in a human or cadaver study.

Results:

Included studies were published between 1985 and 2020. A wide array of vibrational technology such as ultrasound, sonic aerosols or phonophoresis, with varying frequency and amplitude were described in included studies. Thirteen studies evaluated vibrational therapy applied externally to the skin. Two studies evaluated the use of phonophoresis to facilitate transdermal drug delivery. Finally, 11 studies assessed the impact intranasal drug delivery using vibrational technology had on sinonasal pathology. Outcome measures across studies were highly varied.

Conclusions:

Vibration technology used in patients with sinonasal pathology has been shown to improve pain, sinonasal symptom and radiology outcome measures in small pilot studies. Further research is required to study this phenomenon in larger patient populations to fully understand the effect and determine optimal characteristics of sound energy.

Poster A042

Woakes' Syndrome: A case series

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Background:

Woakes' syndrome is a constellation of chronic rhinosinusitis with nasal polyposis (CRSwNP) leading to thinning and expansion of the ethmoid sinus and broadening of the nasal pyramid. Their sinus disease treatment, while extensive, is standard practice, however the management of their nasal deformities varies in the literature. We describe our experiences in Woakes' syndrome management, and advocate for simultaneous closed rhinoplasty in these patients.

Methods:

Four patients with Woakes' syndrome presented with notable nasal pyramid expansion resulting from severe chronic rhinosinusitis with nasal polyposis. All patients had eosinophilic disease, with three exhibiting aspirin-exacerbated respiratory disease. They underwent extensive functional endoscopic sinus surgery from May 2018 to September 2019, while three underwent simultaneous rhinoplasty. Their nasal bones were adequately rarefied, such that only external digital compression was required for reduction.

Results:

Post-operatively, all patients had excellent nasal airway symptom improvement, and the cosmetic results of rhinoplasty demonstrated normalization of strength, symmetry, profile, and contour of the nose with high patient satisfaction. One patient with low compliance for medical therapy has developed significant polyp recurrence, while the rest are being managed effectively with intranasal corticosteroids and ASA desensitization where tolerated.

Conclusion:

Based on our experiences, simultaneous rhinoplasty on the rarefied nasal bones of a Woakes' syndrome patient is not only easy to perform, but provides excellent cosmetic and functional results by allowing bone to remodel in the appropriate position, and avoids unnecessary re-operation.

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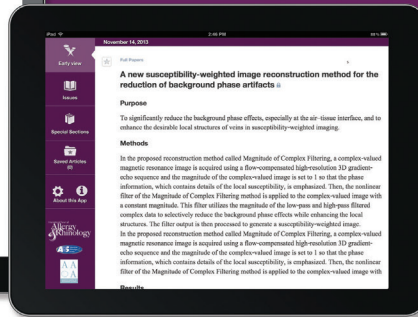
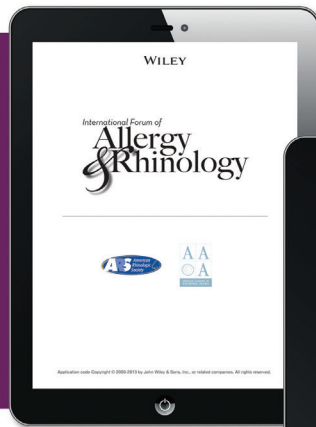
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2022 ARS MEETINGS

Important Dates to Remember

ARS at COSM 2022 – Dallas, TX

April 28-29, 2022

Abstract Submission Opened: September 3, 2021

Abstract Deadline: October 22, 2021

Manuscript Deadline: March 25, 2022

ARS 68th Annual Meeting – Philadelphia, PA

September 9-10, 2022

Abstract Submission Opens: December 1, 2021

Abstract Deadline: April 1, 2022

Manuscript Deadline: August 6, 2022



SAVE THE DATE 2022



COSM 2022

April 28-29, 2022

Hyatt Regency Dallas
Dallas, TX

Highlights:

- Keynote speakers
- Expert panels
- Cutting edge research

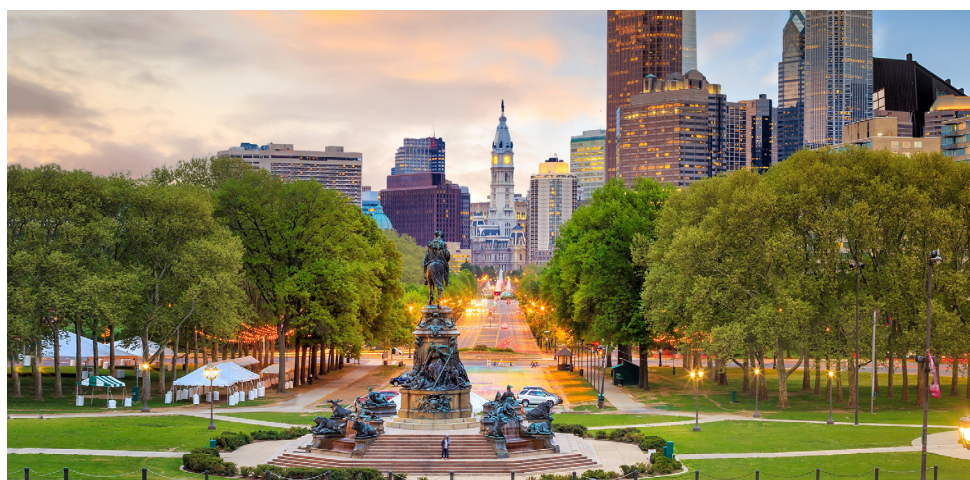


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