American Rhinologic Society

PROGRAM BOOK

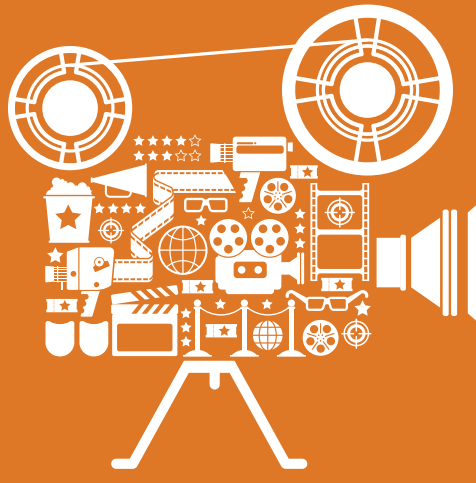
ARS 71st Annual Meeting

October 9-11, 2025 | Indianapolis Marriott East, Indianapolis, IN

American Rhinologic Society | american-rhinologic.org | 973-545-2735

The ARS Guest Countries

India, Taiwan, Thailand



American Rhinologic Society

FALL FILM FESSTIVAL

The ARS will again be featuring the **Fall Film Fesstival** *- 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.

Friday, October 10, 2025
12:15 pm – 1:00 pm
Veterans Hall 1

Kevin Welch, MD, FARS

Presidential Welcome

The ARS Program Committee and I would like to be the first to welcome you to our Fall Meeting in Indianapolis, October 9–11, 2025. This year's program promises an exceptional blend of scientific excellence, professional networking, and lively social events that celebrate our specialty's growing international community.

We will kick off the meeting with a residents and fellows dissection course hosted by Stryker. This is followed by a 3-hour leadership symposium organized by the Women in Rhinology section. That evening ends with a fun social welcoming first our faculty, international guests, and industry partners at a special Match & Mingle Networking Hour, followed by a first-ever Casino Night open to all—a perfect chance to connect with colleagues in a relaxed and fun atmosphere. We are also honored to host Guest Countries: India, Taiwan, and Thailand, bringing rich perspectives and expertise to our sessions and networking opportunities.

Our scientific program starts Friday Oct 10 with the fan favorite Film FESStival. Drop by and see the finalist submissions and find out the winner of this annual competition. The meeting highlights cutting edge both basic science and clinical research within the rhinology field presented in both oral and poster formats. In addition, there are four 45-minute panels and three 30-minute focused panels, staggered to minimize overlapping times. These panels include the international presentation and management of CRSwNP, the importance of ergonomics in sinus surgery, updates on CSF leak repair, and updates on current and emerging biologics for CRS management, to name a few.

Highlights include the 21st Annual David W. Kennedy Lectureship with Rodney Schlosser, MD, FARS, and the 4th Annual Hwang Family Lectureship with Troy Woodard, MD, FARS—both distinguished leaders in the field.

We are proud to offer a range of interactive and specialized events, including the International Roundtable Breakfast Session, Residents & Fellows Committee Lunch Program, Morning Mixer with Poster Viewing all on Saturday Oct 11. Scattered throughout the meeting will be several non-CME educational offerings.

For the first time, we will offer a half-day symposium geared towards our Rhinology Advanced Practice Providers (RAPPers) in one of the breakout rooms on Saturday morning. Speakers will include our very own current RAPPers members of the ARS.

Finally, the Friday session ends on Friday evening with a celebration with the President's Welcome Reception, featuring the NashVegas All Stars Band. We hope the live music will be a nice way to send off Mickey Stewart who will be completing his 6-year tenure as the Executive VP of the ARS. Mickey plays the drums for the NashVegas All Stars Band, so it is an event you cannot miss!

Altogether, participants can earn up to 9.25 AMA PRA Category 1 Credit(s)™ while enjoying a dynamic educational and networking experience.

Thank you for joining us in Indianapolis for an unforgettable combination of world-class science, career-enhancing networking, and memorable social events.

Kevin Welch, MD, FARS
President, American Rhinologic Society

Amber Luong, MD, PhD, FARS

Welcome from the President Elect and 71st Annual Meeting Program Chair

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Amber Luong, MD, PhD, FARS

President Elect and Program Chair

American Rhinologic Society Executives - 2025

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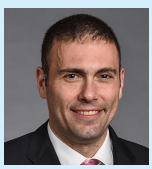

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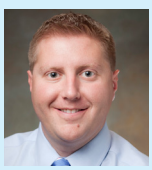

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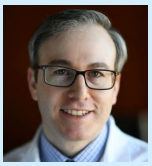

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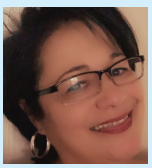

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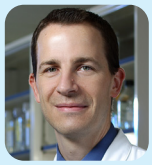
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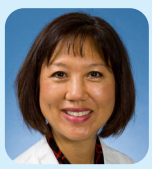
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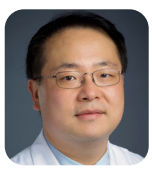

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ARS Mission Statement

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
ARS designates this live activity for a maximum of 9.25 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Learning Objectives from Practice Gaps

At the conclusion of this meeting participants will be able to:

- Understand and discuss the current evidence-based recommendations for the treatment of disorders that affect the nose and the sinuses such as chronic rhinosinusitis, allergic rhinitis, nasal airway obstruction, smell loss, and benign and malignant tumors.
- Discuss the medical and surgical management of recurrent acute and chronic rhinosinusitis through research presentations, debates, and panel discussions.
- Improve the understanding of our members that social determinants of health are important variables that affect our patients' access to care and their outcomes and that these disparities affect not limited medical practitioners but all practitioners caring for patients of diverse backgrounds and means.
- Improve healthcare quality through our oral and poster presentations of cutting-edge research and by incorporating direct member/attendee and speaker involvement through question and answer sessions.
- Assess and explore how we evaluate successful outcomes in skull base surgery through the interaction of rhinologists, endocrinologists, and neurosurgeons.
- Identify state of the art research and research gaps in the field of chronic rhinosinusitis through multidisciplinary efforts involving NIH representatives.
- Understand and appreciate that matters of diversity, equity, and inclusion are critical to facilitating collaborative partnerships among practitioners
- Bring to light controversial topics, such as empty nose syndrome, that require multidisciplinary understanding

How to Obtain Your CME Certificate

At the conclusion of the meeting, you will be provided with a post-meeting link to claim your CME.

ARS 71st Annual Meeting - IFAR Top Reviewers

At IFAR, we aspire to peer review performed with fairness, rigor, and timeliness. Peer review is thankless work and voluntary. Peer reviewers offer criticism and/or praise to challenge thinking, provide honest feedback, and ultimately improve the scientific method. This is a great service to our specialty, the profession of medicine, and to humankind. The editorial board, Associate Editors, and Editors greatly appreciate the below-named individuals for the reviews they submitted in 2023.

*Top reviewers are in bold font. *Three to four reviews. **Five or more reviews.*

-- Timothy L. Smith, MD, *Editor, International Fourm: Allergy & Rhinology*

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2022 - 2023	Sarah Wise, MD, FARS
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**Deceased*

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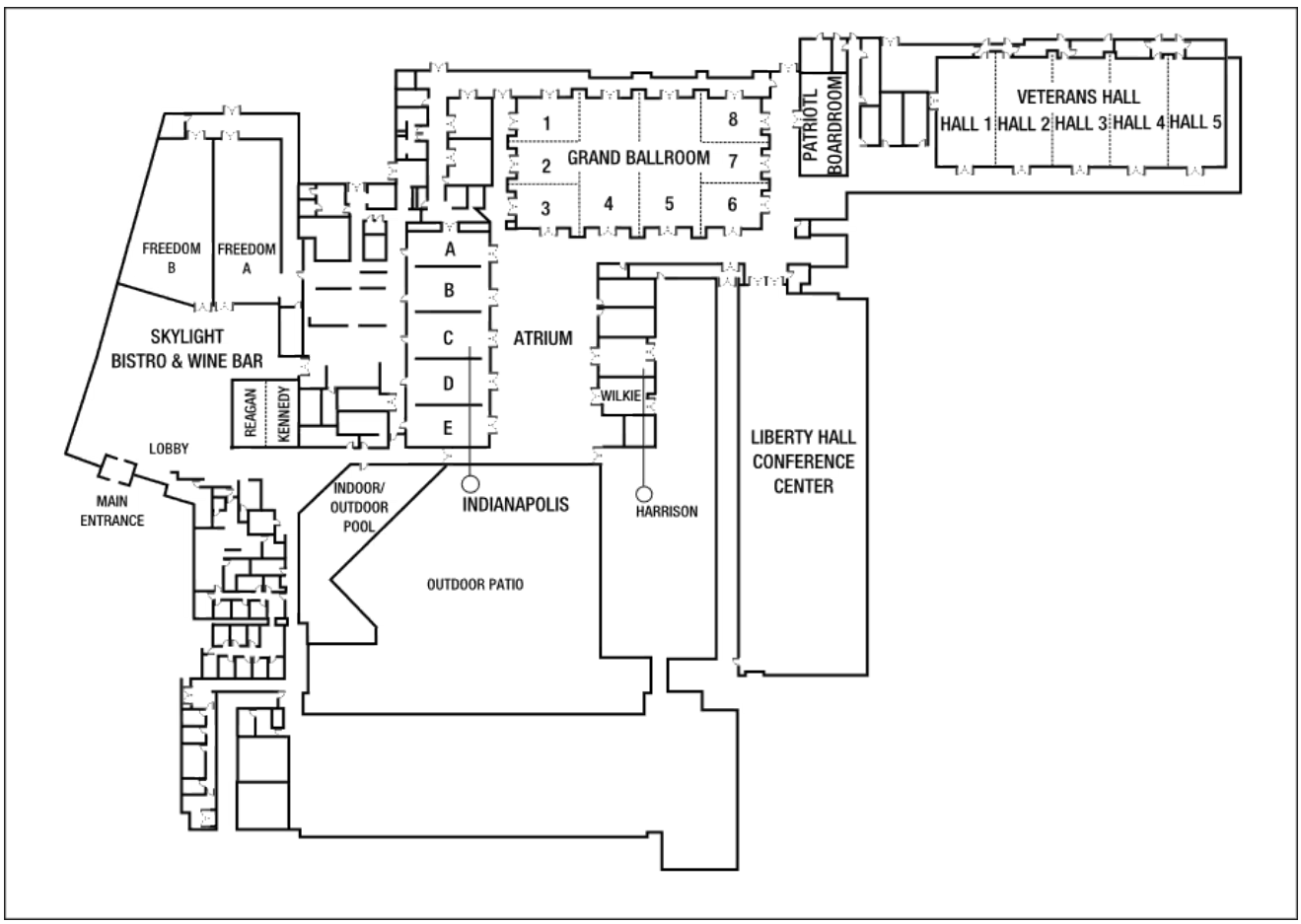
Hemostasis Fiagon
ARS Travel Grants

Exhibitors

3-D Matrix
Acclarent an Integra Lifesciences Company
Advanced RX Compounding Pharmacy
Aerin Medical
Amgen / AstraZeneca
Amgen / AstraZeneca Medical
Brainlab
Brevium
GSK
Hemostasis Fiagon
KARL STORZ Endoscopy-America, Inc.
Medical Center Specialty Pharmacy
Medtronic
ModMed
NasoNeb®
NeilMed
Neurent Medical
Olympus America Inc.
Sanofi-Regeneron
Spirair
Stryker

Meeting Floor Plan
Marriott Indianapolis East



PROGRAM ABSTRACTS

MEETING HIGHLIGHTS

- ARS Welcomes Our Faculty, International Guests & Industry Partners to CASINO NIGHT!
- Resident's Course and Reception
- Allergy in Rhinology Breakfast Symposium
- 21st Annual David W. Kennedy Lectureship - Guest Speaker: Rodney Schlosser, MD, FARS
- 4th Annual Hwang Family Lectureship - Guest Speaker: Troy Woodard, MD, FARS
- Fall Film FESStival
- Women in Rhinology Leadership Symposium
- Symposia Sessions
- International Roundtable Breakfast Session
- Morning Mixer with Poster Viewing
- Residents & Fellows Committee Lunch Program
- Maximum of 9.25 AMA PRA Category 1 Credit(s)™
- President's Reception featuring NASHVEGAS ALL STARS BAND
- Guest Countries: India, Taiwan, Thailand
- Match and Mingle Networking Hour for Faculty, International Guests, Industry Partners
- Four 45-minute panels
- Three 30-minute focused panels

Thursday, October 9, 2025

9:00 am – 5:00 pm
Residents Didactic Course – Junior Track
Indianapolis Room A

9:00 am – 5:00 pm
Residents Dissection Lab – Senior Trac
Stryker Mobile Lab
Indianapolis Marriott East Parking Lot

4:00 pm – 7:00 pm
Women in Rhinology Leadership Development Course
"Enhancing Leadership Skills: A WiR Sponsored Workshop"
Indianapolis Room B

5:00 pm – 7:00 pm
Residents Reception
Freedom Hall B

7:00 pm – 8:00 pm
Match and Mingle Networking Hour
For Faculty, International Guests, and Industry Partners
Freedom A
By invitation only

8:00 PM – 9:30 PM
Casino Night Dinner & Cocktails (Prizes!)
Freedom B

Friday, October 10, 2025

7:45 am – 12:05 pm
Residents Didactic Course – Senior Track
Indianapolis Room A

7:45 am am – 12:05 pm
Residents Dissection Lab – Junior Track
Stryker Mobile Lab
Indianapolis Marriott East Parking Lot

Friday, October 10, 2025
7:00 am - 1:00 pm

7:00 am – 8:00 am
Allergy in Rhinology (AiR) Section Breakfast Symposium
Indianapolis Room E

7:00 am – 8:00 am
ARS Board of Directors Breakfast
Grand Ballroom, Salons 6-

PROGRAM ABSTRACTS

8:00 am – 12:00 pm
ARS Board of Directors Meeting
Grand Ballroom, Salons 6-8

12:15 pm- 1:00 pm
IFAR Board Meeting
Room

12:15 pm – 1:00 pm
Fall Film FESStival
Veterans Hall 1

12:00 pm – 1:00 pm
Lunch in the Exhibit Hall & Posters
Liberty Hall

Friday, October 10, 2025
1:00 pm - 5:00 pm
General Session
Grand Ballroom Salons 1-5

1:00 pm – 1:05 pm
Welcome
Amber Luong, MD, PhD, FARS

1:05 pm – 1:19 pm
President's Address
Kevin Welch, MD, FARS

Top Rated Abstracts - Basic Science Presentations

Moderators: Kent Lam, MD, FARS; Corinna Levine, MD, FARS; Carol Yan, MD

1:20 pm – 1:27 pm
PM 2.5 exposure is associated with reduced type 1 inflammation and IL-10 in CRSwNP
Christina Dorismond, MD, MPH
Rory Lubner, MD
Li-Ching Huang
Daniel Lofgren, MD
Ping Li
Katherine Cahill
Mason Krysinski, MD
Rakesh Chandra, MD, FARS
Justin Turner, MD, FARS
Naweed Chowdhury, MD
Vanderbilt University Medical Center

Chronic sinusitis with polyps (CRSwNP) is a complex disease with multiple etiologic contributors. Prior studies have shown that exposure to ambient particulate matter ≤2.5 μm in diameter (PM2.5) is an independent risk factor for the development of CRSwNP, with evidence of a shift towards Type 2 and 3 inflammation. We hypothesized that there may be distinct cytokine clusters associated with PM2.5 exposure and sought to use principal component analysis (PCA) to better understand this.

Methods:
Middle meatal samples were obtained from patients undergoing endoscopic sinus surgery for CRSwNP. Cytokines were quantified using multiplex flow cytometric bead assay. Clinical and demographic data were also collected, and a spatiotemporal machine learning model was used to estimate daily PM2.5 exposure levels for patients in the 12 months prior to surgery. PCA was then used to identify relevant cytokine groupings for multivariate regression and cluster analysis.

Results:
252 patients were included. A 5-factor PCA solution accounted for 69.2% of the variance. Higher principal component 2 (PC2) scores were linked with lower levels of PM2.5 exposure on multivariate analysis after adjusting for age, BMI, income, rurality, asthma, and allergic rhinitis (β=-0.076, p=0.03). Notably, PC2 was associated with higher levels of IL-1β (β=1438.9, p<0.01), IL-6 (β=4931.5, p<0.01), IL-8 (β=213505, p<0.01), TNFα (β=43.07, p<0.01), and IL-10 (β=27.96, p=0.03), suggesting that chronic air pollution exposure is linked to lower activation of Type 1 inflammation and reduced IL-10.

Conclusion:
Particulate matter exposure may impair anti-inflammatory restorative mechanisms in the nasal epithelial in CRSwNP and contribute to chronic mucosal inflammation.

1:28 pm – 1:35 pm
Inflammatory effects of microplastics and nanoplastics on nasal airway epithelial cells
Margaret Mitchell, MD, MS-HPEd
Mansoor Amiji, Professor
Benjamin Bleier, MD, FARS
Alan Workman, MD
University of Pennsylvania

Background:
Microplastics and nanoplastics (MNPs) have emerged as ubiquitous environmental

contaminants; these particles have been detected in mucus and irrigation fluids, and at greater concentrations in patients with sinusitis. Emerging evidence at other mucosal surfaces, including the gut and lung, suggests that MNPs exacerbate epithelial barrier dysfunction and induce inflammatory responses. Despite their relevance, the impact of inhaled plastics on the nasal epithelium, the initial point of contact for airborne plastics, remains underexplored.

Methods:
Air-liquid interface (ALI) cultures of primary human nasal epithelial cells were apically dosed every other day with control culture media, 100nm polystyrene (PS) nanoplastics, or 1um PS microplastics at a concentration of 10ug/ml and 200ug/ml over an 8-day period. Cross-validation studies of apically secreted cytokines, cellular RNA alterations, and epithelial integrity were performed.

Results:
Dose-dependent elevations in IL-8 and elevations in TNFa were observed after 8 days of exposure to 1um PS microplastics when compared to control cultures ($p<0.05$ and <0.01, respectively). A dose-dependent elevation in IL-8 was also observed after 8 days of exposure to 100nm PS nanoplastics ($p<0.05$). No significant differences in transepithelial electrical resistance were seen. Quantitative PCR validation demonstrated elevations in TNFa transcripts at both 4 and 8 days into the exposure period.

Conclusions:
Polystyrene MNPs cause inflammatory cytokine responses in nasal cultures grown at an air-liquid interface over even a short timeframe. This is the first such finding in a sinonasal model, and this model can answer critical questions about the pathogenicity of plastic exposures.

1:36 pm – 1:43 pm
Aging and interferon signaling in CRS
Jeffanie Wu, MD
Quanhu Sheng
Seesandra Rajagopala
Sandeep Goswami
Li-Ching Huang
Rakesh Chandra, MD, FARS
Naweed Chowdhury, MD
Suman Das
Justin Turner, MD, FARS
Vanderbilt University Medical Center

Introduction:
Chronic rhinosinusitis (CRS) is an inflammatory upper airway disease that is more prevalent among older patients, suggesting that age may be a driving factor in disease pathogenesis. Consequently, we sought to identify mechanistic impacts of aging on upper airway mucosal immunity in CRS.

Methods:
Mucus and sinonasal tissue was collected during endoscopic sinus surgery from young (≤40 years old), middle-aged (41-59 years old), and aged patients (≥60 years old) with CRS (n=481). Bulk (n=44) and single cell (n=15) RNA sequencing was performed in a subset of patients, and cytokine levels were measured using a multiplex cytokine bead assay.

Results:
We identified globally reduced gene transcription across cell types in sinonasal tissue from aged healthy control patients with features indicative of metabolic dysfunction and reduced baseline immune defense. Aged CRS tissue had an accumulation of T-cells, B-cells, and macrophages and an altered transcriptional program in epithelial cells and CD4 T-cells that was characterized by increased neutrophil-attracting chemokine/cytokine secretion, antigen presentation, and interferon signaling. These changes were most pronounced in cells demonstrating a senescent phenotype, which accumulated in aged CRS patients. Mucosa from aged CRS patients was additionally characterized by reduced epithelial transcription of key initiators of type 2 immunity, including CST1 (cystatin SN) and ALOX15 (15-Lipoxygenase-1), and a pro-fibrotic phenotype among tissue fibroblasts.

Conclusion:
These findings clarify mechanisms contributing to increased neutrophilic inflammation in the upper respiratory tract of CRS patients of advanced age, with important implications for clinical care pathways.

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1:44 pm – 1:51 pm

Dynamic immune-epithelial interplay in CRS using multi-scaled transcriptomics: Part 1 immunologic

Jayakar Nayak, MD, PhD
Guanrui Liao
Axel Renteria, MD, MS
Tsuguhisa Nakayama
Qin Ma
Sizun Jiang
Stanford University

Introduction:
The pathophysiology of chronic rhinosinusitis (CRS) is poorly understood, but orchestration between immune and epithelial cells is implicated in disease progression. We applied multi-scale transcriptomics (MST) to define key immune/myeloid players and interactions in CRS, particularly in CRS with nasal polyposis (CRSwNP).

Methods:
Ethmoid sinus and NP tissues were collected from CRSwNP, without NP (CRSsNP), and control patients from sinus surgery. Differential expressed gene (DEG) and immune pathway analyses were performed using single-cell RNA sequencing (scRNA-seq). Spatial transcriptomics was applied to intact tissue samples to further validate the above findings.

Results:
scRNA-seq identified ~33K immune cells, which as expected, showed upregulation of Th2 T cell lineages, Type 2 DEGs and pathways in CRSwNP tissues compared against CRSsNP and controls ($p=0.047$; $p<0.02$ respectively). A significant expansion of M2-polarized macrophages ($p=1.0´10e-7$) expressing CCL13 ($p<0.001$) and CCL18 ($p<0.001$) chemokines was found in CRSwNP but not CRSsNP. Using spatial transcriptomics, these M2 macrophages infiltrated subepithelial tissue layers ($p<0.001$), along with eosinophils ($p=0.00144$). Finally, 2 novel mast cell subtypes were significantly increased in CRSwNP, with elevated IL-4 and IL-13 expression ($p<0.05$) and high probability of mast cell:CD4-Tcell interaction via ligand-receptor analysis ($p<0.01$).

Conclusions:
Improved understanding of in situ mechanisms propelling CRS is central to developing targeted treatments for this inflammatory disease. MST reveals specific, novel and intricate type 2-mediated cells, signaling and interactions involving the immune and myeloid compartment driving pathology in CRSwNP.

1:52 pm – 1:59 pm

Dynamic immune-epithelial interplay in CRS using multi-scaled transcriptomics: Part 2 epithelial

Jayakar Nayak, MD, PhD
Axel Renteria, MD, MS
Guanrui Liao
Qin Ma
Tsuguhisa Nakayama
Sizun Jiang
Stanford University

Introduction:
The pathophysiology of chronic rhinosinusitis (CRS) is poorly understood, but an orchestration between immune and epithelial cells in disease progression has been implicated. We applied multi-scale transcriptomics (MST) to define key epithelial players and interactions in CRS, particularly in CRS with nasal polyposis (CRSwNP).

Methods:
Ethmoid sinus and NP tissues were collected from CRSwNP, without NP (CRSsNP), and control patients following sinus surgery. Differential expressed gene (DEG) and pathway analyses were performed using single-cell RNA sequencing (scRNA-seq) for epithelial cells. Spatial transcriptomics was applied to intact tissue samples to further validate the above findings.

Results:
scRNA-seq identified ~22K epithelial cells from 11 cell types, with a strong correlation (R scores >0.7) and expansion of tuft chemosensory cells ($p=0.021$), as well as suprabasal stem cells ($p=0.03$), in CRSwNP disease but not CRSsNP. Novel prostaglandin signaling in Tuft cells was noted by DEG and pathway analysis ($p<0.001$). Ligand-receptor and spatial transcriptome analysis demonstrated strong Tuft:CD4-T cell interactions specifically in CRSwNP ($p=0.0001$). DEGs in suprabasal cells included massive upregulation of KLF4 and CST1 in CRSwNP ($p<0.0001$ for both). Suprabasal stem cells 'become Type 2 skewed' via upregulation of IL-4 and IL-13 ($logFC>1.5$, $p<0.05$) using spatial transcriptomics analysis.

Conclusions:
Improved understanding of in situ mechanisms

propelling CRS is central to developing targeted treatments for this inflammatory disease. MST reveals specific, novel and intricate signaling and interactions involving the immune system and upper airway epithelium that drive pathology in CRSwNP disease.

2:00 pm – 2:05pm
Q&A

2:05 pm – 2:15 pm
Awards Ceremony
Jean Kim, MD, FARS

2:15 pm – 3:00 pm
Panel: Differences in CRSwNP around the globe: endotypes, treatment, and future directions
Moderator: Arthur Wu, MD, FARS
Panelists: Anders Cervin, Professor; Claire Hopkins, MBChB, PhD; Prof. Osama Marglani, MD, FRCSC; Kornkiat Snidvongs, MD, PhD

3:00 pm – 3:30 pm
Break with Exhibitors in Liberty Hall

Moderators: Yvonne Chan, MD, FARS; Sandra Lin, MD, FARS; Nicholas Rowan, MD

3:30 pm – 3:36 pm
Real-world epidemiological outcomes of biologic therapy in CRSwNP
Elchanan Zloczower, MD, MHA
Gurston Nyquist, MD, FARS
Alex Bebin, Dr.
Yonatan Lahav, Prof.
Meir Warman, Dr.
Kaplan Medical Center

Introduction:
Biologic therapy has emerged as a key treatment for chronic rhinosinusitis with nasal polyps (CRSwNP), particularly in refractory cases. While prior research has focused on clinical outcomes, its impact on healthcare use and epidemiological metrics remains unclear.

Methods:
We conducted a retrospective big-data analysis using the Clalit Health Services database, including all CRSwNP patients treated with Dupilumab (anti-IL-4 receptor) and Mepolizumab (anti-IL-5) after endoscopic sinus surgery (ESS) between 2010–2024. We evaluated changes in antibiotic and systemic steroid use for CRS exacerbations, healthcare visits (community clinics, emergency departments [ED], and hospitalizations), and ESS, before and after biologic treatment.

Results:
A total of 861 patients with CRSwNP underwent ESS and subsequently received biologics (Dupilumab: 54.2%, Mepolizumab: 45.8%). Concurrent asthma was present in 62% of patients. The median therapy duration was 25 months (IQR: 8–49). The follow-up period was 130 ± 78 months before treatment and 43 ± 42 months after treatment (mean ± SD).

Biologic therapy significantly reduced antibiotic use (RR: 1.66, $P < 0.001$) and systemic steroid use (RR: 4.59, $P < 0.001$). Healthcare utilization declined across multiple metrics, including community clinic visits (RR: 1.67, $P < 0.001$), ED visits (RR: 2.83, $P < 0.001$), ESS procedures (RR: 5.72, $P < 0.001$), and hospitalizations (RR: 5.72, $P < 0.001$). Serum eosinophil levels dropped from 520 ± 440 cells/μL to 430 ± 460 cells/μL ($P < 0.001$).

Conclusion:
Biologic therapy after ESS significantly reduces healthcare use and systemic medication in CRSwNP patients, underscoring its broader impact on disease burden and healthcare costs.

Top Rated Abstracts – Clinical Abstracts

3:37 pm – 3:44
Olfaction and sinusitis improve in young children after elexacaftor/tezacaftor/ivacaftor (ETI)
Janice Chung, Resident, PGY-2
Eugene Oh, BS, MSE
Michelle Lee, Resident, PGY-4
Jakob Fischer, MD
Jason Woods, Professor of Pediatrics
Edith Zemanick, Professor of Pediatrics-Pulmonary Medicine
Sonya Heltshe, Associate Professor of Pediatrics
Lucas Hoffman, Associate Professor of Pediatrics
Christopher Goss, Associate Professor of Medicine and Pediatrics
JenniferTaylor-Cousar, Professor of Medicine-Pulmonary Sciences & Critical Care
Daniel Beswick, MD, FARS
David Geffen School of Medicine at UCLA

PROGRAM ABSTRACTS

Background:
Chronic rhinosinusitis (CRS) and olfactory dysfunction (OD) adversely impact health and quality of life (QoL) in people with cystic fibrosis (CF). While elexacaftor/tezacaftor/ivacator (ETI) improves pulmonary outcomes and CRS across ages, it does not improve OD in adults or adolescents. Earlier ETI treatment may prevent or mitigate OD.

Methods:
In 2023-24, six U.S. centers prospectively enrolled young children with CF (YCwCF, age≤9y). Sinus magnetic resonance imaging (MRI), sociodemographics, and clinical data were obtained at baseline, and for those who initiated ETI, one year later. Outcomes included MRI-derived sinus volume/opacification (SV/SO), olfactory cleft opacification (OCO), and olfactory bulb volume (OBV), quantified via segmentation; psychophysical pediatric odor identification testing (Pediatric Smell Wheel, PSW); and caregiver-reported sinonasal and olfactory QoL surveys. Linear mixed-effects models evaluated within-subject changes.

Results:
Thirty-one participants (mean age 4.8±1.9y, 54.8% female) were evaluated, of whom 21 initiated ETI. At baseline, mean SO was 65.5±16.0% and mean PSW score was 6.05±2.19 (vs. expected 6.88 in age-matched children from literature). After ETI initiation (mean follow-up 12.3 months, range 11-16), mean SO decreased by 25.6% (95%CI:-37.8,-13.3;p=0.001), mean OCO decreased by 14.4% (95%CI:-22.5,-6.26;p=0.004), mean OBV increased by 7.39mm3 (95%CI:1.78,13.0;p=0.024), and mean PSW score improved by 1.32 points (95%CI:0.25,2.38;p=0.026). QoL scores were near normal at baseline and did not change significantly.

Conclusion:
YCwCF have sinonasal inflammation and OD. ETI initiation at a young age improved olfactory function, structure, and sinus opacification.

3:45 pm – 3:52 pm
AI surveillance post-treatment for NPC: Identification of ORN & recurrence from endoscopic images
Lirit Levi, MD
Jeffrey Huynh, Medical Student
Yi Wang
Maxime Fieux, MD, PhD
Axel Renteria, MD, MS
Mahdokht Manavi, MD
Shiv Sethi, BS
Zara Patel, MD, FARS
Jayakar Nayak, MD, PhD
Peter Hwang, MD, FARS
Michael Chang, MD
Stanford University

Background:
Skull base osteoradionecrosis (SBORN) is a severe complication of radiation treatment often difficult to distinguish from recurrence of nasopharyngeal carcinoma (rNPC). In this study we develop and evaluate a machine learning model (MLM) using a convolutional neural network (CNN) for identifying post radiation rNPC and SBORN.

Methods:
A CNN-based model (EfficientNet) was trained using 1483 nasopharyngeal endoscopic images collected from 192 patients who were treated with radiotherapy at an otolaryngology center between 2013 and 2024. Three types of endoscopy exams were used: normal (n=866), ORN (n=490) and rNPC (n=127). The latter was based on pathological confirmation, with ORN confirmed via imaging and negative pathology for malignancy. Images were annotated by an otolaryngologist and independently verified by two others. Training, validation, and testing were conducted at an 8:1:1 ratio for both binary classification (ORN vs non-ORN) and three-classification (normal, ORN and rNPC) models.

Results:
The binary MLM achieved an accuracy of 92% on the validation set and 93% on the test set. The three-classification MLM achieved an overall accuracy of 78% and 74% in the validation-set and test-set, respectively. For ORN, the model accuracy was 85%, with recall, precision and specificity of 75% and 76% and 89%, respectively. For rNPC, MLM reached 82% accuracy, with recall, precision, and specificity of 62%, 40%, and 85%, respectively.

PROGRAM ABSTRACTS

Conclusions:
Machine learning for nasal endoscopy images has high performance in identifying ORN and moderate performance for rNPC, offering a valuable screening tool for early identification and potentially improving prognosis for these fatal diseases.

3:53 pm – 4:00 pm
Traffic and industrial pollutants and chronic rhinosinusitis: Distinct cytokine endotypes and risk associations
Hong-Ho Yang, MD
Karl O'Sharkey, PhD
Kimberly Paul, PhD
Jeffrey Suh, MD, FARS
Marilene Wang, MD, FARS
Daniel Beswick, MD, FARS
Jivianne Lee, MD, FARS
Stanford University School of Medicine

Background:
Air pollution has been implicated in the pathogenesis of CRS, with eosinophilic inflammation proposed as a key mediator. This study investigates the association between residential exposure to traffic- and industry-related pollutants and both the risk of CRS and cytokine profiles in the sinonasal epithelium.

Methods:
Sinonasal epithelial tissues were collected from 92 patients during ESS and skull base surgeries, including 30 control subjects and 62 CRS subjects. Residential exposure to combustion- and industry-related pollutants was estimated using a validated land-use regression model based on five-year average concentrations at subjects' residences prior to surgery. Specimens underwent flow cytometry and Luminex assays to quantify type 2 inflammatory cytokines (IL-4, IL-5, and IL-13). CRS odds and cytokine levels were evaluated in multivariable logistic regression and negative binomial regression models, respectively, with pollutant concentrations as the primary predictors.

Results:
Adjusting for patient age, sex, and smoking history, each standard deviation increase in NO2 independently predicted an 88% rise in odds of CRS (aOR 1.88, 95% CI [1.08, 3.28]), Benzene with an 89% rise (aOR 1.89 [1.10, 3.26]), and Lead with a 124% rise (aOR 2.24 [1.16, 4.30]). Controlling for CRS status and co-pollutant levels, each SD increase in NO2 was independently associated with a 2.2-fold increase in IL-4 concentration (aIRR 2.16 [1.10, 4.26]) and a 3.2-fold increase in IL-5 concentration (aIRR 3.25 [1.29, 8.18]).

Conclusions:
Residential exposure to combustion- and industry-related pollutants is associated with a higher risk of CRS, potentially mediated by eosinophilic, type 2 inflammation.

4:01 pm – 4:08 pm
Tezepelumab improves sense of smell, evaluated by UPSIT in patients with severe, uncontrolled CRSwNP
Joseph K. Han, MD, FARS
Stella Lee, MD
Martin Desrosiers, MD
Anju T. Peters, MD
Tanya M. Laidlaw
Vaishali S. Mankad
Julie McLaren
Claudia Chen
Andrew W. Lindsley, MD, PhD
Andrew Foster, PhD
Christopher S. Ambrose, MD
Old Dominion University

Background:
Compared with placebo, tezepelumab reduced nasal polyp size and improved sino-nasal symptoms, including sense of smell, among adults with severe, uncontrolled chronic rhinosinusitis with nasal polyps (CRSwNP) in the WAYPOINT study (NCT04851964). This analysis evaluated the time of onset of improvement in sense of smell, as assessed using the University of Pennsylvania Smell Identification Test (UPSIT).

Methods:
Eligible adults were randomized to receive tezepelumab 210 mg or placebo subcutaneously every 4 weeks for 52 weeks. Sense of smell was objectively assessed using UPSIT (maximum score 40; higher scores indicate lower disease severity) at multiple timepoints over 52 weeks. The proportions of patients with anosmia (UPSIT score ≤ 18) were also assessed.

Results:
In the tezepelumab and placebo groups, the baseline mean (SD) UPSIT scores were 13.1 (7.3) and 11.9 (5.9), respectively. UPSIT scores improved from the first post-treatment assessment in tezepelumab recipients (week 4; LS mean difference versus placebo [95% CI]: 6.03 [4.72–7.34]) and continued to improve over time through week 52 (9.46 [7.82–11.10]). At baseline, the

PROGRAM ABSTRACTS

proportions of patients with anosmia were 84.3% (n=166/197) and 89.2% (n=182/204), in the tezepelumab and placebo groups, respectively. The proportion of patients with anosmia from the first post-treatment assessment was lower in tezepelumab than placebo recipients (week 4, 44.7% vs 82.3%, respectively), and this trend continued through week 52 (31.6% vs 74.3%, respectively).

Conclusion:
Tezepelumab improved sense of smell among adults with severe, uncontrolled CRSwNP versus placebo from as early as week 4 (first assessment). Further improvements were observed over the 52-week treatment period.

4:09 pm – 4:16 pm
The MACRO trial - surgery vs clarithromycin vs placebo for adults with CRS
Claire Hopkins, DM, Prof.
Carl Philpott, Dr.
David Beard
Jonathan Cook
Elnaz Saeedi
Anne Schilder
Jane Vennik
D M Thomas
Paul Little
Valerie Lund, Professor
Caroline Clarke
Guy's Hospital London

Background:
Evidence regarding use of antibiotics and endoscopic sinus surgery (ESS) in managing chronic rhinosinusitis (CRS) is lacking. The trial objective was to compare clinical and cost-effectiveness of adding ESS or 3 months of clarithromycin to intranasal medication (IM) in adults with CRS with (CRSwNP) or without nasal polyps (CRSsNP).

Methods:
A 3-arm randomised controlled trial recruited at 20 UK sites. CRS patients remaining symptomatic after receiving IM comprising corticosteroids and saline irrigations were randomised 1:1:1 to receive ongoing IM plus either 1) ESS, 2) clarithromycin (250mg bd for 2 weeks then od for 10 weeks) or 3) matched placebo. Participants and medical staff were blinded to medical interventions but not surgery. Primary outcome measure was the SNOT-22 disease-specific quality-of-life (QOL) questionnaire at 6 months. Secondary outcomes included generic QOL and cost-effectiveness. Planned sample size was 510. An intention-to-treat analysis was undertaken. ISRCTN: 36962030.

Findings:
181/514 (35.2%) female and 333/514 (64.8%) male participants, with CRSwNP (n=410) or CRSsNP (n=104), were recruited between November 2018 and October 2023 and randomised to ESS (n=171), clarithromycin (n=172), or placebo (n=171). Statistically significant mean differences in SNOT-22 favoured ESS over the other groups (-18.13, (98.33%,CI -24.26, -11.99) and -20.44, (98.33%,CI -26.42, -14.46), respectively), all secondary outcomes showed significantly greater improvements with surgery versus clarithromycin or placebo. No significant benefit from clarithromycin over placebo was found.

Interpretation:
ESS improves disease-specific QOL at 6 months in CRS patients. There is no evidence supporting the routine us

4:17 pm – 4:22 pm
Q&A

4:22 pm – 4:32 pm
MOU Signing with All India Rhinology Societies

4:32 pm – 5:20 pm
4th Annual Hwang Family Lectureship
Guest Speaker: Troy Woodard, MD, FARS
"Turning Trials Into Triumphs: Lessons Learned on the Leadership Journey"

5:20 pm – 6:00 pm
Hwang Lecture - Cocktails

President's Welcome Reception
6:00 pm - 7:30 pm Dinner and Cocktails
7:30 pm – 9:00 pm NASHVEGAS ALL STARS BAND Performance
Veterans Hall 3-5

PROGRAM ABSTRACTS

Saturday, October 11, 2025
8:00 am – 12:00 pm
Breakout 1
Grand Ballroom, Salons 1-3

7:00 am – 8:00 am
International Roundtable Breakfast Session
Indianapolis Room A

7:00 am – 8:00 am
Morning Mixer with the Poster Viewing
Liberty Hall

Session Chair: Edward Kuan, MD, FAR

Moderators: Anthony Del Signore, MD, FARS; Angela Donaldson, MD, FARS; Mathew Geltzeiler, MD, FARS

8:00 am – 8:06 am
Nasoseptal-lacrimal fossal distance and DCR failure
Kalena Liu, BS
Christopher Valentini, MD
Kelsey Limage, BS
Henry Moss, MD
Ava Whitlark, BS
Tiffany Cheng, MD
Charlotte Marous, MD
Adam Flanders, MD
Karine Shebaclo, MD
Alison Watson, MD
Mindy Rabinowitz, MD, FARS
Thomas Jefferson University

Introduction:
Dacryocystorhinostomy (DCR) is a surgery performed for nasolacrimal duct obstruction (NLDO). A high septal deflection may contribute to DCR failures due to limited surgical access and increased adhesion formation. We hypothesize that a narrower nasal septum (NS) and lacrimal fossa (LF) distance is associated with higher rates of DCR failure.

Methods:
A single-institution retrospective chart review was performed for patients who received endoscopic "Endo DCR" from 7/2018 – 7/2023, with follow-up until 12/2024. DCR for sinonasal/lacrimal duct malignancies was excluded. NS-LF distance was measured on preoperative CT in the coronal plane. Failure was defined as the need for a repeat DCR within follow-up period. T-tests, chi-squared tests compared patient characteristics and ROC curve analysis predicted distance cutoff for failure.

Results:
523 patients were identified, with an average age of 60.3 years (SD=16.47). 4.4% (n=23) of patients experienced DCR failure, requiring revision DCR. 16% (n=81) of patients underwent concomitant septoplasty with initial DCR. Patients who failed had a significantly shorter NS-LF distance (8.47 mm vs 9.25 mm, p=0.028). ROC curve analysis identified a cutoff distance of 8.85 mm as the optimal threshold, where NS-LF distance ≥ 8.85 mm had a significantly lower failure rate compared to those with a distance < 8.85 mm (2.6% vs. 7.3%, p=0.016). All revisions were successful regardless of septoplasty status.

Conclusion:
A NS-LF distance of <8.85 mm was significantly associated with DCR failure suggesting that concomitant septoplasty should be considered in these patients. Prospective studies and standardized preoperative imaging may improve surgical planning and outcomes in endo DCR.

8:07 am – 8:13
Teprotumumab therapy for thyroid eye disease: Efficacy and impact on use of orbital decompression
Nitish Kumar, MBBS, MS
Devyani Lal, MD, FARS
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Amar Miglani, MD
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Mayo Clinic – Arizona

Background:
We investigated the impact of teprotumumab therapy (TT) on orbital decompression (OD) performance in treating thyroid eye disease (TED) and compared the efficacy of OD vs. TT on exophthalmos reduction.

Methods:
The Electronic database was queried to identify TED patients treated pre (2015-2020) and post TT (2020-25) approval. Exophthalmos reduction was compared between OD and TT for immediate (≤6 weeks post-intervention) and long-term follow-up; significant exophthalmos reduction (SER) was defined as ≥2 mm reduction.

PROGRAM ABSTRACTS

Results:
Pre-TT approval (n=145), 53 (36.5%) TED patients underwent OD. Post-TT approval (n=262), 29 (11.1%) patients underwent primary OD, and 68 (25.9%) had TT. Nine TT patients (13.2%) underwent subsequent OD, and 3 OD (10.3%) patients underwent subsequent TT. Immediate SER was observed in 94.4% of OD vs. 79.5% TT patients (p=0.028). Median reduction was higher with OD vs. TT (5mm vs. 4mm; p=0.001). Long-term SER was present in 87.8% OD (median 13 months) vs. 62.9% TT patients (median 12 months) (p=0.042). Median reduction was not dissimilar [4mm vs. 3.5mm; p=0.058]. Baseline diplopia was present in 49 (59.7%) OD and 54 (79.4%) TT patients (p=0.019). 17 OD (20.7%) vs. 4 (5.9%) TT patients developed post-intervention diplopia (p=0.008). Among them, 7 OD patients needed strabismus surgery, and the rest (10 OD, 4 TT) were managed with prisms.

Conclusions:
OD for TED decreased after teprotumumab introduction. OD had greater efficacy at exophthalmos reduction in a higher number of patients, in both short and long-term, but had higher post-treatment diplopia rates. In the teprotumumab era, OD indications may be restricted to TT recalcitrant TED or urgent decompression need.

8:14 am – 8:20 am
Olfaction preservation following unilateral endoscopic craniofacial resection
Tae-Bin Won, MD, PhD
Sung-Woo Cho, MD, PhD
Chae-Seo Rhee, MD
Dong-Yong Kim, Prof.
Hyun Jik Kim
Jeong-Whun Kim, Professor
Doo Hee Han
Seoul National University Hospital

Background:
This study evaluated olfactory preservation in patients undergoing unilateral endoscopic craniofacial resection (uECFR) and factors affecting olfactory outcomes.

Methods:
A retrospective review was performed on patients who underwent uECFR with resection of the dura and olfactory bulb by a single surgeon from 2010–2024. Demographics, pathology, and adjuvant radiotherapy were reviewed. Patients with prior radiation or follow-up <6 months were excluded. Olfactory function was assessed preoperatively and ≥6 months postoperatively. All patients completed a visual analog scale (VAS; 0–10) and one of the following: the Korean version of the Olfactory Questionnaire (KOQ), the Korean version of the Sniffin' Sticks test (KVSS), or the Cross-Cultural Smell Identification Test (CCSIT). Preservation was defined as a postoperative VAS >7 and a test score ≥70% of the preoperative value.

Results:
Twenty-four patients (mean age 41.3 ± 14.4 years) were included. Esthesioneuroblastoma (ENB) was most common (n = 20), followed by malignant melanoma (n = 2), adenoid cystic carcinoma (ACC) (n = 1), and squamous cell carcinoma (SCC) (n = 1). Negative margins were achieved in all but one; 11 received adjuvant radiotherapy. Mean follow-up was 47.2 months. Recurrences included 1 regional (ENB), 2 local (SCC, ENB), and 1 distant (ACC). Olfactory preservation was observed in 15 (62.5%, mean VAS 8.8); 9 (37.5%) had no preservation (mean VAS 0.3). Preservation was more common in non-irradiated patients (13/13) than irradiated (2/11) ($p < 0.001$).

Conclusion:
uECFR with dura and olfactory bulb resection may offer oncologic control with olfactory preservation, particularly in cases managed without the need for adjuvant radiotherapy.

8:21 am – 8:27 am
Surveillance recommendations after GTR of uncommon benign sinus tumors: A multi-institutional review
David Lerner, MD
Iulia Tapescu, Medical Student
Yasser Almansour, Medical Student
Derek Liu, MD
Margaret Mitchell, MD
John Craig, MD, FARS
Jacob Eide, MD, FARS
Edward Kuan, MD, FARS
James Palmer, MD, FARS
Nithin Adappa, MD, FARS
Michael Kohanski, MD, FARS

Objective:
To examine recurrence rates for less common benign sinonasal tumors after endoscopic gross total resection and offer guidance regarding

optimal post-operative surveillance strategies based on a multi-institutional experience with prolonged follow-up.

Methods:
A multi-institution review was conducted including patients undergoing endoscopic gross total resection of benign sinonasal tumors between Jan 2010 and June 2023 from four tertiary care academic centers. Excluded were malignant tumors, osteomas, juvenile angiofibroma, and inverted papillomas as well as patients with less than 6 months of follow-up. Tumors were categorized as mesenchymal, vascular, or neural.

Results:
Forty-seven patients were included with an average age of 51.9 years. Mesenchymal tumors accounted for 46.8% (n=22) of all cases followed by vascular (31.9%, n=15) and neural (21.3%, n=10) tumors. Patients were followed for an average of 24.1 months (median 17.8 months) with an average of 2.7 surveillance visits in the first year after surgery. Mesenchymal tumors included solitary fibrous tumor (SFT, n=8) among others while vascular tumors included lobular capillary hemangiomas (n=8) most commonly. All neural tumors were schwannomas. There was only one recurrence, a cavernous hemangioma detected after 10 months endoscopically.

Conclusion:
Our findings suggest a low recurrence rate among uncommon benign sinonasal tumors after undergoing endoscopic gross total resection. Our findings support a standard one-year surveillance period with tumors at low risk of recurrence. After this period, surveillance should be tailored with endoscopy and imaging as needed for higher-risk tumors such as SFT and pleomorphic adenoma.

8:28 am – 8:34 am
Comparison of commerical dural tissue sealants
Katherine Lauritsen, MBS
Aishwarya Menon, Post doctoral fellow
Kaete Archer, MD
Myah Webb, Graduate Student
Jonathan Ting, MD, FARS
Jonathan Wilker, Professor
Vijay Ramakrishnan, MD, FARS
Julie Liu, Professor
Rutgers New Jersey Medical School

Endoscopic skull base surgeons use dural sealants as adjuncts to prevent CSF leaks, yet evidence for their impact on outcomes and data comparing the commercially available products is limited. This study compares the burst pressure and cyclic performance of three PEG-based (DuraSeal®, Adherus®, Coseal) and three fibrin-based (TachoSil®, TISSEEL, VISTASEAL™) sealants in repaired porcine dura after varying cure times using a novel assembly of a pressure apparatus. Porcine dura mater (Animal Technologies, Inc.) was punctured and repaired with sealants beneath a Biodesign® Duraplasty Graft (Cook Biotech Inc.). Burst pressure was measured after 15 mins at room temperature and at 2 and 4 hours in a humidified incubator. Sealants' integrity was tested after five rounds of intracranial hypertensive pressures (between 20-25 cmH2O) in 15-second cycles following 15 mins of cure time. Burst pressure was also compared when sealants were applied above the Biodesign®. Statistical analysis was performed using JMP software. Among fibrin-based sealants, compared to other cure times, TISSEEL showed higher burst pressure at 2-hour cure time ($p < 0.05$), while TachoSil® and VISTASEAL™ performed worse at 24 hours. PEG-based sealants were unaffected by cure time. Sealant placement beneath the Biodesign® improved burst pressure for TISSEEL and Coseal. VISTASEAL™ and DuraSeal® failed after one cycle, whereas other sealants maintained performance during cyclic testing. Fibrin-base sealants demonstrate cure-time dependent performance, whereas PEG-based sealants were unaffected by cure times. Placement beneath the Biodesign® graft improves burst pressure for select sealants. VISTASEAL™ and DuraSeal® show limited durability under cyclic pressure.

8:35 am – 8:40 am
Q&A

Moderators: Meha Fox, MD, FARS; Ashleigh Halderman, MD, FARS

8:41 am – 8:47 am
CPAP at cribriform plate
Glen D Souza, MD
Peter Filip, MD
Vidit Talati, MD
Michael Hutz
Peter Papagiannopoulos, MD
Stephan Munich, MD
Pete S. Batra, MD, FARS
Bobby Tajudeen, MD, FARS
Rush University Medical

PROGRAM ABSTRACTS

Introduction:
Previous studies have described continuous positive airway pressure (CPAP) levels transmitted to the sphenoid sinus but pressure transmitted to the cribriform plate (CP) remains unknown. There is concern that early CPAP re-initiation post-operatively may dislodge reconstruction at the CP. Here, we measure pressure transmitted to the CP and its impact on reconstruction.

Methods:
In 3 fresh fixed cadaver heads, sinus surgery with posterior septectomy was performed and a pressure sensor was placed at the CP. CPAP was applied and ramped from 4 to 20 cm H2O over 5 minutes. Pressure measurements were performed after CP resection and following reconstruction via an endoscopic pericranial flap (EPF). The difference in pressure transmission before and after EPF use was analyzed by a paired t-test using SPSS 28.

Results:
With CPAP at 5, 10, 15 and 20 cm H2O, the intact CP received 4.64, 7.65, 11.65 and 14.65 cm H2O respectively which equates to 92.8 %, 76.5%, 77.67% and 73.25 % of total CPAP level. Following EPF placement this reduced to 4.16, 7.20, 11.20 and 14.20 cm H20 or 83.2%, 72%, 74.66 % and 71% of total pressure. The mean pressure difference was 0.45 cm H2O, SD-0.15, SEM-0.07 which was statistically significant ($p<0.001$). The EPF was not displaced with CPAP.

Discussion:
Pressure transmission to the CP ranges from over 70-90% of the total CPAP level. While numerically modest, the EPF significantly reduced pressure transmitted to the skull base which could be protective. Whether these pressures are transmitted intracranially through the CP is yet to be studied.

8:48 am – 8:54 am

Acute invasive fungal sinusitis: A large database analysis of factors associated with mortality

Franklin Wu, MD
Heli Majeethia, BS
Kristina Montez
Daniel Gorelik, Resident Physician
Zain Mehdi, BS
Sebastian Vazquez, CRC / RF
Lauren Roland, MD
Masayoshi Takashima, MD, FARS
Omar Ahmed, MD, FARS
Houston Methodist Hospital

Objective:
Prior studies analyzing invasive fungal sinusitis (IFS) have been restricted to small datasets and institutional studies due to the rarity of the disease and lack of a specific ICD-9 or ICD-10 code. This study aims to identify predictive risk factors for mortality in patients with IFS.

Methods:
Based on a previously validated algorithm, patients with IFS were identified in the TriNetX global research database. Patient characteristics and comorbidities were studied using hazard ratios and p-value of 0.05 considered significant.

Results:
Of the 1336 IFS patients identified, 50% were concentrated in Southern USA. 53% had hematologic or lymphoid malignancies. Overall mortality rate was 12% at 1 month and 31% at 1 year after diagnosis. All cause 1-month mortality rates for patients with immunodeficiency were as follows: 8% for diabetes, 15% for hematologic or lymph malignancies, 15% for bone marrow disorders, and 7% for immunoglobulin deficiencies. Severe neutropenia (ANC < 500) was linked to significantly higher 5-year mortality (OR 3.897, 95% CI: [3.067, 4.953]). Patients ≥ 65 y/o had lower 5-year survival than those aged 18–44 (HR 0.691, 95% CI: [0.552–0.864]) and 45–64 (HR 0.773, 95% CI: [0.637–0.937]). Patients who received amphotericin had a significantly higher mortality compared to those who never received a dose (HR 1.894, 95% CI: [1.506, 2.381]).

Conclusion:
This novel large-scale IFS database study demonstrated that cases were higher in the south where allergic fungal disease is more prevalent. Additionally, age >65, blood and lymph malignancies, bone marrow disorders, severe neutropenia and amphotericin usage increased mortality rates. Further studies are needed to better characterize IFS.

PROGRAM ABSTRACTS

8:55 am – 9:01 am

Draf 3 with steroid irrigations reduces dependence on biologics in CRSwNP patients

Maria C. Espinosa, MD
Christian Jung, BA
Alison Yu, MD
Mimi Kim
Stacey Kwan
Matthew Bode
Michael Kohanski, MD, FARS
Jennifer Douglas, MD, FARS
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
University of Pennsylvania

Introduction:
While biologics have emerged as promising treatment options for CRSwNP, they entail high costs, continuous treatment, and may have adverse effects. Surgical interventions, such as the Draf 3, remain a well-established approach for refractory cases. The comparative efficacy of biologics and surgical intervention remains a nascent field.

Objective:
This study compares the efficacy of biologics and Draf 3 surgery in conjunction with steroid irrigations as definitive treatment for CRSwNP. We hypothesize that Draf 3 provides equal or superior long-term disease control.

Methods:
Patients who underwent Draf 3 for CRSwNP over an 18-year period at a tertiary hospital were analyzed and reviewed for history of biologic use. Data collected included demographics, surgery indication, biologic type and indication, duration of treatment, current biologic use.

Results:
404 patients underwent Draf 3 for CRSwNP, of which 23.3% had a history of biologic use. 54.3% of those on biologics were on a biologic for CRSwNP (31.9% CRSwNP, 22.34% for CRSwNP + other indication). Other biologic indications included asthma (54.3%), AERD (9.6%), and urticaria (4.3%). Half of those on a biologic for CRSwNP were able to stop an average of 628.6 days after Draf 3. 76% of patients who underwent Draf3 for CRSwNP had no history of biologic use.

Conclusion:
Nearly 25% of CRSwNP Draf 3 patients had a history of biologic use, with more than half of these patients using biologics specifically for CRSwNP. Half of those on biologics for CRSwNP were able to discontinue therapy following surgery. These findings suggest that Draf 3 with topical steroid irrigations may serve as an option for CRSwNP patients and reduce the need for long-term biologic therapy.

9:02 am – 9:08 am

Perioperative management of anti-thrombotic medications in rhinologic surgery

Matthew Mendelsohn, MD
Charles Tong, MD, FARS

Objectives:
Perioperative management of antithrombotic therapy poses a critical challenge in sinus surgery. Currently, no established guidelines exist for managing patients on these therapies within rhinology. This study aims to assess how American Rhinologic Society (ARS) members manage antithrombotic therapy and develop an evidence-based guideline for rhinologic procedures.

Study Type/Design:
A cross-sectional study was conducted using a 59-question survey to assess current practices among ARS members in managing patients on antithrombotic agents. A literature review and consultation with a board-certified cardiologist were performed to develop a management algorithm.

Results:
A total of 98 ARS members participated. Most respondents (60%) have over 10 years of experience, work in an academic hospital (66%), and perform 100-200 procedures annually (43%). The majority reported discontinuing all antiplatelet drugs before surgery, based on personal experience (73%) or cardiologist advice (35%). Among those who continued aspirin, 16% experienced complications, including bleeding that required aborting the procedure (50%) or readmission (25%). No complications were reported when aspirin was withheld. For direct oral anticoagulants (DOACs) and warfarin, 86-95% of surgeons discontinued them before surgery, chiefly guided by cardiology recommendations (72-74%). One complication related to withholding therapy was reported.

Conclusion:
The study revealed significant variability in managing antithrombotic therapy among rhinologic surgeons, with notable adverse events

reported. To address this, we developed an evidence-based algorithm incorporating HAS-BLED and CHA2DS2-VASc scores to guide rhinologists in managing anticoagulation therapy.

9:09 am – 9:15 am
Q&A

9:15 am – 9:45 am
Panel: "Doing more with less – Advancing rhinology care in resource-poor environments"
Moderator: Sanjeet Rangarajan, MD, FARS
Panelists: Mohnish Grover, MS ENT; Katie Philips, MD; Alok Saini, MD, FARS; Christian Quitter, MD

9:45 am – 10:15 am
Break with Exhibitors in Liberty Hall

Moderators: Christopher Le, MD, FARS; Victoria Lee, MD, FARS

10:15 am – 10:21 am
A novel nomogram-based stratification system for inverted papilloma: A multi-institutional study
Tristan Tham, MD
Charles Tong, MD, FARS
Seungjun Ahn, Assistant Professor
Eun Jeong Oh, Assistant Professor
Stanford University

Introduction:
Inverted papilloma (IP) is a benign sinonasal tumor prone to recurrence and malignant transformation. Despite attachment-oriented surgery, recurrence remains a challenge. This multi-center study evaluates clinical and histopathologic predictors of recurrence and develops a prognostic nomogram for individualized risk estimation. To our knowledge, this is the largest study to date investigating clinical factors of recurrence of IP in combination with detailed histopathological data such as dysplasia.

Methods:
We conducted a retrospective cohort study across seven academic centers, including patients with histologically confirmed IP. Prognostic factors (e.g., age, smoking, focality, surgical technique, dysplasia) were assessed. Recurrence-free survival (RFS) was analyzed using Cox regression, and a nomogram was created from the final multivariable model.

Results:
Among 438 patients, 59 (13.5%) had recurrence. On univariable analysis, high-risk dysplasia (HR: 3.23, 95% CI: 1.70 - 6.13, p <0.001) and multifocality (HR: 2.32, 95% CI: 1.37 - 3.92, p = 0.002) were found to be associated with poorer RFS. Similarly, multivariable analysis identified high-risk dysplasia (HR: 3.03; 95% CI: 1.59–5.76; p < 0.001) and tumor multifocality (HR: 2.25; 95% CI: 1.33–3.83; p = 0.003) as independent predictors of poorer RFS. The final nomogram model included these two variables.

Conclusion:
In a large cohort study of IP, this study identifies both tumor multifocality and high-risk dysplasia as being associated with poorer RFS in patients with IP. Incorporating these into a prognostic model may improve risk stratification and postoperative surveillance, potentially enhancing long-term outcomes.

10:22 am – 10:28 am
PM2.5 exposure and recurrence risk in sinonasal inverted papilloma
Stefany Lazieh, BA
Mohammed Ullah, Medical Student
Jonathan Wang, Medical Student
Cole Brokamp, Associate Professor of Pediatrics
Andrew Lane, MD, FARS
Nyall London, MD, FARS
Nicholas Rowan, MD
Wojciech K. Mydlarz, MD
Murugappan Ramanathan, MD, FARS
Johns Hopkins University School of Medicine

Background:
Sinonasal inverted papilloma (IP) is a benign tumor with a high recurrence rate, propensity for malignant transformation, and association with increased concentration of particulate matter smaller than 2.5 microns (PM2.5). Here we examine the relationship between chronic PM2.5 exposure and IP recurrence, need for repeat surgery, and tumor characteristics.

Methods:
Patients diagnosed with IP at an academic medical center between 2013–2016 were included. PM2.5 exposure at 1-, 3-, and 5-years prior to diagnosis was estimated using patient zip codes and a validated spatiotemporal exposure assessment model. Logistic regression assessed associations between PM2.5 and tumor location, recurrence, and surgical details, adjusting for age, sex, race, tobacco/alcohol use, and insurance

type. Results: Among 156 patients (mean age 55 ± 13.5 years; 64.7% male), 126 had complete exposure data. Tobacco use was reported by 52.0%, alcohol use by 42.5%. There were significantly higher odds of recurrence with higher 1-year (aOR 1.36, CI: 1.09-1.69), 3-year (aOR 1.33, CI:1.07-1.64), and 5-year (aOR 1.37, CI: 1.11-1.71) PM2.5 exposures. Odds of requiring repeat surgery were also elevated with higher 1-year (aOR 1.38, CI: 1.11-1.71), 3-year (aOR 1.37, CI: 1.10-1.70), and 5-year (aOR 1.39, CI: 1.12-1.74) exposures. No significant associations were found with tumor characteristics (location, multifocal attachment site), malignancy, or surgery-specific features (positive surgical margins, resectability, drilling of the attachment site). Conclusion: Chronic PM2.5 exposure is associated with increased odds of IP recurrence and the need for revision surgery, highlighting environmental pollution's role in disease progression and patient outcomes.

10:29 am – 10:35am

Artificial intelligence analysis of endoscopic images for the diagnosis of nasopharyngeal carcinoma

Jeffrey Huynh, BS
Lirit Levi, MD
Yi Wang
Maxime Fieux, MD, PhD
Axel Renteria, MD, MS
Mahdokht Manavi, MD
Shiv Sethi, BS
Zara Patel, MD, FARS
Jayakar Nayak, MD, PhD
Peter Hwang, MD, FARS
Michael Chang, MD
Stanford University School of Medicine

Objective:
Endoscopy is a critical tool in diagnosing nasopharyngeal carcinoma (NPC) and relies on the clinician's identification of this lesion of endoscopic images. In this study, we constructed and evaluated a machine learning model (MLM) to identify and segment NPC from endoscopic images.

Methods:
We developed a DINOv2-based vision transformer MLM with endoscopy images of the nasopharynx from patients at an otolaryngology center from 2013 to 2024. Patients with normal, adenoid, and malignant diagnoses were included. Diagnoses and tumor morphology were annotated by a team of otolaryngologists and researchers and were verified by two other otolaryngologists. Ground truth for diagnosis was established from pathology reports. Training, validation, and testing of the model were conducted at an 8:1:1 ratio. A total of 1385 images from 273 patients were used. Our MLM was trained on 1012 normal, 182 adenoid, and 191 malignant tumors.

Results:
Our MLM achieved overall accuracies of 87.5% and 78.5% within the validation and novel test sets, respectively, and a segmentation Dice similarity coefficient of 76.2%. For normal images, the model achieved an 82.4% accuracy, 91.4% precision, 83.5% recall, 79.5% specificity, and 87.3% F1 score. For adenoid images, the model achieved an 90.9% accuracy, 65.4% precision, 73.2% recall, 93.7% specificity, and 68.7% F1 score. For malignant images, the model achieved an 83.7% accuracy, 44.6% precision, 58.0% recall, 87.9% specificity, and 50.3% F1 score.

Conclusion:
MLMs can with moderately high accuracy identify the presence of malignancies in nasopharyngeal endoscopy images, providing an additional and valuable screening helping clinicians with NPC identification on endoscopy.

10:36 am – 10:40 am

Q&A

Moderators: Nyall London, MD, FARS; Zachary Soler, MD, FARS

10:41 am – 10:47 am

Endoscopic findings as predictors of CRS control and long-term disease outcomes

Steven Chun-Kang Liao, MD
Aditi Agarwal, MBBS
Siyuan Dong, MS
Junqin Bai, PhD
Brooke N. Gleason
David B. Conley, MD, FARS
Kevin C. Welch, MD, FARS
Stephanie Shintani-Smith, MD
Robert Kern, MD, FARS
Lutfiyya N. Muhammad, PhD
Bruce K. Tan, MD
Northwestern University

Background:
EPOS 2020 defined chronic rhinosinusitis (CRS) disease control using patient symptoms, medication usage but endoscopic findings were considered optional. The effect of adding

endoscopic features, an appropriate threshold, and their association with present or future symptom control have not been studied.

Methods:
A prospective cohort study of 188 adult CRS patients undergoing bilateral endoscopic sinus surgery from 2017 to 2023 was conducted. Patients were assessed at 6-12 months (V1) and 18-60 months (V2) postoperatively. Individual patient symptoms from the SNOT-22, endoscopic findings (modified Lund-Kennedy score, MLK), and medication usage were recorded. CRS control status was classified as controlled, or poorly controlled (EPOS partly/uncontrolled) based on EPOS 2020 criteria without endoscopic features. The predictive role of endoscopic findings was analyzed.

Results:
Endoscopic findings were weakly associated with concurrent control status but the total MLK (V1 AUC=0.631, $p<0.001$; V2 AUC=0.62, $p<0.05$) outperformed individual MLK components. Adding MLK to V1 control status improved prediction accuracy of V2 control in contrast to V1 control status defined without endoscopic features (AUC=0.751 vs 0.721, both $p<0.001$). An MLK <2 showed the highest predictive accuracy for V2 control status (AUC: 0.761, $p<0.001$; $\chi 2=7.202$, $p<0.01$).

Conclusion:
While endoscopic findings are only weakly associated with concurrent control status, their addition enhances the prediction of long-term CRS outcomes. Our study provides the first real-world evidence supporting endoscopic findings as predictors for CRS disease progression, with an MLK threshold <2 having moderate predictive accuracy for future maintenance of control.

10:48 am – 10:54 am
Healthcare visits following biologic versus surgical treatment in chronic rhinosinusitis patients
Beau Idler, MD

Background:
Biologics are increasingly used in the treatment algorithm of patients with chronic rhinosinusitis with nasal polyps (CRSwNP). We investigated healthcare utilization in patients treated with biologics versus endoscopic sinus surgery (ESS).

Methods:
We conducted a retrospective analysis of adults with chronic rhinosinusitis treated with ESS or biologics from 2019 to 2024 using a national database. We assessed healthcare utilization, including steroid and antibiotic prescriptions, ED and outpatient visits, CRS-associated complications, and common procedural terminology (CPT)-associated costs for 12 months after treatment onset. CRS patients treated with either biologics or ESS were analyzed using unmatched, demographics matched, and propensity score matched (PSM) analyses.

Results:
Sinus-related office or inpatient visits were significantly lower in the biologics group (n=5110) than the surgical group (n=33450) using all comparisons (PSM: OR 0.84, $p=0.003$ and OR 0.19, $p<0.001$, respectively). The average CPT costs were higher in the biologics group using unmatched and demographics matched comparisons ($p<0.001$ and $p<0.001$, respectively), but not with PSM ($p=0.67$). Post-treatment antibiotic or steroid use was elevated in biologics patients using unmatched and demographics matched comparisons (OR 1.26, $p<0.001$ and OR 1.23, $p<0.001$), but not PSM (OR 1.02, $p=0.75$). There were no differences in complications (PSM: OR 1.05, $p=0.79$) or ED visits (PSM: OR 0.63, $p=0.06$).

Conclusion:
Patients treated with biologics have lower healthcare visits than those treated with ESS, though they may have higher costs and steroid/antibiotic use. There is no significant difference in complications or ED visits between the two treatments.

10:55 am – 11:01 am
The impact of health locus of control on outcomes in patients with CRS after ESS
Katherine Mozingo, Medical Student
Kai Kokesh, Medical Student
Felix Fernández-Penny, MD/MBA Candidate
Abdullah Bhurgri, Medical Student
Waleed M. Abuzeid, MD, FARS
Ian M. Humphreys, DO, FARS
Cynthia Levine, MD
Aria Jafari, MD, FARS
Hector A. Perez, MD
University of Washington

PROGRAM ABSTRACTS

Health locus of control (HLC) reflects an individual's perception of what influences their health, and is categorized into three loci: internal (IL), chance (CL), and powerful others (POL). In other chronic conditions, HLC has been shown to impact patient outcomes. However, its role in sinonasal disease remains unexamined. This study investigates the influence of HLC on postoperative outcomes in patients with chronic rhinosinusitis (CRS).

Multidimensional Health Locus of Control Form C (MHLC-C) surveys, demographics, and pre- and postoperative SNOT-22 surveys were collected from 65 adult patients with CRS who underwent endoscopic sinus surgery (ESS) and attended ≥ 3 postoperative visits. Primary HLC alignment was defined by the highest MHLC-C subscale score (IL, CL, or POL). Associations between MHLC-C scores and changes in SNOT-22 scores were analyzed.

Primary HLC alignment of the cohort was: 18% IL, 9% CL, and 80% POL. Average SNOT-22 scores at the third postoperative visit were: IL = 16 ± 11, CL = 14 ± 15, POL = 21 ± 17 ($p = 0.53$); with greater improvement observed in the IL and POL groups compared to the CL group ($p < 0.001$). The minimal clinically important difference (MCID) was achieved by 90% of IL-, 75% of POL-, and 33% of CL-aligned patients. Across all groups, higher CL subscale scores were associated with worse postoperative SNOT-22 outcomes ($r = 0.30$).

An internal health locus of control is associated with a higher likelihood of achieving the MCID after ESS, compared to reliance on chance or powerful others. Otolaryngologists may consider strategies to strengthen patients' internal locus, and reduce chance locus, to enhance patient experience and optimize surgical outcomes.

11:02 am – 11:08 am
Effect of functional nasal surgery on facial pain: A prospective cohort study
John Craig, MD, FARS
Jolly Grewall, Resident
Anne Grossbauer, Medical Student
Carl Wilson, MS
Robert Deeb, Clinical Associate Professor
Henry Ford Health

Introduction:
Functional nasal surgery reliably alleviates nasal obstruction and improves quality-of-life. However, its effect on facial pain (FP) has yet to be studied. This study analyzed FP outcomes following functional nasal surgery.

Methods:
A prospective cohort study was conducted with patients who underwent functional nasal surgery to address nasal obstruction over 18 months by two surgeons. Nasal Obstruction Symptom Evaluation (NOSE, 0-20) and facial pain scores (FPS, 0-5) were collected preoperatively and postoperatively. NOSE and FPS changes were compared between patients with FPS≥2 versus FPS<2 (i.e. with versus without preoperative FP).

Results:
Of 91 patients, mean age was 45.6 years and 62.6% were male. Preoperatively, 36 patients had bothersome FP, and 12/36 (33.3%) had primary headache disorders. Preoperative mean FPSs were 3.2 and 0.2 for those with versus without preoperative FP, respectively. Mean durations to first and second postoperative visits were 47.7 and 203.1 days, respectively. Across all patients, mean NOSE scores were significantly reduced at each follow-up (-9.5, $p<0.0001$). Patients with preoperative FP achieved significantly greater reductions in FPSs at first (-1.74 versus +0.24, $p<0.0001$) and second (-2.20 versus +0.04, $p<0.0001$) postoperative visits, and this was not affected by presence of headache disorders. The relative risk (RR) of having FPS≥2 was also significantly reduced at first (RR=0.44, $p=0.0002$) and second (RR=0.33, $p=0.003$) postoperative visits.

Conclusions:
In patients with nasal obstruction and FP preoperatively, functional nasal surgery led to significant improvements in both nasal obstruction and FP, and these improvements were stable six months postoperatively.

11:09 am – 11:15 am
Q&A

PROGRAM ABSTRACTS

11:15 am – 12:00 pm
Panel: "Surgical Strategies for Challenging CSF Leak Cases"
Moderator: Jessica Grayson, MD
Panelists: Andy Chua, MD, FARS; Prof. Cem Meco, MD; Brian Thorp, MD, FARS; William Yao, MD, FARS
Sponsored by the Skull Base and Orbital Surgery Section

12:00 pm – 1:00 pm
Residents and Fellows Lunch Session
"Igniting your career: Making the most of the first three years post-training"
Indianapolis Room AB

12:00 pm – 1:00 pm
Lunch in Exhibit Hall and Posters
Liberty Hall

Saturday, October 11, 2025
8:00 am – 12:00 pm
Breakout 2
Grand Ballroom, Salon 4

7:00 am – 8:00 am
International Roundtable Breakfast Session
Indianapolis Room A

7:00 am – 8:00 am
Morning Mixer with the Poster Viewing
Liberty Hall

Session Chair: Jason Talmadge, MD

Moderators: Stephanie Smith, MD; Sarah Wise, MD, FARS

8:00 am – 8:06 am
Characterization of T and B cell repertoires in patients with acute invasive fungal sinusitis
Khai Nguyen, BA
John Schneider, MD
Nyssa Farrell, MD
Lauren Roland, MD
Washington University in St. Louis

Background:
Acute invasive fungal sinusitis (AIFS) almost exclusively affects immunocompromised patients. Innate immune defects, such as myeloid malignancies and neutropenia, are risk factors for AIFS. Recent evidence has suggested a protective role of adaptive immune cells in AIFS. We hypothesize that adaptive immune responses are critical to infection control in the setting of innate immune deficiencies in AIFS.

Methods:
T-cell receptor (TCR) and B-cell receptor (BCR) complementarity determining region 3 (CDR3) sequences were mined from RNA-sequencing data of AIFS and control subjects (n=12/group) from our surgical patient biobank. Clonal homeostasis, clonal diversity, V-gene usage, and isotype composition were examined. BCR biophysical properties were analyzed. BCL6 mRNA expression was compared.

Results:
Both T and B cells were clonally expanded in AIFS, coupled with a decrease in repertoire diversity, indicating antigen-driven clonal selection and proliferation. BCRs preferentially used IGHV4-31 and IGKV2D-29, suggesting selective pressures that favor these variable genes. The IgG:IgA ratio was elevated in AIFS, implying a shift from mucosal immunity towards responses against acute antigens. AIFS BCR light and heavy chains exhibited substantial biophysical differences, representative of divergent antigenic specificities compared to non-infected controls. BCL6, a germinal center response marker, was upregulated in AIFS.

Conclusion:
The adaptive immune repertoire in AIFS exhibited multiple changes suggestive of activation and response to pathogen. Future studies should focus on delineating cell type-specific processes that promote control of infection and survival in AIFS to develop targeted treatment options.

8:07 am – 8:13 am
Multi-omic spatial analysis of persistent immune activation in dupilumab-treated CRSwNP
Tolani Olonisakin, MD, PhD
Abigail Gaffar
Paul Cowan, DO
Andrew Lane, MD, FARS
Johns Hopkins University

Background:
Dupilumab, a biologic that inhibits IL-4R signaling induced by both IL-4 and IL-13, has revolutionized management of chronic rhinosinusitis with polyposis. However, the disease recurs when the

medication is stopped, suggesting persistence of inflammatory drivers even while on dupilumab. Here we seek to identify upstream mechanisms that remain active when the disease is clinically controlled on dupilumab.

Methods:
We performed immunohistochemistry, spatial transcriptomics with Visium HD technology, and single cell spatial phenotyping using the PhenoCycler-Fusion system on formalin-fixed paraffin-embedded tissue obtained from CRSwNP patients before and during dupilumab treatment. Protein data was analyzed using QuPath and CytoMAP.

Results:
Tertiary lymphoid structures defined by CD4+ CD20+ aggregates were demonstrated in sinonasal mucosa in dupilumab-treated patients. These aggregates were found to be enriched in memory/multipotent progenitor CD4+ TCF1+ cells. As expected, we observed downregulation of IL13-dependent genes—ALOX15, periostin, and eotaxins—in the epithelial cell compartment of dupilumab-treated ethmoid tissue compared to nasal polyps. A number of other mediators, including the CXC chemokine family appeared to be upregulated in dupilumab-treated tissue compared to nasal polyp.

Conclusions:
Tertiary lymphoid structures can be spatially identified in nasal polyp tissue and colocalize with memory/multipotent progenitor CD4+ TCF1+ cells. Tissue obtained from dupilumab-treated patients show persistence of tertiary lymphoid structures enriched in CD4+ TCF1+ cells, as well as upregulation of specific inflammatory mediators, suggesting potential for novel targeted therapy.

8:14 am – 8:20 am
Transcriptomic responses to particulate matter
Amarbir Gill, MD
Yiran Li
Marc Hershenson
Bangqiao Yin
Johann Gudjonsson
Jennifer Fox
Rachael Bogle
Lam Tsoi
Jeremiah Alt, MD, PhD, FARS

Background:
Particulate matter (PM) exposure may be a key risk factor for a chronic rhinosinusitis (CRS) and disease exacerbation; however, the pathogenic response of CRS epithelium to PM compared to healthy epithelium is not well-elucidated.

Methods:
Human nasal epithelial cells (HNECs) obtained from patients with chronic rhinosinusitis (CRS) (n=2) and healthy individuals (n=2) were cultured at the air–liquid interface and exposed to PM. Transcriptional and morphological responses were evaluated using bulk RNA sequencing and histological analysis, respectively.

Results:
Both healthy and CRS-derived cells exhibited increased expression of the serine protease inhibitor SERPINB1, suggesting a shared epithelial stress response. However, there was a distinct divergence in the overall cellular responses between the two groups. Compared to no PM, HNECs from CRS patients exposed to PM showed marked upregulation of pro-inflammatory cytokines (e.g., IL1B, CXCL8, TNFAIP3), increased expression of cell death-associated genes (e.g., CASP3, DAPK1), and downregulation of ciliated genes (e.g., FOXJ1, DNAI2), indicating epithelial injury and impaired mucociliary function. Conversely, HNECs from healthy donors exposed to PM maintained epithelial integrity and exhibited no significant inflammatory or cytotoxic responses. These findings were supported by H&E and immunofluorescence staining, which revealed severe epithelial damage and ciliary loss in PM-exposed HNECs from CRS patients.

Conclusion:
Our findings suggest that HNECs from CRS patients display a heightened and maladaptive

response to PM exposure compared to healthy individuals, potentially contributing to epithelial disease progression and exacerbation.

8:21 am – 8:27 am
Transoral sympathetic neuromodulation for nasal decongestion: A porcine model
Abhiram Cherukupalli, MD MSE MHSc
Oriol Cuxart
Sandhya Tiku
Nicholas Rowan, MD
University of British Columbia

Objective:
Nasal congestion (NC) is one of the most common complaints in otolaryngology. Current therapies focus on inflammatory states and parasympathetic pathways in the sinonasal cavity. Despite the notable contributions of dysregulated automatic activity to symptom burden, treatment options are limited in efficacy and potential invasiveness. To explore alternative treatment options, we used a novel non-invasive transoral neuromodulation technique to stimulate sympathetic sinonasal fibers and assess the effect on nasal airway patency.

Methods:
Using a porcine model, two Millar pressure catheters were placed and secured at the internal nasal valve and posterior aspect of the ventral turbinate. CPAP was utilized to create continuous airflow. Under direct visualization the nasopalatine nerve was stimulated via a monopolar circuit at a range of 5-40 Hz, 0.1 - 1mA, for 2 min. Continuous pressure measurements were recorded and processed using MATLAB. Cohen's d and Wilcoxon signed-rank test were utilized to compare the ΔP pre and post stimulation.

Results:
Decongestion was observed in the nasal airway between the two catheters, with the greatest pressure drop at 20Hz measuring 0.75 mmHg (d=0.21, p=0.7) and 1.38 mmHg (d=0.53, p=0.13) in subject 1 and 2, respectively. Both subjects consistently exhibited a reduction in airway resistance with stimulation, indicating an increase in airway radius of approximately 1.3cm.

Conclusion:
In this proof-of-concept study, a novel transoral sympathetic neuromodulation method increased nasal airway patency 2.5-fold after two minutes of stimulation. This supports the need for further investigations of its potential as a therapeutic approach in humans.

8:28 am - 8:34 am
Characteristic differences between GPA patients with and without saddle nose deformity
Nitish Kumar, MBBS, MS
Amar Miglani, MD
Gaurav Jategaonkar
Stephen Bansberg, Consultant
Michael Marino, MD, FARS
Devyani Lal, MD, FARS
Pedro Lanca Gomes, MD
Mayo Clinic – Arizona

Background:
Saddle nose deformity (SND) afflicts one-third of granulomatosis with polyangiitis (GPA) patients, but associated risk factors are poorly understood. We aim to identify patient and disease characteristics associated with saddling in GPA, and the impact of nasal septal perforation (NSP) on SND severity.

Methods:
Unified health records of 3 tertiary care centers were inspected (01/2020-10/2024) to collect data on patient and disease characteristics for GPA patients with (GPAwSND) and without SND (GPAsSND).

Results:
104 patients were included (GPAwSND:55, GPAsSND:49). GPAwSND vs. GPAsSND cohort had younger age (years) (Median 49 vs. 63; $p<0.001$), more females (85.5% vs. 63.3%; $p=0.009$), more patients with NSP (61.8% vs. 6.1%; $p<0.001$), and higher median Lund-Mackay scores (8 vs. 2; $p=0.007$). ANCA positivity (c-ANCA/p-ANCA/anti-MPO/anti-PR3), biologic use, SNOT-22 scores, and time from symptomatic onset to GPA diagnosis were not different between the cohorts. On multivariate analysis, younger age ($p<0.001$), female sex ($p<0.001$), and NSP ($p<0.001$) were independently associated with SND. Twenty-one (38.2%) patients in the GPAwSND cohort had an intact septum without perforation. Of GPAwSND with NSP, sex, multisystemic involvement, perforation dimensions, and perforation distance from the k-area/columella were not associated with the severity of SND (Daniel and Brenner's classification).

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Conclusions:
NSP is not required for SND in GPA patients. However, the presence of an NSP was independently associated with SND in GPA. Additionally, factors beyond local sinonasal tissue destruction, such as young age and female sex were also associated with SND. Interestingly, NSP dimensions and location were not associated with SND grade.

8:35 am – 8:40 am
Q&A

8:40 am – 9:10 am
Panel: "Advances and Obstacles in In-Office Rhinologic Procedures: Technology and Coding"
Moderator: Omar Ahmed, MD, FARS
Panelists: Mary Ashmead, MD; John Craig, MD, FARS; R. Peter Manes, MD, FARS

Moderators: Isaac Schmale, MD, FARS; Kristine Smith, MD, FARS

9:11 am – 9:17 am
Effect of budesonide nasal irrigation in patients chronic rhinosinusitis with nasal polyps
Juliana Pascutti, MD
Renato Rios
Caio Floriano
Isabela Pontes
Marcel Miyake

The indication for nasal irrigation with corticosteroids after sinus surgery in patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP)is well established, as surgery facilitates solution penetration throughout the sinonasal cavity.However,it remains unknown whether this approach could also be beneficial before undergoing surgery.This study aims to compare the effect of budesonide versus saline nasal irrigation in CRSwNP patients who have not undergone sinus surgery.

Methods:
A randomized,double-blind,placebo-controlled parallel-group study was conducted in patients with CRSwNP with no previous sinus surgery. Patients were randomized to receive either 1 mg budesonide or saline nasal irrigation twice daily for four weeks.The primary outcome was the change in the 22-item Sinonasal Outcome Test(SNOT-22).Secondary outcomes included the Visual Analogue Scale(VAS), Nasal polyp score(NPS), and the Connecticut(CCCRC) olfactory test.

Results:
A total of 52patients were randomized(mean age50.1 ± 12.9 years; 51.9% female).The intention-to-treat (ITT)analysis showed that the budesonide nasal irrigation group demonstrated a significantly greater improvement in SNOT-22in Budesonide group(LS mean difference: 33,2[28,9 SD];p<0,001)when compared to the control group (LS mean difference: 15,1[25,1 SD];p< 0,001) and VAS in Budesonide group(LS mean difference: 35,3[39,3 SD];p<0,001) when compared to the control group(LS mean difference: 12,9[29,5 SD];p<0,001).No significant differences were observed between groups in NPS or CCCRC.

Conclusion:
Even in patients whose paranasal sinuses have not been surgically opened, budesonide nasal irrigation may be an important tool for controlling sinonasal symptoms in in those who are not undergoing surgery.

9:18 am – 9:24 am
Use of biologics, aspirin desensitization, and leukotriene modifiers in AERD: A real-world study
Nitish Kumar, MBBS, MS
Devyani Lal, MD, FARS
Michael Marino, MD, FARS
Amar Miglani, MD
Tyson Pace
Mayo Clinic – Arizona

Background:
Based on recommendations of a recent Cochrane Review, a real-world study of medical therapy in aspirin-exacerbated respiratory disorder (AERD) was conducted.

Methods:
AERD patients treated from 1/2020-3/2025 in a healthcare system with access to aspirin therapy after desensitization (ATAD) and biologics were identified. Patterns of ATAD and biologic intervention were studied.

Results:
488 AERD patients were treated as follows: ATAD: 267 (54.7%); biologics: 235 (48.2%); ATAD+biologic: 124 (25.4%); leukotriene modifiers: 332 (68% total; 82% with ATAD). Pre-

intervention ESS rates were similar in biologics (91.9%) vs ATAD (90.1%) patients; p=0.07. Post-therapy ESS was also similar (biologic: 58.6%; ATAD: 66.4%; p=0.19). Long-term ATAD was maintained for 150/267 (56.2%). Most common factors for stopping ATAD (n=117) were GI intolerance (27.4%), lack of efficacy (15.4%), failure to resume ATAD after planned surgery (13.7%); GI bleeding (8.5%), anaphylaxis/allergic reaction (8.5%), non-compliance (7.7%), and prescription of another anticoagulant (4.3%). Biologics were continued in 192/235 (81.7%). Common causes of stopping biologics (n=43) were adverse events (37.2%), poor response (16.3%), cost (16.3%), non-compliance (13.9%), and insurance denial (2; 4.7%). Biologics were switched 87 times in 62 patients, most often for poor control of CRS and/or asthma. Dupilumab (144/192; 75%) was the most frequently used biologic.

Conclusions:
Contemporary use of biologics was almost as frequent as ATAD in a system with access to both therapies. Given low cost of ATAD and its advantage in developing NSAID tolerance in AERD patients, factors that facilitate ATAD (adherence, adverse effects, access, physician effort) need further study.

9:25 am – 9:31 am
Olfaction, symptoms, and patient-reported outcomes with EDS-FLU in CRS with vs without nasal polyps
Rodney J. Schlosser, MD, FARS
Medical University of South Carolina

Background:
The exhalation delivery system with fluticasone (EDS-FLU; XHANCE®) is the only FDA-approved medication for treatment of chronic rhinosinusitis without nasal polyps (CRSwNP).

Objectives:
Evaluate whether treatment response with EDS-FLU differs between patients with CRS with nasal polyps (CRSwNP) and without nasal polyps (CRSsNP).

Methods:
Data were pooled from two randomized, placebo–controlled trials. Patients received EDS-FLU 186 µg or 372 µg per nostril or EDS-placebo twice daily for 24 weeks. Endpoints included nasal congestion, discharge, facial pain/pressure, and sense of smell scores; the Smell Identification Test (SIT); and the Patient Global Impression of Change (PGIC).

Results:
Treatment-by-subgroup interaction effects (p>.05 for all comparisons) demonstrated that CRS patients with and without NP experienced similar changes with EDS-FLU (n=137 CRSwNP; n= 225 CRSsNP) vs EDS-Placebo (n=69 CRSwNP; n=116 CRSsNP) in nasal congestion (CRSwNP: LS mean -0.90 vs -0.44, P = .001; CRSsNP: -0.81 vs -0.51, P = .001), nasal discharge (CRSwNP: -0.77 vs -0.42, P = .002; CRSsNP: -0.74 vs -0.46, P = .001), facial pain or pressure (CRSwNP: -0.67 vs -0.51, P = .175; CRSsNP: -0.64 vs -0.52, P = .174), and sense of smell (CRSwNP: -0.45 vs -0.20, P = .03; CRSsNP: -0.60 vs -0.34, P = .004) at week 12, as well as in olfaction measured by SIT (CRSwNP: 1.38 vs -2.88, P = .001; CRSsNP: 2.25 vs 0.30, P = .03) and in the proportion of patients reporting their disease was “Much or Very Much Improved” on PGIC (CRSwNP: 50% vs 22%, P ≤ .001; CRSsNP: 55% vs 27%; =P ≤ .001) at week 24.

Conclusion:
EDS-FLU provides comparable efficacy for symptoms, olfaction, and patient-reported improvement in CRS with or without nasal polyps.

9:32 am – 9:38 am
Olfactory function recovery in primary vs. revision TSA
Sanjena Venkatesh
Jadyn Wilensky, Clinical Research Assistant
Maria Espinosa, MD
Alison Yu, MD
James Palmer, MD, FARS
Nithin Adappa, MD, FARS
Michael Kohanski, MD, FARS
Jennifer Douglas, MD, FARS

Background: Transsphenoidal surgery raises concerns of olfactory impairment. The impact of revision surgery on olfactory outcomes, however, is unknown. This study investigates objective olfactory function, as well as olfactory-specific and sinonsasal quality of life (QOL) following transsphenoidal approach (TSA) for pituitary adenoma.

Methods: We conducted a comparative analysis of olfactory function in patients undergoing primary versus revision TSA. Objective olfaction

was assessed via the Brief Smell Identification Test (B-SIT); olfactory and sinonasal QOL were evaluated via the Brief Questionnaire of Olfactory Disorders–Negative Statements (B-QOD) and 22-item SinoNasal Outcome Test (SNOT-22), respectively.

Results: 77 patients met inclusion criteria. Baseline olfactory function did not significantly differ between primary and revision cohorts, suggesting that olfactory function recovers to baseline following initial surgery. Objective olfactory function recovered faster in the revision group, with significantly higher B-SIT scores noted at four ($p = 0.04$) and six ($p = 0.04$) weeks postoperatively. By three months, B-SIT scores were comparable between groups. No significant differences were observed in B-QOD, total SNOT-22, or SNOT-22 smell scores across groups at any timepoint.

Conclusion: This is the first study to compare olfactory outcomes between primary and revision TSA. Contrary to expectations, revision skull base surgeries do not confer a greater risk of persistent olfactory dysfunction. In fact, these cases may experience faster recovery, potentially due to less extensive tissue disruption. Further research is needed to elucidate the factors influencing olfactory preservation in this complex population.

9:40 am – 9:45 am
Q&A

9:45 am – 10:15 am
Break with Exhibitors in Liberty Hall

Moderators: Amarbir Gill, MD; Dennis Tang, MD, FARS

10:15 am – 10:21 am
Utility of maxillary sinus papillary mucosal edema in predicting odontogenic sinusitis
Hussein Mackie, BS
Japnam Jassal
Carl Wilson, MS
John Craig, MD, FARS
Michigan State University College of Human Medicine

Introduction:
Odontogenic sinusitis (ODS) refers to purulent sinusitis caused by infectious maxillary dental pathologies, with >90% occurring unilaterally. While various clinical features suggest ODS, diagnosing ODS can still be challenging. ODS patients frequently demonstrate maxillary sinus papillary mucosal edema (MSPME). This study aimed to determine MSPME's value in predicting ODS versus non-odontogenic rhinosinusitis.

Methods:
A 6-year retrospective cohort study was conducted on patients who underwent at least maxillary antrostomy for unilateral sinus disease (USD). A prospective analysis was performed to determine sample sizes for three USD groups (80% power): ODS, purulent non-odontogenic maxillary sinusitis, and non-purulent chronic rhinosinusitis with nasal polyps (CRSwNP). Multiple clinical variables were collected, but the primary outcome was MSPME via double-blinded case video review. One author, blinded to pathologies, reviewed and saved 70° endoscopic maxillary sinus views after complete surgery. The senior author blindly reviewed all saved images to assess for MSPME presence.

Results:
Of 44 ODS, 22 purulent non-ODS, and 13 non-purulent CRSwNP, mean age was 57.0 years and 55.3% were female. MSPME was seen in 100% of ODS, 22.7% purulent non-ODS, and 7.7% CRSwNP. MSPME was significantly more likely in ODS compared to non-odontogenic conditions ($p<0.0001$), demonstrating 100% sensitivity and 87.2% specificity for ODS (82.9% PPV, 100% NPV).

Conclusions:
MSPME was significantly more likely in ODS compared to non-odontogenic conditions. With 100% sensitivity and NPV, MSPME absence makes ODS very unlikely. With 83% PPV, MSPME is not pathognomonic for ODS, but should arouse suspicion for a possible odontogenic source.

10:22 am – 10:28 am
Clinical features and dental pathologies in maxillary sinus fungal balls and odontogenic sinusitis
Eunice Im, BA
Lane Donaldson
Bobby Tajudeen, MD, FARS
Edward Kuan, MD, FARS
Marta Kwiatkowska
Chadi Makary, MD, FARS
Tim Fu
Jennifer Douglas, MD, FARS

PROGRAM ABSTRACTS

Jun Jin
Alberto M. Saibene, MD
John Craig, MD, FARS
Michigan State University College of Human Medicine

Introduction:
While maxillary sinus fungal balls (MSFB) can be associated with odontogenic conditions, they clinically behave differently from bacterial odontogenic sinusitis (ODS). This multicenter study aimed to analyze and compare different features of MSFB and ODS.

Methods:
A multicenter international retrospective cohort study was conducted on adults with MSFB and ODS who underwent sinus surgery. Statistical analyses accounted for multiple comparisons. First in MSFB, it was determined whether different dental pathologies or procedures were more likely in FB versus non-FB sides. Second, clinical features and dental pathologies were compared between MSFB and ODS. For analyses, dental pathologies were considered individually and as two groups: primary infectious pathologies and dental/oral procedures with indwelling metallic elements.

Results:
There were 203 MSFB and 200 ODS patients across 13 centers internationally. Among MSFB, FB sides were associated with sinus protrusion of root canal materials (p=0.04) and dental implants (p=0.04). Compared to ODS, MSFB patients were more likely female, Hispanic, and diabetic, and were less likely to be smokers and have extramaxillary sinus opacification on computed tomography. MSFBs were also less likely than ODS to be associated with apical periodontitis (OR=0.22) and oroantral fistulas (OR=0.05), and more likely to be associated with protruded root canal material (OR=19.3) and midface hardware (OR=6.36).

Conclusion:
MSFBs were associated with protrusion of metallic elements from dental/oral procedures. Compared to MSFB, ODS was more associated with infectious dental pathologies and extramaxillary sinus involvement. MSFBs from odontogenic factors should be considered distinct from ODS.

10:29 am – 10:35 am
Association of sclerotherapy with HHT epistaxis severity and QoL
Amy Ensing, BS
Jenny Ji
Firas Hentati
Andrew Peterson, MD
Dorina Kallogjeri, Assistant Professor
Jay Piccirillo, MD
Washington University in St. Louis School of Medicine

Background:
Hereditary hemorrhagic telangiectasia (HHT)-related epistaxis causes significant morbidity. Sclerotherapy and doxycycline may reduce epistaxis severity and improve quality of life (QOL) in HHT patients.

Methods:
This prospective case series investigated the impact of sclerotherapy +/- doxycycline on HHT-associated epistaxis severity and epistaxis-specific QOL. The primary outcome was change in Nasal Outcome Score for Epistaxis in HHT (NOSE HHT) 2-weeks post-sclerotherapy. Secondary outcomes included change in NOSE HHT 3-months post-sclerotherapy, Epistaxis Severity Score (ESS), and Clinical Global Impression–Severity (CGI-S) and Improvement (CGI-I) scores.

Results:
There were 43 patients included in the final analysis, 10 of whom concurrently initiated doxycycline. At 2-weeks post-sclerotherapy, median change in NOSE HHT score was -0.59 (95% CI -0.76, -0.45) and 56% (22/39) of patients had a clinically meaningful improvement based on a minimal clinically important difference of 0.46. At 3-months, median change in NOSE HHT score was -0.53 (95% CI -0.69, -0.38) and 58% (23/40) of patients had a clinically meaningful improvement. Median change in ESS was -1.9 (95% CI of -2.7, -1.0). No scarring was noted post-injection. Although there was no clinically meaningful difference in change in NOSE HHT score at 2-weeks among participants who received doxycycline compared to those who did not, more participants who started doxycycline self-reported that their epistaxis was No problem or a Mild problem at 3-months (percent difference=28.0%; 95% CI -7.3%, 63.2%).

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Conclusion:
Sclerotherapy is associated with improved QOL and decreased epistaxis severity in HHT patients and the addition of doxycycline may augment response.

10:36 am – 10:40 am
Q&A

10:40 am – 11:25 am
Panel: "Bridging Airways: Integrating Care for Patients with Sinonasal Disease and OSA"
Moderator: Masayoshi Takashima, MD, FARS
Panelists: Nicolas Busaba, MD, FARS; Andrew Goldberg, MD, FARS; Leah Hauser, MD

Moderators: Mohamad Chaaban, MD, FARS; Randall Ow, MD, FARS

11:26 am – 11:32 am
Obesity and chronic rhinosinusitis with nasal polyps
Jeffanie Wu, MD
Li-Ching Huang
Daniel Lofgren
Ping Li
Katherine Cahill
Mason Krysinski
Rakesh Chandra, MD, FARS
Justin Turner, MD, FARS
Naweed Chowdhury, MD
Vanderbilt University Medical Center

Introduction:
Chronic rhinosinusitis (CRS) is a heterogenous inflammatory syndrome of the paranasal sinuses that is classically defined phenotypically as either with nasal polyps (CRSwNP) or without nasal polyps (CRSsNP). More recently, inflammatory markers have been used to cluster patients into putative endotypes presumed to have a common underlying etiology. Obesity is known to create a proinflammatory state in similar chronic airway inflammatory conditions such as asthma, but the potential impact of obesity in CRS-associated inflammation has not been investigated.

Methods:
Samples were collected from 415 patients with CRS (239 CRSsNP, 176 CRSwNP) and 100 control patients undergoing surgery in a prospective longitudinal study. Mucus inflammatory cytokines were measured using a multiplex cytometric bead assay targeting 21 biomarkers. Cytokine levels were then compared between obese and non-obese patients using a BMI cutoff of 30.

Results:
In healthy controls, mucus IL-5 levels were notably higher (38.4 pg/mL vs 7.4 pg/mL, p=0.03) in obese patients compared to non-obese patients. Levels of IL-2 (185 vs 39 pg/mL, p=0.02), IL-4, (17.7 vs 6.3 pg/mL, p=0.03), TNF-α (58 vs 44 pg/mL, p=0.03), IFNγ (18.5 vs 17.6 pg/mL, p=0.01), GM-CSF (8.5 vs 2.5 pg/mL, p=0.009) were elevated in obese CRSwNP patients. In CRSsNP, there were no statistically significant differences based on BMI stratification.

Conclusions:
Obese CRSwNP patients have elevations in Type 1 and 2 cytokines compared to non-obese patients, potentially indicative of a pro-inflammatory bias in the sinonasal mucosa of obese patients. There may be a role for weight loss and medical weight management in the treatment of CRSwNP.

11:33 am – 11:39 am
Septoplasty and sleep: Anatomic predictors of sleep outcomes
Mackenzie Latour, MD
Amber Cradeur, Medical Student
Michael Yim, MD, FARS

Introduction:
Nasal septal deviation (NSD) has been described as the most significant nasal obstructor contributing to morbidity in obstructive sleep apnea (OSA). Our objective was to investigate the relationship between NSD morphology and sleep outcomes after septoplasty.

Methods:
Retrospective cohort study was conducted evaluating patients with OSA who underwent septoplasty for NSD. Inclusion required pre-operative CT and polysomnogram (PSG) as well as post-operative PSG (n=23). CT analysis measured cross sectional area (CSA) of internal nasal valve (INV), CSA of central compartment at maximum deviation for most and least obstructed side (MOS/LOS-CSA), anterior vs posterior location, and angle of deviation. Primary outcome was change in AHI post-operatively. Statistical analysis included bivariate t-tests and multivariable logistic regressions.

Results:

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Following septoplasty, there was a significant mean reduction of AHI by 15.4 events per hour (p=0.02). Patients with an AHI reduction of ≥5 events/hour had higher baseline AHI (49.5 vs 12.7; p=0.03), smaller ipsilateral INV CSA (73.9 mm² vs 112.4 mm²; p = 0.02), and smaller MOS-CSA (75.3 mm² vs 92.3 mm²; p=0.02). Higher baseline AHI, smaller MOS-CSA, and smaller ipsilateral INV-CSA were all associated with this improvement in AHI (p<0.05). After adjusting for baseline AHI, MOS-CSA (OR 0.97, p=0.04) and ipsilateral INV CSA (OR 0.95, p=0.045) independently retained predictive significance for post-operative improvement in AHI.

Conclusion: Patients with OSA and NSD experienced significant improvement in AHI following septoplasty. Anatomic narrowing of the internal nasal valve and of the central compartment at deviation independently predicted positive surgical response.

11:40 am – 11:46 am

Physical activity and chronic rhinosinusitis risk

Heli Majeethia, BS
Jagan Dwarampudi, MS
Zain Mehdi, BS
Renjie Hu, PhD
Vivek Pandrangi, MD
Dennis Tang, MD, FARS
Arthur Wu, MD, FARS
Masayoshi Takashima, MD, FARS
Omar Ahmed, MD, FARS

While physical activity is known to modulate systemic inflammation, its role in chronic rhinosinusitis (CRS) remains unclear. This study evaluates the association between moderate to vigorous physical activity (MVPA) and CRS risk using Fitbit data.

We analyzed Fitbit wearers from the All of Us dataset, requiring ≥1 year with ≥180 days with ≥100 steps of data. Participants with extreme MVPA values (0 or >1000 minutes/week) and those previously diagnosed with CRS were excluded. MVPA was categorized as <75, 76-150, 151-225, 226-300, and >300 minutes/week. Cox proportional hazards models, adjusting for sex, race, ethnicity, age, allergic rhinitis, and obesity, assessed CRS risk over 5 years. Primary outcomes were incidence of 1-CRS (initial diagnosis), 2-CRS (second/confirmed diagnosis), and asthma.

Among 16,524 participants, 349 developed 1-CRS and 135 developed 2-CRS. Increased MVPA was associated with a reduced CRS risk. Compared to <75 min/week, hazard ratios (HRs) for the development of 2-CRS were:
•76-150 min/week: HR = 0.43 (95% CI: 0.26-0.72, p = 0.0012)
•151-225 min/week: HR = 0.27 (95% CI: 0.14-0.50, p < 0.0001)
•226-300 min/week: HR = 0.35 (95% CI: 0.18-0.65, p = 0.0012)
•>300 min/week: HR = 0.42 (95% CI: 0.27-0.66, p < 0.0001)
Increased MVPA was associated with a decreased risk for CRS and asthma. Similar trends were seen for 1-CRS and asthma, but MVPA showed the strongest protective effect for 2-CRS.

Regular MVPA is associated with a lower CRS risk, with 151-225 min/week showing the strongest protection. Attenuation at higher levels suggests a nonlinear relationship. These findings are novel and future research is required to understand the potential strategy of regular MVPA for CRS prevention.

11:47 am – 11:53 am

Pollen and CRS quality of life disease severity

Benton Tullis, BS
Jess Mace, MPH
Conner Massey, MD
Stuart Batterman
Vijay Ramakrishnan, MD, FARS
Daniel Beswick, MD, FARS
Zachary Soler, MD, FARS
Timothy Smith, MD, FARS
Jeremiah Alt, MD, PhD, FARS
Amarbir Gill, MD
University of Utah

Background:
Airborne particles, such as particulate matter pollutants, may play a role in the pathophysiology of chronic rhinosinusitis (CRS). Nevertheless, our understanding of the impact of aerosolized pollen particles on CRS disease severity remains limited. Here, we analyze the effects of pollen exposure on disease-specific and general quality-of-life (QOL) reports.

Methods:
Patients were prospectively enrolled across four academic medical centers; they completed the 22-item SinoNasal Outcome Test (SNOT-22) and

PROGRAM ABSTRACTS

Medical Outcomes Study Questionnaire Short-Form 6-D (SF-6D) surveys at enrollment. Mean annual pollen exposure over a five-year period prior to enrollment was obtained from the National Allergy Bureau using residence zip codes. Unadjusted Spearman's correlation coefficients (rs) and 95% confidence intervals (CI) were calculated.

Results:
103 patients were included. Higher five-year overall weed pollen exposure correlated with worse SNOT-22 scores (rs =0.20; 95% CI: 0.00054, 0.38; p=0.043), while five-year mean ragweed pollen exposure correlated with worse presenting SNOT-22 (rs =0.24; 95% CI: 0.033, 0.42; p= 0.019) and SF-6D scores (rs =-0.21; 95% CI: -0.40, -0.0054; p=0.039).

Conclusion:
This multi-institutional pilot study suggests that long-term weed pollen exposure has negative impacts on patients with CRS QOL as measured by the SNOT-22 and SF-6D.

11:54 am – 12:00 pm
Q&A

12:00 pm – 1:00 pm
Residents and Fellows Lunch Session
"Igniting your career: Making the most of the first three years post-training"
Indianapolis Room AB

12:00 pm – 1:00 pm
Lunch in the Exhibit Hall & Posters
Liberty Hall

Saturday, October 11, 2025
8:00 am – 12:00 pm
Breakout Room 3
Grand Ballroom, Salon 5

7:00 am – 8:00 am
International Roundtable Breakfast Session
Indianapolis Room A

7:00 am – 8:00 am
Morning Mixer with the Poster Viewing
Liberty Hall

Session Chair: Anna Knisely, MD, FARS

8:00 am – 8:30 am
Panel: "When Life Gets in the Way of Career and Normalcy"
Moderator: Stephanie Joe, MD, FARS
Panelists: Regan Bergmark, MD, FARS; Carolyn Orgain, MD; Timothy Smith, MD, MPH, FARS
Sponsored by the Women in Rhinology Section

Moderators: Naweed Chowdhury, MD; Daniel O'Brien, MD, FARS

8:30 am – 8:36 am
The utility of sentiment analysis in multilingual patient education materials in rhinology
Arun Raghavan, MD
Hector A. Perez, MD
Felix Fernandez-Penny, Medical Student
Aria Jafari, MD, FARS
University of Washington

Introduction:
Effective and accurate communication between clinicians and patients is essential to providing appropriate care across language barriers. While document translation helps bridge this gap, it can alter meaning and sentiment. The American Rhinologic Society (ARS) offers patient education materials in English and Spanish on various Rhinology topics. This study used multilingual natural language processing (NLP) to analyze differences in sentiment between the English and Spanish versions of ARS materials.

Methods:
41 documents in both languages were identified on the ARS website and organized into 4 content categories: Anatomy, Diagnoses, Medical Treatments, and Surgical Treatments. Sentiment analysis was performed using a natively multilingual, publicly available NLP algorithm.

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Sentiment was reported on a continuous scale from -1 (very negative) to +1 (very positive) and compared between English and Spanish documents using paired T-tests.

Results:
Materials in English were found to be more positive than their Spanish translations (0.05 vs 0.001, $p < 0.001$). By category, the sentiment of English documents was higher than their Spanish translations in the Diagnoses (0.005 vs -0.04, $p=0.002$) and Surgical Treatments categories (0.06 vs 0.002, $p=0.02$). The greatest difference in sentiment was found between the English and Spanish versions of the document "Expectations of Sinus Surgery" (0.17 vs -0.06).

Conclusions:
This study reveals a tendency toward more positive sentiment in English ARS patient education materials compared to Spanish translations, particularly in content pertaining to rhinologic diagnoses and surgical treatments. NLP may identify meaningful quality improvement opportunities in patient education.

8:37 am – 8:43 am
Minimal clinically important difference for smell identification test scores in Cystic Fibrosis
Eugene Oh, BS, MSE
Jessa Miller, MD
Michelle Lee, Resident Physician, PGY-4
David Baraghoshi, Assistant Professor of Biostatistics
Jeremiah Alt, MD, PhD, FARS
Naweed Chowdhury, MD
David Gudis, MD, FARS
Peter Hwang, MD, FARS
Ashoke Khanwalkar, MD, FARS
Jennifer Taylor-Cousar, MD
Daniel Beswick, MD, FARS
David Geffen School of Medicine at UCLA

Introduction:
The Smell Identification Test (SIT) assesses olfactory dysfunction (OD), which is common in people with cystic fibrosis (PwCF). However, the minimal clinically important difference (MCID) for the SIT has not been established in PwCF. This study aimed to determine the SIT MCID in adult PwCF who were treated with elexacaftor/tezacaftor/ivacaftor (ETI) and/or endoscopic sinus surgery (ESS).

Methods:
Data from three prior prospective studies, across eight U.S. institutions, was pooled for this study. Participants with baseline and at least one follow-up SIT score at 3, 6, 9, 12, or 24 months were included. MCIDs were calculated using three distribution-based methods: (1) standard error of measurement (SEM) at baseline, (2) 1.96×SEM (95% confidence interval [CI]), and (3) 0.5×standard deviation of the change scores for each follow-up timepoint relative to baseline. The average and variability of MCID values were assessed across timepoints.

Results:
Ninety-nine PwCF (ETI: 79; ESS: 20) were included for analysis. The pooled cohort had a mean [±SD] age of 33.4±11.4 years with a baseline mean SIT of 28.4±8.1. Mean MCID values ranged from 3.69-4.05 across timepoints: 4.05±1.82 at 3-months (mos), 3.88±1.98 at 6-mos, 3.94±1.93 at 9-mos, 3.69±2.21 at 12-mos, and 3.76±2.13 at 24-mos. Across the three methods, the MCID ranged between 1.81-6.14. The mean MCID across all timepoints and methods was 3.86 (95% CI: 3.74-3.98).

Discussion:
The distribution-based SIT MCID in PwCF (3.86) is comparable to the MCID of 4.0 in Pw/oCF, suggesting a similar threshold for clinically meaningful change for the CF population. MCID values remained consistent across multiple follow-up timepoints, supporting its potential long-term stability.

8:44 am – 8:50 am
Is there a role for office biopsy prior to resection of inverted papilloma?
Alison Yu, MD
Julia Tapescu, Medical Student
Sanjena , Medical Student
Maria Espinosa, MD
Jennifer Douglas, MD, FARS
James Palmer, MD, FARS
Michael Kohanski, MD, FARS
Nithin Adappa, MD, FARS
University of Pennsylvania

Background:
Inverted papilloma (IP) are benign sinonasal tumors that harbor a 7-10% potential for malignant transformation to squamous cell carcinoma (SCC). The treatment of IP is surgical resection. Biopsy of IP can be helpful for diagnosis, but its

accuracy may be affected by the co-existence of inflammatory processes. The objective of this study was to determine the diagnostic accuracy of office biopsy in patients who underwent surgical resection for IP.

Methods:
This was a retrospective review of patients who underwent resection of IP at a tertiary care center over a 10-year period from January 2015 to December 2024 and who had an office biopsy prior to surgery. Patient demographic and tumor characteristics were obtained. We investigated the accuracy of office biopsy and compared it against the final pathology results from tumor resection.

Results:
121 patients met the inclusion criteria. Final pathology demonstrated 85 (70.2%) IP without dysplasia, 10 (8.3%) other papilloma subtypes without dysplasia, 22 (18.2%) papilloma with dysplasia, 3 (2.5%) SCC in situ, and 1 (0.83%) SCC. The maxillary sinus was the most common attachment site (69.4%), followed by skull base (24.0%) and turbinates (15.7%). The accuracy of office biopsy showing papilloma without dysplasia was 85.1% (80/94) and for papilloma with dysplasia was 68.8% (11/16). 11.8% (10/85) of the IP without dysplasia cases had false negative biopsies showing inflammatory lesions, while none of the pre-malignant or malignant IP cases had a false negative (non-neoplastic) biopsy ($p<0.001$).

Conclusion:
With a false negative rate of 12% on office biopsy for IP, proceeding to surgical resection in the operating room is warranted when there is a strong clinical suspicion.

8:51 am – 8:57 am
Species-level nasal microbiome analysis across diseases using third-generation sequencing
Yasine Mirmozaffari, BS
Cristian Roca
W. Jared Martin
Kees Heetderks
Anna Van Dorsten
Lauren Cook, BS
Ezer Benaim, MD
Nicole Capps
Kelli Sullivan
Adam Kimple, MD, PhD, FARS
Matthew Wolfgang
University of North Carolina, Chapel Hill

Background/Aims:
The sinonasal microbiome influences respiratory health, but most studies rely on short-read 16S rRNA sequencing, which limits taxonomic resolution to the genus level. This pilot study aimed to use third generation long-read sequencing to characterize the nasal microbiome at species-level resolution in patients with primary ciliary dyskinesia (PCD), chronic rhinosinusitis without nasal polyps (CRSsNP), and healthy controls.

Methods:
Nasal epithelial lining fluid was collected, using Leukosorb strips, from 53 participants (20 PCD, 15 CRSsNP, 18 healthy controls) at tertiary care center. Full-length 16S rRNA sequencing was performed with third generation sequencing technology. Microbiome composition was analyzed using PERMANOVA and relative abundance profiling at genus and species levels.

Results:
Bacterial composition differed significantly between PCD and CRSsNP ($p=0.009$) and between PCD and healthy controls ($p=0.003$). No significant difference was noted between CRSsNP and healthy subjects. PCD samples showed enrichment of Streptococcus pneumoniae, Pseudomonas aeruginosa, Haemophilus influenzae, and Moraxella catarrhalis, and reduced Staphylococcus epidermidis, Cutibacterium acnes, and Corynebacterium spp. CRSsNP samples demonstrated increased Staphylococcus epidermidis compared to other groups.

Conclusions:
Long-read sequencing enables species-level microbiome profiling, revealing distinct sinonasal dysbiosis in PCD characterized by pathogenic species enrichment and commensal depletion. These findings support the need for species-specific analysis in future research on microbiome-targeted diagnostics and therapies.

PROGRAM ABSTRACTS

8:58 am – 9:04 am
Endoscopic sinus surgery does not alter the sinus microbiome in patients with CRS
Glen D'Souza, MD
Sarah Khalife, MD
Donyea Moore
Evan Patel
Peter Filip, MD
Peter Papagiannopoulos, MD
Bobby Tajudeen, MD, FARS
Pete S. Batra, MD, FARS
Mahboobeh Mahdavinia, Dr.
McMaster University

Background:
Dysbiosis of the nasal microbiome can occur due to many known factors, and the change in nasal microbiome following surgery has yet to be investigated. This study evaluates alterations of nasal microbiome over time after endoscopic sinus surgery (ESS) in patients with chronic rhinosinusitis (CRS) compared to controls.

Methods:
Nasal swabs were collected from adult patients with CRS undergoing ESS and from controls without CRS undergoing endoscopic resection of pituitary tumors at 3 time points: baseline prior to surgery, one month and 3-6 months post-operatively. Microbiome analysis of swabs was conducted and statistical comparisons were made to determine changes within groups over time and between groups.

Results:
64 individuals were included and assessed: 44 CRS cases undergoing ESS and 20 controls. Some gatekeeping bacteria in Corynebacterium genus were depleted in CRS at all time points. While there were no significant changes in diversity, evenness or richness over time in CRS (adjusted-p=0.0592), controls demonstrated a decrease in microbial diversity and evenness at one month post-operatively (adjusted-p<0.0001), with a rapid return to baseline diversity 3-6 months post-operatively. Several functional pathways of microbiome involved in stress response increased post-operationally and then returned to baseline among controls but not in CRS.

Conclusion:
Endoscopic surgery in those without CRS impacts nasal microbiome diversity and function early on with resolution after 3-6 months, which indicates a stress response and possibly a protective anti-inflammatory role, which is lacking in CRS patients. These differential responses may be linked to the decreased relative abundance in several gatekeeping bacteria in CRS.

9:05 am – 9:10 am
Q&A

Moderators: Kara Detwiller, MD, FARS; Bobby Tajudeen, MD, FARS

9:11 am – 9:17 am
Gaze mapping in nasal endoscopy
William Smithee, MD
Edward McCoul, MD, FARS
Tulane

Introduction:
Nasal endoscopy (NE) is a cornerstone of otolaryngologic diagnosis, yet subtle findings like mucus may be overlooked during routine exams. Prior work suggests that perception and recognition are dissociable elements of clinical interpretation. Gaze mapping offers a novel means of quantifying this perceptual behavior. This pilot study evaluates the relationship between visual attention and recognition of abnormal findings, with a focus on mucus as a diagnostically relevant but potentially underrecognized feature.

Methods:
Eight clinicians reviewed 100 NE images, each shown for 2 seconds on a screen equipped with an EyeLink 1000 gaze tracker. Areas of interest (AOI) were manually pre-defined on each image using Experiment Builder software and included mucous, lesions, and anatomic landmarks. After viewing each image, participants indicated whether they perceived any abnormality and selected from a standardized list. Fixation was defined as ≥600 ms of gaze within an AOI. Primary outcomes included mucus containing AOI identified and association between dwell time on mucus AOI and the perception of an abnormal finding.

Results:
Gaze dwell time had a mean (SD) of 265 (402) ms for mucus AOI compared to 890 (1194) for normal structures (p=0.011). Pooled across all observers, 58% of mucus AOI were identified, with a modest effect of overall dwell time (d=0.35) on perception of an abnormal finding.

PROGRAM ABSTRACTS

Conclusion:
Gaze fixation occurs for normal structures more often than for mucus. Gaze mapping can be used to evaluate the relationship between visual attention and cognitive recognition during NE. These results highlight perceptual differences and may inform future educational interventions.

9:18 am – 9:24 am
Deep learning distinguishes polyp from polypoid turbinate
Nicholas Mankowski, MD
Dipesh Gyawali
Jonathan Bidwell
Kayla E. Baker
Elena Bartolone
Dhara Patel
Thomas Mundy
Sejal Shyam Bhatia
Akio Fujiwara
Edward McCoul, MD, FARS
Tulane University School of Medicine

Introduction:
Polypoid change of the middle turbinate (PCMT) is a distinct disease process in contrast to sinonasal polyposis (SP) within the middle meatus, which is typically seen in chronic rhinosinusitis with polyposis (CRSwP). PCMT has a strong association with allergic rhinitis and may be managed differently than CRSwP. Distinguishing PCMT from SP on nasal endoscopy (NE) poses a diagnostic challenge, which may be enhanced by deep learning applications.

Methods:
A YOLOv11-nano segmentation model using two-stage transfer learning was developed to distinguish SP from PCMT. The model was pretrained on a colonoscopy polyp dataset, then fine-tuned on 485 labeled NE images. Targeted augmentation addressed imaging artifacts and expanded the dataset to 2910 images. Training used a batch size of 64 for 400 epochs on dual NVIDIA RTX A5500 GPUs with an 80/20 training-validation split. The model was tested on a separate test set of 102 images from patients with known SP or PCMT, evaluated by intersection-over-union (IoU) and DICE score, with statistical validation by paired t-test.

Results:
The model demonstrated significant performance improvements over the baseline across all metrics ($p<0.001$). Overall, the model achieved IoU 0.84 and DICE 0.89, with precision 0.90 and recall 0.90, which minimized both false positives and false negatives in clinical interpretation. The model achieved IoU 0.88 and DICE 0.92 on SP segmentation, and IoU 0.79 and DICE 0.84 on PCMT segmentation.

Conclusions:
Deep learning can distinguish between PCMT and SP on images obtained during NE. This has implications for the application of NE to effectively differentiate CRSwP from similar disease states.

9:25 am – 9:31 am
The predictive value of AI image regression analysis of rhinograms for patient symptoms
Rhea Darbari Kaul, BMedicine, MResearch
Christine Choy
Liam Grouse
Cedric Thiel, MD
Ghasem Azemi
Sidong Liu
Raymond Sacks, Professor
Raewyn Campbell, MD, FARS
Larry Kalish, MBBS
Antoni Di Ieva
Richard Harvey MD, PhD, FARS
Macquarie University

Introduction:
Rhinomanometry, a reference measure for the nasal airway, is often considered a research tool as resistance only weak-to-moderately correlates with patient symptoms. However, like lung spirometry curves(spirograms) offer information well beyond FEV, the rhinomanometry curve(rhinogram) has characteristics beyond simple nasal resistance. This study applied artificial intelligence(AI) to develop a predictive model examining the link between rhinograms and patient-reported outcomes(PROMs).

Methods:
A diagnostic cross-sectional study was conducted on patients from a rhinology clinic. Rhinomanometry curves were assessed via image regression with convolutional neural networks (CNN) on a visual AI platform(Ximilar). PROMs included nasal obstruction (ordinal/VAS), the nasal subdomain and total SNOT-22. There was an 80/20 training/testing split. The primary outcome was a correlation coefficient(R2 score). Prediction errors were assessed with mean

absolute error(MAE) and root mean squared error(RMSE). Heatmaps were generated for regions of interest in CNN decision making.

Results:
Two hundred patients (age 44±17yrs, 48% female) were analysed. Analysis of rhinograms demonstrated high to strong correlation (0.7-0.9) with R2 scores of SNOT-22(0.84), nasal subdomain(0.79), nasal obstruction(ordinal 0.77/ VAS 0.75). The prediction errors (MAE/RMSE) were; SNOT22(24/30), nasal subdomain (8/9), nasal obstruction ordinal(2/2) and VAS(22/27).

Conclusion:
This study highlights the strong relationship between nasal airflow analysis and patient reported outcomes. It is highly likely that the rhinogram produced from rhinomanometry may contain significantly more value to clinical care when assessed beyond simple resistance measures at 150Pa.

9:32 am – 9:38 am
ML-enhanced diagnosis of sinusitis
Dipesh Gyawali, MS
Majid Hosseini
Morteza Bodaghi
Thomas Mundy
Jonathan Bidwell
Kayla E. Baker
Elena Bartolone
Dhara Patel
Sejal Shyam Bhatia
Akio Fujiwara
Edward D. McCoul, MD, FARS

Background:
Sinusitis is a prevalent disease for which nasal endoscopy (NE) is an optimal diagnostic modality. However, NE accuracy is limited by inter-operator variability in landmark identification and localization of mucus that is necessary for sinusitis diagnosis. We sought to develop a machine learning (ML) framework to identify purulent mucus (PM) in the middle meatus to assist in the interpretation of NE findings and improve diagnostic consistency.

Methods:
4,184 NE images obtained using a flexible digital endoscope were annotated by trained physicians with segmentation of middle turbinate (MT), middle meatus (MM) and PM. A custom YOLOv11-nano model was trained for MT and PM segmentation with 80/20 train-validation split. A MiDaS-DPT Large depth model was trained for MM detection and our clinical algorithm was tested on an unseen set of 194 images from 50 patients with an established diagnosis of sinusitis based on clinical criteria. A diagnosis of sinusitis was indicated by the presence of PM in the MM.

Results:
The model achieved a 95% DICE for MT detection and 83% DICE for PM segmentation with 81% intersection-over-union. For sinusitis classification, our system achieved 80% sensitivity, 40% specificity, 84% DICE and 74% accuracy in identifying patients with sinusitis, which minimized both false positives and false negatives in clinical interpretation.

Conclusion:
This novel ML-driven approach enhances clinical decision-making for diagnosing sinusitis with NE. By reducing inter-operator variability and expediting diagnostic steps, this work holds potential for improving workflow efficiency and patient outcomes. Future research will focus on prospective real-time implementation in a clinical setting.

9:40 am – 9:45 am
Q&A

9:45 am – 10:15 am
Break with Exhibitors in Liberty Hall

10:15 am – 11:00 am
Panel: "Immune Dysregulation and Aging: Evolving Insights into CRS Pathogenesis and Therapy"
Moderator: Justin Turner, MD, FARS
Panelists: Do-Yeon Cho, MD; David Jang, MD, FARS; Erin O'Brien, MD, FARS
Sponsored by the Allergy and Immunology in Rhinology Section

Moderators: Charles Ebert, Jr., MD, FARS; Patricia Loftus, MD, FARS

11:00 am – 11:06 am
Caffeine: An overlooked ally for olfactory health?
Mark Schuweiler, BS, BA
Wassim Najjar, Post Doctoral Research Fellow
Nicholas Rowan, MD
Leila J. Mady, Assistant Professor
Murugappan Ramanathan, MD, FARS

PROGRAM ABSTRACTS

Andrew Lane, MD, FARS
Stella Lee, MD
Johns Hopkins School of Medicine

Introduction:
Caffeine is known for its potential neuroprotective properties, yet its relationship to age-related smell changes remains unclear. Work to clarify this relationship has produced mixed data. This study examines whether routine caffeine consumption influences psychophysical olfactory function in a nationally representative sample.

Methods:
Data were analyzed from the 2013–2014 National Health and Nutrition Examination Survey (NHANES). Olfactory function was assessed with the 8-item Pocket Smell Test and compared to average daily caffeine intake. Caffeine use was categorized into low (< 32.5mg), moderate (32.6 - 219.5mg), and high (> 219.5mg). Logistic regression controlled for relevant olfaction-related covariates.

Results:
Moderate and high caffeine intake were significantly associated with better olfaction. After adjusting for covariates, individuals with moderate intake had 1.31 times higher odds (95% CI 1.017–1.527, p=0.036) and those with highest intake had 1.75 times higher odds (95% CI 1.236–1.883, p<0.001) of normosmia compared to those with lower intake. Each increase in caffeine intake quartile was associated with 1.32 times higher odds (95% CI 1.187–1.384, p<0.001) of normosmia. Self-reported olfaction was not associated with caffeine intake (p=0.23).

Conclusion:
Several studies have examined the possible association between caffeine consumption and olfactory function. With mixed results, literature lacks a unified consensus. This study suggests a dose-dependent protective association between daily caffeine intake and olfaction, with high consumption showing the greatest benefit. Further study is warranted to confirm these findings longitudinally and elucidate the underlying physiological mechanisms.

11:07 am – 11:13 am

Is olfactory recovery more promising after COVID-19 than other causes, even two years later?

Do-Yeon Cho, MD
John Hunsicker, MD
Mabel Berg, BS
Nicolaus Knight, MS
Jessica Grayson, MD
Bradford Woodworth, MD, FARS
Justin Turner, MD, FARS
University of Alabama at Birmingham

Background:
Smell loss was recognized early in the COVID-19 pandemic as a hallmark symptom, prompting sustained interest in its long-term outcomes. This study compares olfactory recovery in patients with COVID19–related smell loss (CRSL) to those with smell loss from other causes (Non-CRSL), with a focus on individuals who began treatment more than 2 years after onset.

Methods:
Patients presenting to a tertiary smell and taste clinic at least twice between Jan 2023 and Feb 2025 were included if they completed all Sniffin' Sticks tests—comprising threshold, discrimination, and identification (TDI) subtests. Clinically significant improvement (CSI) was defined as ≥5.5-point increase in TDI score. All received olfactory training and twice-daily budesonide nasal irrigation (0.5mg/2mL).

Results:
A total of 105 patients were analyzed: 47 with CRSL and 58 with Non-CRSL. Baseline TDI scores were significantly higher in the CRSL group (19.6+/-0.9) compared to Non-CRSL (16.8+/-0.9; p<0.05). CRSL group demonstrated significant improvement in TDI scores at follow-up (Initial: 19.6+/-6.3; Last follow-up (LFU): 23.9+/-6.5; p<0.0001), with 46% (n=22) meeting criteria for CSI. Non-CRSL group showed no statistically significant change (Initial: 16.8+/-6.8; LFU: 17.8+/-6.8; p>0.05). Among the CRSL group, 36 patients began treatment >2 years after symptom onset (mean duration: 30.8+/-5.5 months) and noticed significant improvement (Initial: 19.6+/-6.4; LFU: 24.0+/-6.2; p<0.0001), with CSI achieved in 50% (n=18).

Conclusion:
Smell loss after COVID-19 was associated with a more favorable recovery profile than other causes,

even when treatment began more than 2 years after onset. Late intervention may still offer meaningful improvements in CRSL.

11:14 am – 11:20 am
Efficacy of PRP in olfactory dysfunction: Meta-analysis
Ali Jafar, MD, MSc, FARS
Fatima Almousawi, Medical Student
Kuwait University

Background:
Olfactory dysfunction (OD) is a debilitating condition with few effective treatments. Platelet-rich plasma (PRP), has regenerative potential, and shown promise in restoring olfactory function. This systematic review and meta-analysis evaluates the efficacy and safety of PRP in treating OD.

Methods:
A comprehensive search of PubMed, Embase, and the Cochrane Library was performed through April 2025 in accordance with PRISMA guidelines. Eligible studies included randomized controlled trials and cohort studies assessing PRP for OD. Primary outcomes included changes in objective olfactory test scores (UPSIT, TDI) and subjective assessments (VAS, Likert). Random-effects meta-analysis was performed with pooled standardized mean differences (SMD) and 95% confidence intervals (CI). Heterogeneity was assessed using the I^2 statistic.

Results:
Nine studies (864 patients) met inclusion criteria. PRP significantly improved objective olfactory function compared to controls (SMD = 1.12; 95% CI: 0.79–1.45; $p < 0.0001$; $I^2 = 41\%$). In post-COVID OD subgroups, a similar effect was observed (SMD = 1.04; 95% CI: 0.60–1.48; $p < 0.001$). Subjective improvements were also significant, with a pooled VAS mean difference of 2.3 points (95% CI: 1.4–3.2; $p = 0.002$). PRP was administered via olfactory cleft injections, typically in one to three sessions. Reported adverse events were minor, with no serious complications.

Conclusion:
PRP is a safe, minimally invasive treatment that significantly improves both objective and subjective outcomes in patients with olfactory dysfunction. It represents a promising therapeutic option, particularly for post-viral etiology.

11:21 am – 11:27 am
Trigeminal dysfunction is associated with increased risk of parosmia: A population-based study
John Dewey, MD
Ryan Ziltzer, MD MPH
Hassan Ramadan, MD, FARS
Chadi Makary, MD, FARS
West Virginia University

Background:
Olfactory dysfunction and dysgeusia can significantly affect quality of life. More specifically, parosmia has been more prevalent since the occurrence of the COVID-19 pandemic. While most of olfaction occurs via the olfactory nerve, there is also a contribution by the chemosensory fibers of the trigeminal nerve in the nose. This study aims to investigate the association between olfactory and taste dysfunction, including parosmia, with trigeminal neuralgia and migraine disorders.

Methods:
A retrospective population-based matched case-control study was performed using TriNetX database and analytics platform. Patients with a diagnosis of parosmia (cases) were matched with a cohort of patients with no olfactory nerve dysfunction (control). Patients with history of chronic rhinosinusitis or olfactory meningiomas were excluded.

Results:
1:1 propensity score matching for age, sex, and race was performed. Patients with olfactory and smell dysfunction were at increased risk of having trigeminal neuralgia (OR=1.6, 95% CI of 1.4,1.7), trigeminal nerve disorders (OR=1.8, 95% CI of 1.6,1.9), and migraine disorders (OR=1.5, 95% CI of 1.5,1.6). This association was stronger when looking at parosmia specifically [trigeminal neuralgia (OR=1.9, 95% CI of 1.5,2.3), trigeminal nerve disorder (OR=2.3, 95% CI of 1.9,2.7), and migraine disorder (OR=2.0, 95% CI of 1.8,2.1)].

Conclusion:
Disorders of smell and taste, including parosmia, are associated with an increased risk of dysfunction of the trigeminal nerve, trigeminal neuralgia, and migraine. Further studies are needed to define its mechanistic link and elucidate its implication in clinical management of olfactory disorders.

PROGRAM ABSTRACTS

11:28 am – 11:34 am
Q&A

Moderators: Devyani Lal, MD, FARS; Lauren Roland, MD

11:35 am – 11:41 am
Eosinophil peroxidase levels decrease following treatment in eosinophilic chronic rhinosinusitis
Jacquelyn Callander, MD
Annabelle Charbit
Camryn Marshall
Kritika Khanna, PhD
Steven Pletcher, MD
Jose Gurrola, MD
Andrew Murr, Professor
Monica Tang
Andrew Goldberg, MD, FARS
Patricia Loftus, MD, FARS

Background:
We previously demonstrated that eosinophil peroxidase (EPX) levels in nasal mucus correlated to clinical markers of type 2 inflammation and tissue eosinophilia in chronic rhinosinusitis (CRS). This study evaluates EPX as a dynamic biomarker across treatment modalities and its potential as a prognostic tool in eosinophilic CRS.

Methods:
Patients with bilateral CRS undergoing treatment with 1) endoscopic sinus surgery (ESS), 2) a course of oral prednisone, or 3) dupilumab injections, as well as non-CRS controls undergoing endoscopic endonasal pituitary surgery were prospectively enrolled. Nasal cytology brushings from the middle meatus were collected pre- and post-treatment, except in the dupilumab group (sampled once after stabilization). EPX was quantified via ELISA and correlated with clinical data.

Results:
Twenty-six CRS patients and seven non-CRS controls were included. EPX levels decreased post-treatment across all groups. Mean change was -840.5 ng/µl (CRS surgery, standard error of the mean [SEM] = 528.0), -742.8 ng/µl (CRS oral prednisone, SEM= 897.6), and -16.2 ng/µl (non-CRS controls, SEM = 21.4). Five CRS patients had pre-treatment EPX = 0 ng/µl, suggesting non-type 2 disease. Among patients with measurable baseline EPX, the CRS surgery group showed a significantly greater EPX reduction than controls (p=0.039), whereas the prednisone group did not (p=0.923). In dupilumab-treated CRS, mean difference in EPX compared to the pre-treatment CRS groups was -943.0ng/ul (SEM 439.02).

Conclusion:
EPX levels are elevated in CRS and decline following medical and surgical treatment. These findings support EPX as a marker of disease activity and treatment response in CRS.

11:42 am – 11:48 am
Neutrophil-eosinophil ratio predicts surgical success in CRSwNP
Sathish Paramasivan, MD, MPH, PhD
Benjamin Bleier, MD, FARS
Stella Lee, MD
Harvard Medical School

Background:
Amongst chronic rhinosinusitis with nasal polyps (CRSwNP) patients, biologics have become a pillar of treatment for surgically refractory disease. Development of reliable, non-invasive tests to predict surgical success remains a critical unmet need. We examined the utility of peripheral blood neutrophil-eosinophil ratio (PNER) as a novel biomarker for predicting surgical response.

Method:
Multicenter cohort study of surgical CRSwNP. Complete blood counts with differentials were measured, along with surgical success and progression to biologics. Receiver-operator characteristic (ROC) curves was performed for blood biomarkers. Effective biomarkers were identified amongst a training group and applied prospectively to an independent experimental group to confirm accuracy.

Results:
A total of 1,073 patients were recruited from two independent centres. PNER was most effective in measuring surgical success and exceeded that of eosinophil count alone, with area under ROC of 0.772 (0.726 – 0.817; p <0.001). Cut-off PNER value of 10 resulted in sensitivity of 88% and specificity of 60%. PNER remained stable over multiple blood draws (p =0.504). When applied to a naïve experimental cohort of 415 patients, positive predictive value was 87%, negative predictive value was 58% and overall accuracy was 76%.

Conclusion:
Predicting surgical success with non-invasive

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testing remains an unmet need in CRSwNP. PNER is a non-invasive, readily available test that predicts surgical response and is superior to eosinophil count alone. We hypothesize PNER more accurately predicts mixed endotypes among patients with nasal polyp phenotype. Clinicians can use PNER to both counsel surgical candidates with CRSwNP and tailor post-operative management.

11:49 am – 11:55 am
The effect of penicillin allergy on antibiotic treatment outcomes in patients with rhinosinusitis
Dylan Levy, MD
Edward McCoul, MD, FARS
Duncan Green
Nrusheel Kattar, Resident

Background:
Rhinosinusitis (RS) is prevalent in the ambulatory setting and is often treated with antibiotics. When indicated, empiric treatment with a penicillin is recommended. However, up to 25% of the US population has a penicillin allergy label (PAL) within their health record, which can result in treatment with second-line antibiotics. The goal of the present study was to explore the effect of PAL on clinical outcomes in patients with RS.

Methods:
A chart review was performed in adult patients with RS who received antibiotics between 2011-2024. Treatment failure was defined as need for a second antibiotic within 30 days. Treatment-related adverse events (AE) were indexed to a new diagnosis of diarrhea within 30 days of treatment. Odds ratio of success:AE compared to standard of care was used to measure the effect size of non-penicillin antibiotics.

Results:
335,015 subjects who received antibiotics for RS were included. Of these, 55,557 (16.6%) had a PAL. These patients were more likely to receive a non-penicillin antibiotic for initial therapy (87.8%). Patients with a PAL had a slightly greater rate of treatment success, 78.2% vs 75.8%. Patients given clindamycin showed a decreased benefit:risk odds ratio compared to penicillin standard of care (0.30, 95% CI 0.29-0.31). However, patients given a macrolide (1.01, 95% CI 0.98-1.04) or tetracycline (0.90, 95% CI 0.91-0.89) showed comparable benefit:risk odds ratio to standard of care.

Conclusion:
In patients with RS, PAL often leads to the prescription of a second-line antibiotic, which has a decreased benefit-to-risk ratio compared to first-line treatment. This emphasizes the need for additional efforts to remove PALs in patients without a true penicillin allergy.

11:56 am – 12:00 pm
Q&A

12:00 pm – 1:00 pm
Residents and Fellows Lunch Session
"Igniting your career: Making the most of the first three years post-training"
Indianapolis Room AB

12:00 pm – 1:00 pm
Lunch in the Exhibit Hall & Posters
Liberty Hall

Saturday, October 11, 2025
8:00 am – 12:00 pm
Breakout Room 4
Grand Ballroom - Salons 6-7

7:00 am – 8:00 am
International Roundtable Breakfast Session
Indianapolis Room A

7:00 am – 8:00 am
Morning Mixer with the Poster Viewing
Liberty Hall

8:00 am – 8:30 am
Recurrent acute sinusitis
Speaker: Jane Wang, FNP-C

8:30 am – 8:35 am
Q&A

8:35 am – 9:05 am
Humoral immune deficiency
Speaker: Christine Reger, FNP-C

9:05 am – 9:10 am
Q&A

9:10 am – 9:40 am
Basic rhinology imaging review
Meghan Norris, PA-C

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9:40 am – 9:45 am
Q&A

9:45 am – 10:15 am
Break with Exhibitors in Liberty Hall

10:15 am – 11:00 am
Epistaxis: Don't panic
Leslie Gomez, FNP-C

11:00 am – 11:05 am
Q&A

11:05 am – 12:00 pm
Mentorship Panel: "RAPPer Dynamic Duos: An APP and MD Team Approach"
Moderator: Emily Moldoff, FNP-C
Panelists: Adam Deconde, MD; Leslie Gomez, FNP-C; Christine Reger, FNP-C; Timothy Smith, MD, FARS; Lindsay Wyant, PA-C

12:00 pm – 1:00 pm
Residents and Fellows Lunch Session
"Igniting your career: Making the most of the first three years post-training"
Indianapolis Room AB

12:00 pm – 1:00 pm
Lunch in the Exhibit Hall and Posters
Liberty Hall

Saturday, October 11, 2025
1:00 pm – 5:00 pm
General Session
Grand Ballroom - Salons 1-5

1:00 pm – 1:15 pm
ARS Business Meeting and Presidential Citations
Kevin Welch, MD, FARS; Michael Stewart, MD, FARS; Amber Luong, MD, PhD, FARS

1:15 pm – 2:00 pm
21st Annual David Kennedy Lectureship
Guest Speaker: Rodney Schlosser, MD, FARS
Title: Highs and Lows During a Career in Academic Rhinology"

Moderators: Edward Kuan, MD, FARS; Tran Locke, MD, FARS

2:00 pm – 2:06 pm
Metropolitan air pollution and the upper-lower airway: Chronic rhinosinusitis and asthma out-patient burden
Hong-Ho Yang, MD
Esther Velasquez, PhD
Peter Hwang, MD, FARS
David Geffen School of Medicine at UCLA

Objective:
Air pollution is increasingly recognized as a contributor to upper airway inflammation. We investigated the association between ambient air pollutant levels and subsequent outpatient burden of CRS in the US.

Methods:
We conducted a national ecological study utilizing data from the Merative MarketScan database and the EPA Air Quality System. For each Core-based Statistical Area (CBSA), we calculated the annual frequency of CRS-related outpatient visits (CRS-OV) and the rolling mean daily air pollutant levels over the preceding 365 days. Mixed-effects negative binomial regression models at the ecological unit (CBSA-by-year) were developed to estimate the association between pollutant levels and CRS-OV, as well as additive interactions between pollutant pairs.

Results:
Across 5,114 ecological observations between 2007-2020, median CRS-OV was 163 visits per 1,000 well-patient check-ups (IQR 109-262). Adjusting for demographics, comorbidities, and area-level tobacco exposure, a significant rise in CRS-OV was observed with each standard deviation increase in PM2.5 (aIRR 1.13, 95% CI [1.11, 1.15] per 2.56 μg/m³), PM10 (1.09 [1.06, 1.12] per 7.21 μg/m³), O3 (1.05 [1.03, 1.07] per 0.005 ppm), CO (1.03 [1.00, 1.05] per 0.21 ppm), SO2 (1.03 [1.01, 1.05] per 5.69 ppb), and NO2 (1.04 [1.01, 1.08] per 7.10 ppb) levels. Adjusting for co-pollutant exposure, increases in PM2.5, PM10, and SO2 exhibited independent associations with higher CRS-OV. Interaction analyses identified additive synergies between PM2.5×SO2, PM2.5×O3, and PM10×CO.

Conclusions:
Increased ambient pollutant levels are associated with a subsequent increase in CRS outpatient burden. Synergistic interactions between pollutants further amplify this impact.

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2:07 pm – 2:13 pm

The impact of air quality on inflammatory markers in chronic rhinosinusitis

Nanda Nayak
Christina Dorismond, MD, MPH
Rory Lubner, MD
Daniel Lofgren, MD
Ping Li
Katherine Cahill
Mason Krysinski , MD
Rakesh Chandra , MD, FARS
Justin Turner, MD, FARS
Naweed Chowdhury, MD

Introduction:
Recent studies by our group have identified various inflammatory patterns in CRS associated with PM2.5 exposure characterized by elevations in Type 2 and 3 cytokines. We hypothesized that a similar inflammatory pattern may exist in association with the air quality index (AQI), a commonly used measure of air pollution. The objective of this study was to explore this association to better understand the potential impact of the environment on CRS.

Methods:
Clinical and demographic data for 634 patients undergoing sinus surgery for CRS were extracted and a spatiotemporal machine learning model was used to estimate average 30-day AQI exposure levels based on home address. Inflammatory mucus cytokines were quantified in intraoperative specimens with a cytometric bead assay and normalized/scaled. Spearman correlations and regression analysis were performed to characterize the relationship between this scaled metric and estimated average AQI exposures.

Results:
AQI levels were positively correlated with elevations in RANTES (p=0.003) and IL-21 (p=0.02) in CRSwNP. The relationship between IL-21 cytokine elevation and average AQI levels was persistent after adjusting for numerous potential clinical and sociodemographic confounders including age, sex, BMI, history of asthma/allergic rhinitis, income, and rurality measures in CRSwNP (p=0.0378).

Conclusions:
Exposure to air pollution as measured by AQI appears to be associated with elevations in IL-21 in CRSwNP. As Th17 cells are a potential source of IL-21 in the nasal epithelium, this finding suggests involvement of the Type 3 inflammation axis in air-pollution associated CRS. Further experimental studies are needed to understand the pathophysiologic mechanisms.

2:14 pm – 2:20 pm

Altered nasal microbiota in sinonasal tumors: An analysis of malignant, benign, and healthy tissue

Evan Patel, MS
Glen D'Souza, MD
Sarah Khalife, MD
Donyea Moore
Phillip Engen
Lauren Kret
Peter Filip, MD
Peter Papagiannopoulos, MD
Bobby Tajudeen, MD, FARS
Mahboobeh Mahdavinia, Dr.
Pete S. Batra, MD, FARS
Rush Medical College, Rush University Medical Center

Introduction:
Although shifts in nasal microbiota are documented in inflammatory upper airways conditions, tumor-associated changes remain less well understood. In a first, this study sequentially compares microbiota between patients with malignant tumors (MT) and benign sinonasal tumors (BT) with healthy controls.

Methods:
We prospectively collected intraoperative sinus tissue samples and culture swabs from 68 adults (MT=21, BT=15, control=32). After −70 °C storage, 16S rRNA (27F/338R) sequencing via NovaSeq was performed. α-diversity (Shannon, Simpson, observed features, evenness) β-diversity and relative abundances (RA) of bacteria were analyzed. PERMANOVA and PERMDISP tested group differences.

Results:
Microbial α-diversity differed across groups, with malignant tumor (MT) samples exhibiting the lowest diversity, benign tumor (BT) samples showing intermediate diversity, and controls demonstrating the highest diversity. β-diversity analyses showed significant compositional differences: MT vs control (p<0.001) and BT vs

control (p<0.001). MT samples exhibited increased within-group dispersion. However, BT vs MT communities did not differ significantly. Pseudomonas spp. were enriched in MT and BT groups. Pseudomonas aeruginosa was more frequent among MT compared to controls, and BT featured higher RA of S. aureus. Controls showed greater abundance of Corynebacterium and Cutibacterium.

Conclusion:
Sinonasal tumors had altered nasal microbiota, particularly in malignancy. Enrichment of P. aeruginosa underscores potential microbe–tumor interactions. Future investigation may seek to clarify whether these shifts influence tumor development or represent secondary changes, potentially quantifying outcomes and guiding therapeutic strategies.

2:21 pm – 2:27 pm
AutoML differentiation of sinonasal malignancies on CT and MRI
Elliott Sina, BA
Kelsey Limage
Emma Anisman, BS
Emma Tam, BA
Nickolas Pudik, BS
Chase Kahn, MD
Srihari Daggumati, Dr.
Gurston Nyquist, MD, FARS
Sidney Kimmel Medical College, Thomas Jefferson University

Introduction:
Automated machine learning (AutoML) is an artificial intelligence tool that facilitates image recognition model development. This study assesses the diagnostic performance of AutoML in differentiating common sinonasal malignancies using preoperative CT and MRI.

Methods:
A dataset consisting of 2,076 unique contrast-enhanced CT and T1-weighted MRI sequences from 53 patients with sinonasal squamous cell carcinoma (SCC) (962 images) and 58 patients with non-SCC malignancies (1,114 images) was uploaded to Google Cloud Vertex AI AutoML. A single-label classification model was created using an 80%-10%-10% training-validation-testing split. Performance metrics were calculated at a 0.5 confidence threshold.

Results:
The model achieved an aggregate AUPRC of 0.999 with an F1 score, sensitivity, specificity, PPV, and NPV equilibrated to 98.10%. The model achieved strong performance in classifying SCC (F1 = 96.81%; AUPRC = 0.992; sensitivity = 94.79%; PPV = 98.91%), adenoid cystic carcinoma (F1 = 100%; AUPRC = 1; sensitivity = 100%; PPV = 100%), adenocarcinoma (F1 = 93.33%; AUPRC = 0.974; sensitivity = 95.46%; PPV = 91.30%), esthesioneuroblastoma (F1 = 83.02%; AUPRC = 0.945; sensitivity = 75.86%; PPV = 91.67), sinonasal undifferentiated carcinoma (F1 = 88.37%; AUPRC = 0.92; sensitivity = 86.36%; PPV = 90.48%), and mucosal melanoma (F1 = 79.17%; AUPRC = 0.902; sensitivity = 76.00%; PPV = 82.61%).

Conclusion:
Our customized AutoML model accurately distinguishes common sinonasal malignancies using multimodal imaging and outperforms traditional ML. It is the first AutoML tool to integrate CT and MRI for sinonasal malignancy classification. Its highly automated, user-friendly design supports scalable clinical implementation.

2:28 pm – 2:35 pm
Induction chemotherapy in sinonasal malignancies
Marn Joon Park, MD, PhD
Seyoung Seo, Assistant Professor
Ho-Seo Sa, Professor
Ji Hyun Oh, Clinical Instructor
Wonki Cho, Clinical Instructor
Ji Heui Kim, Professor
Myeong Sang, Professor
Yoo-Sam Chung, Professor
Inha University Hospital, Inha Univeristy College of Medicine

Background:
Despite the potential of induction chemotherapy (IC) to facilitate organ preservation and enabling surgical resectability in sinonasal malignancies, its efficacy and impact on long-term organ preservation and survival remain inadequately explored.

Methods:
This retrospective analysis included 310 patients receiving definitive treatment for locally advanced sinonasal malignancies (>T3) at a

single academic institution for 32years. We assessed responsiveness and side effects of IC, comparing oncological outcomes including overall survival (OS) and recurrence-free survival (RFS) between patients who received IC (n=67) and those with only definitive therapy (n=243). Additionally, we focused specifically on the impact of IC on T-downstaging, surgical resectability, with initial and long-term organ preservation, according to initial T stage, cancer histology, and by responsiveness to IC.

Results:
IC achieved a response rate of 61.2% across various cancer subtypes, with the rates of T-downstaging, surgical resectability, and initial organ preservation all ranging between 55% to 60%. Compared to non-IC patients, IC significantly reduced distant metastasis across cancer subtypes but did not enhance OS or RFS. Moreover, IC patients had significantly shorter duration for orbital recurrence thus increased eyeball exenteration over time than non-IC patients. Well-responders to IC demonstrated significantly improved OS, RFS, and final intracranial content preservation, but not final orbital preservation.

Conclusions:
While more than half of sinonasal cancer patients well respond to IC, enabling initial organ preservation, IC does not improve long-term survival or sustained organ preservation compared to definitive therapy alone.

2:36 pm – 2:40 pm
Q&A

2:40 pm – 3:15 pm
Panel: "Ergonomics in Endoscopic Sinus and Skull Base Surgery"
Moderator: Raewyn Campbell, MD, FARS
Panelists: Jeffrey Bedrosian, MD, FARS; Martin Citardi, MD, FARS; Vijay Ramakrishnan, MD, FARS

3:15 pm – 3:45 pm
Break with Exhibitors in Liberty Hall

Moderators: Benjamin Bleier, MD, FARS; Michael Marino, MD, FARS

3:45 pm – 3:51 pm
Electrophysiologic signature of CFTR dysfunction in a CF carrier rabbit
Do-Yeon Cho, MD
Daniel Skinner, BS
Shaoyan Zhang, PhD
Justin Turner, MD, FARS
Jessica Grayson, MD
Bradford Woodworth, MD, FARS
University of Alabama at Birmingham

Background:
CFTR mutations are increasingly recognized in patients with chronic rhinosinusitis (CRS), suggesting a link between CF carrier status and refractory CRS. Recent advances in gene manipulation techniques have provided a number of opportunities for developing genetically modified animals other than mice. A newly developed heterozygous CFTR-F508del (ΔF508) rabbit offers a relevant model to explore this relationship. This study characterizes the electrophysiological phenotype of these heterozygous ΔF508 CF rabbits.

Methods:
Nasal potential difference (NPD) measurements were performed in vivo to assess CFTR function across the nasal epithelium in both wild-type (WT) and heterozygous ΔF508 rabbits. Primary rabbit nasal epithelial (RNE) cells were cultured from both groups and evaluated using Ussing chamber assays to measure CFTR-mediated Cl□ secretion with ivacaftor (CFTR potentiator).

Results:
In vivo NPD demonstrated a significant reduction in CFTR-mediated Cl□ transport in heterozygous ΔF508 rabbits compared to WT controls. Specifically, forskolin-stimulated Cl□ transport was approximately 50% lower in ΔF508 rabbits (ΔmV: WT=-39.9+/-2.1; Heterozygous=-19.3+/-0.3; $p<0.01$). Ussing chamber analysis of RNE cultures showed significantly enhanced response to ivacaftor in heterozygous rabbits (ΔISC: WT=35.8+/-1.5; Heterozygous=40.2+/-2.2 μA/cm²; $p<0.05$).

Conclusions:
This novel heterozygous CFTR-F508del rabbit model exhibits electrophysiological features consistent with human CF carriers. The enhanced ivacaftor response in RNE from

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carriers suggests therapeutic potential and supports further exploration of CFTR modulation in CRS associated with CF carrier status.

3:52 pm – 3:58 pm
Human olfactory organoids as an in vitro model of the olfactory epithelium
Jennifer Douglas, MD, FARS
Ankit Chauhan, Post-Doctoral Researcher
Kang-Hoon Kim, Research Associate
Noam Cohen, MD, FARS
Danielle Reed, Member
Peihua Jiang, Member
Hong Wang, Member
Nithin Adappa, MD, FARS
James Palmer, MD, FARS
Michael Kohanski, MD, FARS
University of Pennsylvania

Background:
The olfactory epithelium (OE) is a distinctive neuroepithelium capable of regeneration. However, injuries can lead to olfactory dysfunction, significantly affecting safety, nutrition, and quality of life. The direct study of OE biology in humans has been limited due to restricted access to human tissue and the lack of a human-based model system.

Methods:
Human superior turbinate biopsies from adult and pediatric subjects were obtained. Tissue was dissociated and cultured to generate olfactory organoids. Immunostaining and RT-qPCR of the organoids was performed using OE cell-specific antibodies and primers. Live cell imaging of Ca2+ response to odorant was evaluated as a surrogate for function. Organoids derived from inferior turbinate (non-OE) tissue were used as a control.

Results:
Staining of the generated organoids demonstrates the presence of OE cell-type markers: NCAM (immature and mature OSNs), olfactory marker protein (OMP; mature OSNs), SOX2 (globose basal cells (GBCs) and sustentacular cells (SCs)), keratin-5 (K5) (horizontal basal cells (HBCs)), and keratin-8 (K8) (SCs)). NCAM+ cells have neuron-like morphology with a long process and dendritic knob, cell body, and long axon, typical components of an OSN. RT-qPCR demonstrates expression of markers for mature OSNs (OMP), SCs (SOX2, EZRIN), GBCs (SOX2), and HBCs (KRT5, SOX2). Organoids mobilize Ca2+ in response to odorants, suggesting organoids contain functional OSNs. Organoids cultured from inferior turbinate tissue do not mobilize Ca2+.

Conclusion:
Preliminary data supports a novel human olfactory organoid model which may help investigate OE biology in normal and diseased states, with potential therapeutic insights.

3:59 pm – 4:05 pm
Epithelial damage in CRS
Amarbir Gill, MD
Yiran Li
Marc Hershenson
Bangqiao Yin
Johann Gudjonsson
Jennifer Fox
Rachael Bogle
Lam Tsoi
Jeremiah Alt, MD, PhD, FARS

Background:
Epithelial damage has been hypothesized to contribute to chronic rhinosinusitis (CRS). However, the mechanisms underlying disease progression remain poorly understood.

Methods:
Single-cell RNA sequencing was performed on 5 control anterior ethmoid (AE), 6 CRS with nasal polyps (CRSwNP) AE, and 4 NP tissue samples (70,993 cells total). Cell cluster types were identified and differential gene expression between cohorts was analyzed. RNA sequencing was correlated with histology and immunofluorescence (IF) imaging. Dimension-reduction and clustering data processing were employed; manual annotations were compared to those produced through automated classification.

Results:
Compared to control and NP, AE tissue demonstrated severe epithelial damage, as evidenced by decreased transcripts encoding tight junction proteins and upregulation of apoptosis (e.g., PMAIP1), oxidative stress (e.g., PPP1R15A, EIF4EBP1), and heat-shock protein genes. Extracellular matrix degradation was evidenced by overactivation of cysteine and metalloprotease proteins. POSTN and

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ALOX15 were highly upregulated in AE epithelium compared to CT, suggesting a link between epithelial damage and subsequent immune cell recruitment typical of NPs. IF and RNA analysis revealed a partial restoration of secretory and ciliated epithelial cells in NP relative to AE, while basal epithelial and tuft cells were significantly expanded, indicating a compensatory response to epithelial injury.

Conclusion:
Our data suggest that non-polyp sinonasal tissue in patients with CRSwNP is uniquely characterized by severe epithelial damage, which may exist prior to, and act as a nidus for, NP formation by promoting a dysfunctional tissue repair response.

4:06 am – 4:12 pm
Tuft cell activity in AERD
Lancelot Herpin MD/MSTR Candidate

Introduction:
Aspirin-exacerbated respiratory disease (AERD) is a TH2 inflammatory airway disease with unclear pathogenesis. Tuft cells are rare epithelial cells that express receptors, including bitter taste receptors (T2Rs), and act as sentinels, triggering immune defenses such as antimicrobial peptide and cytokine release when activated. Using bitter taste perception as a proxy for tuft cell activation, we found that AERD patients are hypersensitive to denatonium benzoate (DB), which activates T2Rs on tuft cells.

Objective:
Determine tuft cell activation in primary nasal epithelial air-liquid interface (ALI) cultures derived from AERD and control patients.

Methods:
ALIs from AERD patients and controls were primed with 3 days of IL-13 to mimic the nasal polyp environment, then exposed to 0, 1, and 10 mM DB for 30 minutes. Collected apical secretions were analyzed via ß-defensin 2 (βD2) enzyme-linked immunosorbent assays (ELISAs). Tuft cell frequency was assessed via ALI immunostaining and microscopy.

Results:
βD2 baseline secretion was higher in AERD ALIs than in controls (68 pg/mL ± 28, n = 7; -11 pg/mL ± 6, n = 4; $p < 0.001$). βD2 response to 1 mM DB was similar to baseline secretion (85 pg/mL ± 31, n = 7; -5 pg/mL ± 7, n = 4; $p = 0.035$), and both AERD and control responses to 10 mM DB were increased compared to baseline secretion (310 pg/mL ± 55, n = 5; 95 pg/mL ± 39, n = 2; $p = 0.002$). Mean tuft cell frequency was higher in AERD ALIs compared to controls (AERD 12.4 per HPF ± 3, n = 5; control 6 per HPF, n = 1).

Discussion:
The results show increased frequency as well as baseline and stimulated tuft cell activity in ALIs from AERD compared to controls. This differential activity may contribute to AERD pathophysiology.

4:13 pm – 4:19 pm
Q&A

4:20 pm – 5:00 pm
Panel: "Evolving Biologic Therapies for CRSwNP and Patient Management Strategies"
Moderator: Jivianne Lee, MD, FARS
Panelists: Martin Desrosiers, MD; Tanya Laidlaw, MD; Ahmad Sedaghat, MD

5:00 pm
Closing Remarks

5:00 pm – 7:00 pm
Rhinologists in Private Practice "RiPP Clinical Connections"
JW Marriott Velocity Endzone

6:00 pm – 7:30 pm
Rhinology Advanced Practice Provider Rappers Event
Indianapolis AB

POSTERS

Poster #A001
Acute rhinosinusitis in pediatric cystic fibrosis
Emily Kwon, BA
Annie Xu, BA
Sudeepti Vedula, MD
Rachel Kaye, MD
Evelyne Kalyoussef, MD
Wayne Hsueh, MD
Rutgers New Jersey Medical School

Introduction:
Acute rhinosinusitis (ARS), a common inflammatory condition of the nasal and paranasal sinuses, poses a significant risk to pediatric cystic fibrosis (CF) patients, often leading to hospitalization. This study investigated the impact of CF on the management and outcomes of children hospitalized with ARS using a national database.

Methods:
The 2001-2019 Kids' Inpatient Database (KID) was queried for children with ARS and CF. Propensity score matching was employed to balance CF and non-CF patients on demographics, comorbidities, and facility factors. Outcomes, including orbital complications, sinus involvement, length of stay, hospital charges, and surgical interventions, were compared using frequency, bivariate, and multivariate analyses. Significance was set at $p<.05$.

Results:
Among 989 inpatient ARS cases, 617 involved CF. CF patients exhibited significantly lower rates of preseptal (66.7% vs. 33.3%, $p=0.005$) and postseptal cellulitis (98.0% vs. 2.0%, $p=0.005$). However, they experienced longer hospital stays (9.8 vs. 5.2 days, $p<0.001$) and higher hospital charges ($78,887 vs. $28,449, $p<0.001$) compared to patients without CF. A significant association was found between CF and increased sinus involvement ($p=0.002$), with CF patients more likely to have multiple sinuses involved. CF patients also had more concurrent diagnoses ($p<0.001$), but did not undergo more surgical interventions ($p=0.17$).

Conclusion:
CF patients hospitalized for ARS face a greater disease burden, characterized by prolonged hospital stays, increased healthcare costs, and more extensive sinus involvement, indicating a higher complexity of illness. However, CF patients appear to have a lower incidence of orbital complications from ARS.

Poster #A002
WITHDRAWN

Poster #A003
Age-related decline in nasal polyp inflammation: Reduced eosinophils in older adults with CRSwNP
Elchanan Zloczower, MD, MHA
Naama Roneal, Dr.
Oleg Sukamanov, Dr.
Ady Yosepovich, Dr.
Meir Warman, Dr.
Kaplan Medical Center

Background:
Chronic rhinosinusitis with nasal polyps (CRSwNP) is a prevalent inflammatory condition that significantly impacts patients' quality of life. While systemic inflammation changes with age, the impact of aging on local nasal polyp inflammation remains unclear.

Objective:
To investigate age-related histopathological and inflammatory changes in nasal polyps, focusing on the oldest age group.

Methods:
We conducted a retrospective analysis of 352 nasal polyp biopsy slides from 121 CRSwNP patients who underwent sinus surgery at a single academic center between 2016 and 2024. Patients were stratified into four age groups: 19–40 years (n=31, 25.6%), 41–60 (n=47, 38.8%), 61–79 (n=37, 30.6%), and ≥80 (n=6, 5%). Inflammatory severity was assessed by epithelial changes(squamous metaplasia, goblet cell hyperplasia, ulceration), stromal features (fibrosis, edema), and cellular infiltrates (eosinophils, neutrophils, plasma cells). Blood eosinophil levels were also compared to tissue eosinophil counts.

Results:
Squamous metaplasia was found in 45.5% of samples but was least frequent in patients aged

≥80 (33%, p = 0.621). Eosinophilic infiltration was significantly reduced in the oldest group (50% vs. 86% in younger cohorts, p = 0.018), with a trend toward milder overall inflammation (50% vs. 9.7–10.8%, p = 0.06). These findings were independent of peripheral eosinophil levels, which were also lower in the oldest group (p = 0.193).

Conclusions:
Inflammatory activity in nasal polyps—especially eosinophilic infiltration—declines with age, suggesting an age-related attenuation of local immune responses. These findings support the concept of “”inflammaging”” as a localized phenomenon in CRSwNP, with implications for age-specific treatment.

Poster #A004
Allergic rhinitis quality of life measures in patients with cystic fibrosis
Adam Kimple, MD, PhD, FARS
Asha Nadabar, MPH
Meghan Norris, PA-C
Inbar Fried
Jackson Vuncannon, MD
Cristine Klatt-Cromwell, MD
Brian Thorp, MD, FARS
Charles Ebert, MD, MPH, FARS
Brent Senior, MD, FARS
University of North Carolina - Chapel Hill

Background:
Cystic fibrosis (CF) universally results in sinonasal inflammation. Patients with CF (pwCF) generally underreport sinonasal symptoms compared to objective parameters. While modulator therapies dramatically improved the lives of pwCF, many patients still struggle with sinonasal disease. Allergic rhinitis (AR) has highly efficacious therapies and coexists in select pwCF. To optimize management of AR in pwCF they must be identified. We hypothesized that screening with the Rhinoconjunctivitis Quality of Life Questionnaire (RQLQ) would help identify pwCF with possible AR for optimization of their AR treatment.

Methods:
A retrospective review of AR quality of life data was conducted for pwCF with unknown AR status and patients with known AR starting immunotherapy at a single institution between June 2018 to March 2025.

Results:
We identified 8 pwCF and 229 patients with AR who were beginning immunotherapy. The overall RQLQ mean scores for CF and AR patients were 1.03±0.78 and 1.95±1.28, respectively. The pwCF reported lower (better) overall RQLQ scores compared to those initiating immunotherapy. For the nasal subdomain, pwCF reported lower RQLQ mean scores (0.97±0.99) than those with AR (2.44±1.51). There were statistically significant differences in overall ($p<0.034$) and nasal subdomain RQLQ scores ($p<0.006$) in CF and AR patients

Conclusion:
The RQLQ mean scores were better for pwCF compared to patients with AR, which suggests the RQLQ score may not be a good indicator for possible AR in pwCF. Further research is needed to assess the relationship between RQLQ scores and objective allergy severity in pwCF. Identification of AR in pwCF is important for a more comprehensive approach to their care and improve quality of life.

Poster #A005
Analysis of Google AI overview summaries for rhinologic surgery
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Since launching in May 2024, Google Artificial Intelligence (AI) Overview has been a prominently displayed generative AI feature that summarizes search results using Google Gemini AI technology. This study characterizes summary contents and resources cited for search terms related to common rhinologic procedures.

From January to April 2025, we conducted an observational study of 58 Google AI Overview summaries using search terms associated with septoplasty, turbinate reduction, sinus surgery, and rhinoplasty. Summaries were analyzed for topics and resource websites . Differences in represented topics and website types between search terms, procedures, medical versus lay

terms, and Google Gemini iterations were compared using Pearson's χ2 test and analysis of variance.

Google AI Overviews generated using Gemini 1.0 and 2.0 contained 4.08 topics generated from 6.17 sources versus 6.45 topics from 42.85 sources, respectively. The three most frequently addressed topics were benefits, surgical details, and recovery for Gemini 1.0 and benefits, surgical details, and considerations for 2.0, with the latter frequently including a disclaimer to speak with a physician. Medical and lay search terms generated similar topics and resource types. The most common resource type was academic hospitals for Gemini 1.0 (58.2%) and private practice websites for 2.0 (54.6%) Otolaryngology society websites represented only 1.8% and 1.7% of resources cited by Gemini 1.0 and 2.0, respectively.

Google AI Overview has captured more salient topics about rhinologic surgery from many online sources with subsequent iterations of its underlying AI model. Efforts may be needed to better represent otolaryngology best practices with appropriate citations.

Poster #A006

Association between organophosphates and hay fever

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Background:
Organophosphate pesticides (OPs) are widely used agricultural pesticides whose metabolites are detected in urine despite being banned from residential use. OP poisoning is associated with acute respiratory compromise but newer studies suggest that chronic low-level exposure modulates the immune system and are associated with respiratory diseases such as asthma. This study aimed to assess whether urinary concentrations of OP metabolites (UOPs) are associated with hay fever in a national cohort.

Methods:
The 2005-2006 National Health and Nutrition Examination Survey (NHANES) is a cross-sectional study representing the US population. Participant UOPs and allergy questionnaire test results were included. Weighted multivariable logistic regression analysis, while adjusting for age, gender, race, was used to model the relationship between OP metabolites and hay fever diagnosis. Spearman correlation coefficient was used to establish correlations between serum IgE & UOPs.

Results:
A weighted sample of 267,353,268 people was included (mean age 39 years, 51 % female). Multivariable logistic regression showed increased odds of hay fever with diethylphosphate in urine (OR 1.88 p=0.010). Spearman's rho correlation coefficient indicated significant correlation between serum IgE and diethylphosphate in urine (p=0.007< .05; r=-0.054). Statistically significant correlations between race, gender and age and hay fever diagnosis were also identified.

Conclusions:
Our findings support previous studies suggesting a role for organophosphate insecticides in respiratory disease and now hay fever. Immune modulation through IgE is suggested but additional studies are needed to elucidate biological mechanisms and clinical significance.

Poster #A007

Association of GLP-1 agonists on medical outcomes and surgical utilization in chronic rhinosinusitis

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Introduction:
Chronic rhinosinusitis (CRS) is a multifactorial disorder of sustained sinonasal mucosal inflammation, often driven by dysregulated innate and adaptive immune responses. Glucagon-like peptide-1 (GLP-1) agonists, which have gained popularity in the treatment of diabetes, also have anti-inflammatory and immunomodulatory effects. Any association, however, between GLP-1 agonists and CRS disease severity remains unknown. This study assesses healthcare utilization of patients with CRS who start GLP-1 agonists.

Methods:
This retrospective cohort study assessed

patients with CRS within a national cohort from 2015-2024. Patients were grouped by whether they received at least one GLP-1 agent. Outcomes within a 24-month period were compared between cohorts. Propensity score matching was performed as a subgroup analysis.

Results:
220,479 patients with CRS were included: 11,020 (5.0%) received GLP-1 agonists, and 209,459 (95.0%) did not. The GLP-1 cohort had higher rates of diabetes, allergy, and asthma ($p<0.05$), but no differences in sex, age, or race. The rate of sinus surgery was significantly lower in the GLP-1 group (5.8% vs 7.8%, $p<0.05$), and remained significant on propensity-score analysis (5.6% vs 7.1%, $p<0.05$). ED visits ($p<0.001$), inpatient visits ($p=0.005$), and office visits ($p<0.001$) were lower in the GLP-1 cohort on propensity score analysis. Rates of medical complications, steroid use, and antibiotic use were not different between cohorts.

Conclusion:
Among patients with CRS, GLP-1 agonist usage was associated with lower rates of sinus surgery and healthcare encounters. Future studies are needed to explore the etiology underlying reduced surgical utilization in patients with CRS using GLP-1 agonists.

Poster #A008
Association of menopause and systemic hormonal contraceptives with chronic rhinosinusitis
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Background:
Chronic rhinosinusitis (CRS) is an inflammatory sinonasal condition divided into with (CRSwNP) and without (CRSsNP) nasal polyps. Sex hormones have been implicated as important modulators of inflammation; however, the associations of CRS with hormone-modifying states such as menopause and systemic hormonal contraceptive (SHC) use have not been established. Our study aims to examine these associations using a large database in the United States.

Methods:
Separate analyses were conducted for the associations of menopause and SHC use with CRS using data from the All of Us Research Program. Menopause analysis included 38,749 female participants 40-60 years of age. The SHC analysis included 44,280 female participants 20-40 years of age. Data on CRS diagnoses and covariates for each participant were extracted from the dataset. These variables were included in multivariable logistic regression models to determine independent associations of menopause status and SHC use [stratified into progestin-only contraceptives (POCs) and estrogen-containing contraceptives (ECCs)] with CRS. Odds ratios (OR) and 95% confidence intervals (95% CI) were calculated.

Results:
We found no significant association of menopause (yes versus no) with CRS after controlling for covariates (OR: 1.02; 95% CI: 0.94–1.11). POC use was not associated with CRS (OR: 0.89; 95% CI: 0.78–1.01), while ECCs were associated with a decreased odds of CRSsNP (OR: 0.73; 95% CI: 0.65–0.81) but not with CRSwNP (OR: 0.84; 95% CI: 0.53–1.27).

Conclusion:
Menopause and POC use were not associated with CRS, but ECC use was associated with a lower odds of CRSsNP. More research is needed to establish causation and better understand the mechanisms underlying this association.

Poster #A009
Beta-2-transferrin testing in CSF rhinorrhea
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Introduction:
Beta-2-transferrin (B2T) is the gold standard diagnostic test to evaluate for presence or absence of cerebrospinal fluid (CSF) rhinorrhea. B2T is often a send out test resulting in delays of results. This study sought

to determine the impact of B2T testing on clinical decision making in patients presenting with suspected CSF rhinorrhea.

Methods:
A retrospective chart review was performed of all inpatients presenting with CSF rhinorrhea from 2000-2024 at an academic institution. Data was collected on etiology and complications of CSF leak. Primary outcomes included clinical interventions such as skull base precautions, lumbar drain (LD) placement, and timing of surgical repair.

Results:
Fifty-seven patients (39 B2T ordered) with CSF rhinorrhea met criteria. When comparing patients with and without a B2T ordered, there was no significant difference between time from presentation to implementation of skull base precautions ($P>0.56$), lumbar drain placement ($P>0.53$), or surgery ($P>0.25$). There was no difference in complications of CSF leaks (meningitis, seizures, readmission, revision surgery, and death).
Of the 39 patients who had B2T ordered, skull base precautions were implemented 4.99 days ($P<0.05$) prior to B2T result. Twenty-six patients (67%) had a LD placed, an average of 3.92 days ($p>.07$) prior to B2T result (69% placed before B2T result). Sixteen patients (41%) underwent surgical intervention an average of 3.27 days ($P>.36$) after B2T result (19% occurred before B2T result).

Conclusion:
This data suggests that B2T has limited impact on timing of clinical interventions or CSF leak complications. Skull base precautions and LD placement were driven by clinical suspicion rather than confirmatory B2T result.

Poster #A010
Case report and literature review: Sinonasal malignant peripheral nerve sheath tumor
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Introduction:
Malignant peripheral nerve sheath tumors (MPNST) are rare and aggressive soft tissue sarcomas, accounting for 5-10% of all sarcomas with only 8-16% of these occurring in the head and neck. The nonspecific presentation can mimic benign pathologies, delaying accurate diagnosis and treatment.

Methods:
We present a single case report of low-grade MPNST of the paranasal sinus and a review of existing literature on this rare clinical entity. A PubMed search identified cases of MPNST located in or extending into the nasal cavity or paranasal sinus.

Results: An otherwise healthy 68-year-old male presented with a year-long history of progressively worsening unilateral sinonasal symptomatology, found to be due to MPNST involving the right nasal cavity, maxillary, ethmoid, and sphenoid sinuses. Literature review yielded 64 total cases from 1971-2024. Majority of cases were unilateral (78%) and demonstrated extension into multiple sinonasal subsites (69%). Notably, 23% were initially misdiagnosed, either clinically or histologically. Nearly half of cases were treated with surgery alone (45%) including both open and endoscopic approaches. Disease-related mortality from local recurrence or distant metastasis occurred in 17% of cases as late as 15 years post-treatment.

Conclusion:
The presented case underwent endoscopic resection, achieving negative margins and no evidence of recurrence at three months. Sinonasal MPNST are rare clinical entities with aggressive pathology and historically high morbidity and mortality. Complete resection is the mainstay of treatment and approach is dictated by ability to achieve clear margins. Heightened surveillance and long-term follow up is warranted given risk of recurrence and distant metastasis.

Poster #A011
CFD and and human cadaver models to investigate the balloon surgery effects on nasal airflow
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POSTERS

This study evaluates the impact of balloon surgery on nasal airflow and heat transfer using an integrated approach combining computational fluid dynamics (CFD) and human cadaver models.

Six cadaver specimens underwent balloon dilation procedures with pre- and post-surgical CT scans used to reconstruct subject-specific 3D nasal models. CFD simulations were performed to quantify changes in airflow dynamics and heat transfer efficiency.

Results demonstrated significant anatomical modifications in most samples, particularly in the posterior turbinate region and nasopharyngeal transition zone. All six specimens showed improved airway patency with increased local cross-sectional areas (up to 109.74%), enhanced volume flow rates (up to 48.33%), and reduced local airflow resistance (up to 92.49%). Heat transfer efficiency increased correspondingly, though not proportionally to airflow improvements, suggesting that structural modifications impact thermal regulation distinctly from ventilation.

This pioneering investigation provides objective evidence for balloon surgery's effectiveness in treating nasal obstruction while revealing the complex relationship between anatomical changes and functional outcomes.

The findings emphasize the importance of personalized pre-surgical assessment and suggest that CFD modeling could serve as a valuable tool for optimizing surgical planning and predicting patient-specific outcomes.

Poster #A012

Characterization of neutrophils in CRS secondary to primary ciliary dyskinesia

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Background:
Primary ciliary dyskinesia (PCD) is a rare genetic disease caused by loss of mucociliary clearance due to defective motile cilia. PCD results in recurrent upper and lower respiratory infections, as well as chronic rhinosinusitis (CRS) and otitis media. PCD sinus disease has no efficacious treatments and our understanding of the underlying pathophysiology is poor. We present data to help better understand PCD related CRS.

Methods:
Cytobrushes were utilized to collect sinonasal mucus from the middle meatus. Mucus samples underwent mass spectrometry for unbiased protein identification. Samples were collected from individuals with: PCD (n=8), CF (n=11), CRSsNP (n=11), and healthy controls (n=7). RNA was isolated for RNA sequencing from surgical pathology blocks of patients that underwent sinus surgery (PCD, CF, CRSsNP, and healthy controls, n=20).

Results:
Proteomic expression data demonstrates a neutrophilic predominance in PCD compared to healthy subjects, as well as the presence of neutrophils carrying cell surface markers consistent with granulocyte myeloid-derived suppressor cells (gMDSCs) or immunosuppressive neutrophils. Transcriptomic data from sinus contents suggests the presence of a hypoxic environment as demonstrated by increased expression of ELGN3 in PCD.

Conclusions:
Our data suggests that immunosuppressive neutrophils may play an important role in the pathophysiology of PCD. Previous studies in other disease models demonstrate that hypoxia promotes gMDSCs' immunosuppressive activity. Thus, we propose that impaired mucociliary clearance leads to a hypoxic environment, which results in recruitment of gMDSCs and dysfunctional neutrophils, leading to a persistence of rhinosinusitis in PCD.

Poster #A013

Characterization of olfactory cleft volumes in non-chronic rhinosinusitis olfactory dysfunction

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Introduction:
Olfactory dysfunction in relation to imaging findings are well described in chronic rhinosinusitis (CRS), but less data exists for non-CRS patients, with focus thus far on differences found within the olfactory bulb and sulci. Here we characterize the olfactory cleft in patients with long term non-CRS olfactory dysfunction.

Methods:
We retrospectively reviewed adult patients without CRS at our sinus center from 2014 – 2024 who received a CT sinus scan. We defined cohorts of patients with olfactory dysfunction (ICD R43.0, R43.8, R43.1, R44.2) and control patients who underwent endoscopic skull base surgery without olfactory dysfunction. We extracted DICOM images for each CT and calculated the volume and radiodensity of the olfactory cleft, using predefined borders.

Results:
The olfactory dysfunction cohort included 44 patients, and the control cohort included 14 patients. The mean olfactory cleft volume in the olfactory dysfunction cohort (0.19 ± 0.13cm3, mean ± SD) was smaller than that of the control one (0.29 ± 0.10cm3, p=0.02). There was no significant difference in radiodensity of the olfactory cleft between the two groups (-2.51x10^5 ± 5.23x10^5 olfactory, -3.90x10^5 ± 5.83x10^5 control, p=0.40). No correlation was found between UPSIT score and olfactory cleft volume (p=0.285).

Conclusion:
Our data suggest that patients with non-CRS olfactory dysfunction may have a smaller olfactory cleft than normosmics. Theoretically, this decreased space could allow for greater mucosal effacement and obstruction during an inflammatory response which may predispose to persistent hyposmia. Future work will evaluate how olfactory cleft volume may differ between various etiologies of olfactory dysfunction.

Poster #A014
WITHDRAWN

Poster #A015
Comparing ventricle volumes between patients with primary ciliary dyskinesia and healthy controls

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Background:
Primary ciliary dyskinesia (PCD) is a rare inherited disorder characterized by ciliary dysfunction. Loss of motile cilia on ependymal cells in the ventricles results in hydrocephalus in animal models, but there is limited evidence supporting a similar relationship in humans. We retrospectively compare ventricle volumes and metrics for ventriculomegaly between patients with PCD to age (within two years) and sex matched healthy controls to study this relationship.

Methods:
Lateral-, third-, and fourth ventricles were segmented from MRI scans using FastSurfer. Volumes were calculated using 3D Slicer. Metrics for ventriculomegaly including the Evans index (EI), z-Evans index (zEI), and anteroposterior diameter of the lateral ventricle index (ALVI) were measured manually from MRI and CT scans. Not all metrics could be calculated for each patient due to differences in scan protocols.

Results:
The PCD patient cohort consisted of 26 patients with age range 18 – 69 years old (mean 42.4, sd 13.2). There was no statistically significant difference in lateral- ($p = 0.98$), third- ($p = 0.51$), or fourth- ($p = 0.63$) ventricle volumes between PCD patients ($n = 10$) and controls. There was no statistically significant difference in any ventriculomegaly metric between the two groups: EI ($n = 26$, $p = 0.25$), zEI ($n = 10$, $p = 0.26$), ALVI ($n = 14$, $p = 0.25$).

Conclusion:
Recent work suggests that genetic subgroups of PCD may be associated with ventriculomegaly; however, these are not observed in our PCD cohort. Additional studies with larger cohorts and subgroup analyses will further help to clarify if loss of motile cilia results in ventricle changes in patients with PCD.

Poster #A016
COVID-19 infection increases the risk of subsequent diagnosis of chronic rhinosinusitis
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Objectives:
To analyze the impact of COVID-19 infection on diagnosis and surgery for chronic rhinosinusitis (CRS).

Methods:
TriNetX, a large, international database of anonymized health records, was queried for adults with either positive or negative SARS-CoV-2 PCR tests between 01/01/2020 - 01/01/2021. Patients with cancer or immune deficiency prior to COVID-19 diagnosis were excluded. The cohorts were propensity score-matched for multiple variables. Measures of association and a Kaplan-Meier analysis of CRS diagnosis and incidence of functional endoscopic sinus surgery were calculated after a 3-month wash-out period.

Results:
A total of 3,319,246 patients underwent COVID-19 testing during this period. There was significant difference in incidence of CRS up to 31 months post-index event (Relative Risk 1.05, p 0.032) but no differences in incidence of CRS or sinus surgery over any other time frames; however, some differences were found within subgroups, including White (1.61, 0.007), Asian (0.66, 0.001), Hispanic/Latino (0.78, <0.0001), Native Hawaiian/Pacific Islander (0.58, 0.032), and vaccinated patients (1.61, 0.007).

Conclusions:
While exposure to COVID-19 is only associated with an increased risk for developing CRS up to 31 months post infection, exposure to COVID-19 may increase risk for CRS development in certain populations over an indefinite time frame. A similar association with increased sinus surgery rates in certain subgroups may suggest a correlation between COVID-19 and greater CRS severity in these subgroups. The mechanism behind the increased incidence of CRS in vaccinated patients remains unclear and warrants further investigation.

Poster #A017
CRS and secondary immunodeficiency disorders
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Background:
The literature surrounding secondary or acquired immunodeficiency disorders (SID) and their impact on CRS susceptibility, relationship with the sinonasal microbiome, and impact on patient outcomes needs further evaluation. We performed a scoping review on various causes of SID to summarize the current state of the literature and identify key areas in need of future research.

Methods:
This scoping review was conducted according to the PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines. PubMed, Cochrane CENTRAL, Scopus, and Web of Science databases were systematically reviewed from inception through November 2024. Studies on the prevalence, evaluation, and management of CRS in cancer, transplant, or diabetic patients were included.

Results:
A total of 2,189 records were reviewed and assessed for eligibility. Sixty-nine publications met criteria for inclusion (31 cancer, 13 diabetes, and 25 transplant). Twenty-nine cancer-related CRS studies (94%) looked at post-treatment effects, primarily radiation therapy (76%) and immunomodulators (17%),

with the prevalence of post-treatment CRS ranging from 9.3% to 67.7%. Solid organ transplant studies were more common than hematopoietic stem cell transplant (60% vs 32%), with 33% of solid organ transplant studies focusing on lung transplant in cystic fibrosis. Literature on diabetes as a risk for non-fungal CRS/RARS was more limited and varied in scope.

Conclusion:
There is a rapidly developing body of research surrounding SID and CRS/RARS. However, there is need for higher level studies that evaluate the true incidence of rhinosinusitis in patients with SID, and studies that compare different treatment approaches in these patients with SID and rhinosinusitis.

Poster #A018
CRS inflammatory profile in traffic-related air pollution
Ina Lee

Introduction:
Chronic rhinosinusitis (CRS) pathophysiology involves genetic, environmental, and host factors. Traffic-related air pollution may influence inflammation. This study examined patient proximity to major roads and its links to demographics, inflammation, and quality of life.

Methods:
Patients with CRS treated surgically at a single academic center between September 2015 and September 2024 were identified and enrolled in a longitudinal prospective cohort study. Traffic-related data, including the total length of highways and arterial roads within 1-kilometer radii and daily vehicle and truck traffic volumes, were quantified with a geospatial model. Inflammatory cytokines were measured using a multiplex bead assay. Spearman correlations and regression models were used to identify associations between traffic exposure and patient demographics, clinical factors, inflammatory mucus cytokines, and quality-of-life (QOL) scores.

Results:
567 patients with complete data were analyzed. Participant race was associated with higher proximity to arterial roads (p=0.0084). In patients with chronic rhinosinusitis with nasal polyps (CRSwNP), the total length of arterial roads were correlated with lower IL-2 levels (p=0.0313, r=-0.1808) while in patient without polyps IL5 (p=0.0032, r=-0.2736) and IL7 (p=0.0444, r=-0.1862) were lower.

Conclusion:
This data suggests a relationship between exposure to vehicle emissions and specific inflammatory cytokines, including IL-2, IL-5, and IL-7. Combined with prior work, the findings imply that chronic exposure to traffic-related air pollution may contribute to the inflammatory milleu of CRS.

Poster #A019
CRS outcome prediction tool
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Introduction:
Electronic medical calculators offer real-time, evidence-based support at the point of care. While factors like sex, depression, and migraine influence sino-nasal outcome test (SNOT-22) scores in chronic rhinosinusitis (CRS), anticipating treatment response remains difficult. We present a calculator to predict patient-reported improvement (PRI) after medical treatment for CRS.

Methods:
Multivariate logistic regression models were used to estimate odds ratios and predict the probability of PRI, based on previously published associations. The models accounted for interactions between changes in SNOT-22 scores and depression or migraine status. A clinical calculator was developed incorporating baseline SNOT-22 scores and key predictors of PRI, including sex, age, education level, depression, and migraine.

Results:
Our calculator estimates (1) the probability of PRI after medical treatment for CRS and/or (2) the required change in SNOT-22 score to

achieve PRI (i.e., MCID), based on SNOT-22 scores, sex, age, education, and depression/migraine status. A 47.2% probability cutoff optimized sensitivity and specificity (Youden Index) and defined the PRI threshold. Higher probabilities indicate greater likelihood of improvement; lower values suggest reduced likelihood.

Conclusion:
This proof-of-concept uses known sociodemographic predictors to estimate treatment response in CRS through an electronic medical calculator. Future work will validate the model and evaluate its clinical utility.

Poster #A020
CRS patients' perceptions of cannabis use
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Background:
Chronic rhinosinusitis (CRS) significantly affects quality of life with symptoms such as nasal congestion, pain, and sleep disturbances. Limited research explores cannabis as a potential adjunctive treatment for CRS symptom relief.

Objective:
This study aims to assess CRS patients' perspectives on cannabis use, including usage patterns, perceived benefits, and preferred methods of administration.

Methods:
A cross-sectional survey was conducted among CRS patients from two otolaryngology clinics. Participants completed a 13-item questionnaire adapted from prior studies to capture data on cannabis usage, attitudes, and preferences. Of 106 approached patients, 72 completed the survey (68% response rate). Descriptive analyses were performed to evaluate usage patterns and perceptions.

Results:
Among participants, 35% had never used cannabis, 38% were past users, and 28% were current users. Of current users, 75% reported cannabis alleviated CRS symptoms, particularly sleep disturbances (80%), pain (67%), and emotional distress (40%). When considering cannabis for CRS treatment, most patients preferred tablets (42%) and edibles (35%) over smoking (7%) or vaporizing (4%). Interest in cannabis for CRS treatment was high (92%) if proven effective. Legalization increased cannabis appeal for 38% of patients. Sources of cannabis information included friends/family (40%), social media (22%), and healthcare providers (14%).

Conclusion:
Cannabis may serve as a promising adjunctive therapy for CRS, particularly for managing sleep and pain symptoms. Significant patient interest underscores the need for further research and enhanced healthcare provider involvement to address knowledge gaps and support evidence-based discussions.

Poster #A021
Crusting after synthetic peptide hydrogel use in submucosal inferior turbinate resection
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Objective:
To evaluate the efficacy of a synthetic self-assembling peptide hydrogel in reducing postoperative crusting and enhancing mucosal healing following turbinate reduction surgery.

Methods:
In this prospective, blinded study, 10 patients underwent bilateral submucosal resection of their inferior turbinates. Postoperatively, patients received either topical application of a synthetic peptide hydrogel to both nasal cavities or current standard of care. Endoscopic videos of both nasal cavities were recorded

during their 4-week postoperative visit. Blinded, board-certified rhinologists independently reviewed and scored these recordings, assessing the percentage of crusting visualized on the inferior turbinates using a visual analog score.

Results:
Ten patients (7 male, 3 female; mean age 45.4 years) completed the study. The mean percentage of total crusting visualized on the inferior turbinates was 11.23% in the hydrogel group compared to 20.84% in the control group. While this represented a notable relative reduction in postoperative crusting, the difference did not reach statistical significance (p=0.53).

Conclusion:
This preliminary study suggests a trend toward reduced crust formation with the use of a synthetic self-assembling peptide hydrogel following turbinate reduction surgery. Although not statistically significant, the observed decrease in crusting may reflect a clinically meaningful improvement in postoperative healing. Further studies with larger sample sizes are warranted to validate these findings and determine the broader applicability of peptide hydrogels in enhancing recovery after rhinologic procedures.

Poster #A022
DEK:AFF2 sinonasal carcinoma: A case report and literature review
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Introduction:
DEK:AFF2 fusion-associated carcinoma is a rare and aggressive subtype of nonkeratinizing squamous cell carcinoma recently identified in the sinonasal tract. These tumors are frequently misdiagnosed due to their bland histology and architectural overlap with Schneiderian papillomas, leading to delays in treatment and poorer outcomes. This study characterizes the clinical behavior, histopathologic features, and treatment responses of sinonasal DEK:AFF2 carcinomas.

Methods:
We present a case of a 22-year-old female with DEK:AFF2 fusion carcinoma initially misdiagnosed as inverted papilloma. A systematic literature review using PubMed was performed to identify sinonasal DEK:AFF2 cases. Data were extracted on demographics, tumor site, initial diagnosis, treatment, and outcomes to assess trends and behavior of this entity.

Results:
Twenty-nine cases were identified, with a mean age of 54 years and a female predominance (66%). Most tumors involved the nasal cavity or nasopharynx. Misdiagnosis occurred in 96.5% of cases, often as Schneiderian papilloma or carcinoma ex-papilloma. Nearly all patients underwent surgical resection; 52% received adjuvant therapy. Recurrence was seen in 72% of cases, with metastases in 16%. Thirteen percent of patients died of disease. Median follow-up was 29 months.

Conclusion:
Sinonasal DEK:AFF2 carcinoma is a newly recognized but clinically aggressive malignancy. Its frequent misdiagnosis underscores the need for early molecular testing, especially AFF2 immunohistochemistry. Immunotherapy may offer benefit in select patients. Awareness of this entity and incorporation of molecular diagnostics into routine practice are critical to guide appropriate treatment and improve outcomes.

Poster #A023
Delays in CSF leak treatment associated with higher ADI
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Objective:
Cerebrospinal fluid (CSF) leak symptoms are non-specific, often delaying diagnosis and treatment. This study examines socioeconomic

and demographic factors influencing time to presentation and surgical repair.

Methods:
A retrospective analysis was conducted on patients with suspected CSF leaks who underwent surgical repair from 2010 to July 2024 at a tertiary hospital. Patients with confirmed iatrogenic CSF leaks were excluded. Demographics, area deprivation index (ADI), comorbidities, healthcare access, and time to presentation were assessed. ADI differences were analyzed using Student's t-tests ($p<0.05$).

Results:
Among 202 patients, the average age was 56. The cohort was 56% white and 77% female. Racial distribution included 32% black and 10% other races. The mean BMI was 36 (range: 15–65). Before diagnosis, 27% saw a primary care physician (PCP), 63% an otolaryngologist, and 10% were referred from neurosurgery. Most patients (64%) presented after >2 months, 12% within 1 month, and 9% within 2 months. White patients presented earlier than black patients (274 vs. 419 days), though not statistically significant. However, black patients had significantly higher ADI scores (64 vs. 42, $p<0.001$). Patients who first sought care with a PCP were from more disadvantaged communities (ADI: 57 vs. 47, $p=0.02$).

Conclusion:
Black patients had a 145-day longer delay than white patients, though not statistically significant. However, significantly higher ADI scores among black patients highlight socioeconomic barriers to timely care. These findings emphasize the need for further research to address disparities and improve equitable access to CSF leak management.

Poster #A024
Depemokimab reduced SCS use during ANCHOR-1/2 trials
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Background:
Depemokimab is the first ultra-long-acting biologic with enhanced IL-5 binding affinity, high potency, and extended half-life, enabling sustained suppression of type 2 inflammation and twice-yearly dosing. This analysis assessed the impact of depemokimab on systemic corticosteroid (SCS) use in the ANCHOR-1/2 trials.

Methods:
Adults with inadequately controlled CRSwNP were randomized (1:1) to depemokimab (100 mg subcutaneous) or placebo, plus standard of care, once every 26 weeks for 52 weeks. Outcomes were assessed among the integrated population and included the proportion of patients that required ≥1 SCS course for CRSwNP, or any reason; and time to first course of SCS for any reason (all post hoc).

Results:
During the 12 months before the trials, 72% (depemokimab; n=196/272) and 65% (placebo; n=166/256) of patients required SCS for CRSwNP. Up to Week 52, 21% (depemokimab) and 28% (placebo) of patients required ≥1 SCS course for CRSwNP (odds ratio [OR] [95% CI]: 0.63 [0.42, 0.95] nominal p=0.029); these values were 30% and 41%, respectively, for ≥1 SCS course for any reason (OR [95% CI]: 0.53 (95% CI: 0.37, 0.78), nominal p=0.002). Time to first use of SCS for any reason up to Week 52 was delayed in the depemokimab group (hazard ratio [95% CI]: 0.64 [0.48, 0.85], nominal p=0.003).

Conclusion:
A lower proportion of depemokimab-treated patients required ≥1 course of SCS versus placebo and time to first SCS use was delayed with depemokimab versus placebo. These findings suggest that twice-yearly depemokimab reduced the need for rescue SCS during ANCHOR-1/2, and may help reduce the associated healthcare burden of SCS use in patients with CRSwNP.

POSTERS

Poster #A025

Development of CRSwNP and EoE following initiation of immune checkpoint inhibitor therapy

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Introduction:
Immune checkpoint inhibitor (ICI) therapy has revolutionized cancer treatment. Pembrolizumab is an ICI that inhibits the programmed cell death protein 1 (PD-1) pathway, reversing T-cell suppression and inducing antitumor responses. Hypereosinophilia in melanoma has been linked to better clinical responses and longer progression-free survival, suggesting it may be a positive prognostic marker for some patients undergoing ICI therapy. We report new onset and exacerbation of multiple type 2 inflammatory diseases including chronic rhinosinusitis with nasal polyposis (CRSwNP), allergic rhinitis, asthma, and eosinophilic esophagitis (EoE) in an individual patient following the initiation of immune checkpoint inhibitor therapy.

Case Presentation:
A 56-year-old male with a history of childhood asthma developed symptoms of nasal congestion and allergic rhinitis as well as worsening asthma after starting pembrolizumab for metastatic melanoma. He was treated with budesonide irrigations with improvement of his sinonasal symptoms and Wixela for his asthma but then developed severe esophageal pain and dysphagia. The patient was found to have an absolute eosinophil count of 980 eosinophils/ul. Esophageal biopsy confirmed a diagnosis of EoE with >100 eosinophils/HPF in the distal esophagus, for which he underwent topical and oral steroid therapy to control symptoms.

Conclusion:
ICI checkpoint inhibitor treatment can lead to the development of type 2 inflammation, and in this case, multiple syndromes in a patient including CRSwNP, asthma exacerbation, allergic rhinitis, and EoE. Compensatory immune responses may occur with ICI treatment, illuminating a possible mechanism underlying the development of type 2 diseases.

Poster #A026

Diagnostic challenge of orbital apex inflammatory processes

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Background:
Orbital apex processes can have poor visual and neurologic outcomes, therefore appropriate diagnosis and management is critical. We aim to highlight the difficult diagnostic workup and necessity of early intervention.

Methods:
All patients with the diagnosis of an orbital apex lesion treated at a tertiary care center between 2013 and 2023 were included and retrospectively analyzed. The primary endpoint was definitive diagnosis. Secondary endpoints were time from symptom onset to otolaryngology involvement and vision and neurologic outcomes.

Results:
Ten patients met inclusion criteria. A definitive diagnosis was reached in 60.0% (n=6) of patients representing five unique diagnoses; four patients were diagnosed with otherwise non-specific inflammatory conditions. The average time from symptom onset to first otolaryngology involvement was 9.1 months. In patients who initially presented with only ophthalmologic deficits (n=4) and in those with complete vision loss (n=3), the average time from symptom onset to otolaryngology intervention was 6.5 months and 6.67 months, respectively. In patients with both ophthalmologic and neurologic deficits at time of presentation (n=6), the time to first otolaryngology intervention was an average of 10.83 months after symptom onset.

Conclusion:
The etiology of an orbital apex lesion can represent a diagnostic challenge that requires persistent pursuit beyond initial workup. Early exclusion of malignancy is important as it allows for aggressive treatment with anti-inflammatory medications, although this may mask or even lead to invasive fungal sinusitis. Ultimately, delay in referral and definitive treatment may worsen disease sequelae.

Poster #A027
Do all septal perforation patients benefit from posterior septectomy
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Nasal septal perforation (NSP) can lead to frustrating symptoms including congestion, bleeding, and post-nasal drip. Management of NSP (e.g. surgical repair or buttons), especially large perforations still pose a challenge. A posterior septectomy is an alternative procedure, yet, its mechanisms + optimal approaches for symptom relief are not clear. If failed, it cannot be easily reversed.

We recruited 7 patients with NSPs and used a previously published virtual surgical planning system to perform partial and full posterior septectomies that were straight (remove posterior edge fully), conservative (remove 50% of posterior edge), and tapered downward (starts with 100%, and taper to 50%). A partial septectomy removed halfway between NSP and the septum end, whereas a full septectomy cut to the end of the septum. The optimal surgery for each patient was determine based on commutated regional wall shear stress (WSS) along the perforation margin, which has been previous implicated to drive NSP symptoms. WSS was abnormally higher surrounding the original NSP for 6 patients, with the remaining patient with low WSS + asymptomatic. The average SNOT-22 and NOSE score for all patients was 26.83 ± 13.61 and 33.35 ± 23.4, respectively, and 16 and 15 for the asymptomatic patient.

5 patients have significantly reduced WSS post-septectomy. For 3 patients, a downward tapering septectomy was the most effective to reduce WSS. For 1 patient, a conservative septectomy was the most effective. For 1 patient, the downward tapering and straight septectomy were equally effective. For 1 patient, none of the options were effective.

CFD models of virtual surgery septectomy methods may be an effective option to personalize septectomy for symptomatic patients.

Poster #A028
Does the nasal cycle affect CFD nasal cavity dimensionless parameters?
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Introduction:
Computational Fluid Dynamics (CFD) modeling allows objective measures of nasal airflow using computerized tomography scans (CT). Objective parameters Φ (symmetry of airflow) and R (bilateral resistance), developed recently, provide a standardized framework to analyze nasal airflow. However, it is unknown if the nasal cycle affects these parameters. Our objective is to study the temporal variability of Φ and R using CFD from CT performed at different times over months or years.

Methods:
We included 56 CT from 18 patients (Pt), each with multiple scans (min=2 CT, max=6 CT) over time (min= 1 month, max= 2 years). We used Flowgy to analyze CFD models comparing Φ and R between CT for each Pt.

Results:
Values of Φ and R were remarkably consistent across different CT of the same Pt. Pt #2 (n=2 CT) showed an increase in R from 13 to 18, but

minimal change in Φ (1.3 to 1.4). Similarly, Pt #18 (n=5 CT) showed minimal change, with R increasing from 22 to 26, and Φ from 1.1 to 1.6. Likewise, Pt #9 (n=3 CT) had changes in R from 25 to 32 and Φ from 1.9 to 1.4. With the exception of Pt #7 (n= 5 CT), who had one CT outside and the remaining 4 within, all patients remained within or outside the high probability range (R=8-26; Φ=1-1.8) across all CT.

Conclusion:
These results highlight the potential of Φ and R parameters as objective and reliable metrics for nasal functional analysis, regardless of the time of CT acquisition and of the stage of the nasal cycle. This is the first study to evaluate the temporality of objective measures of nasal airflow using CFD modeling over time accounting for potential differences in the nasal cycle. Further studies under controlled CT acquisition conditions could confirm these findings.

Poster #A029
Dupilumab effectiveness through 24 months in patients from the United States with CRSwNP in AROMA
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Introduction:
We report the long-term effectiveness of dupilumab in patients from the United States (US) with chronic rhinosinusitis with nasal polyps (CRSwNP) enrolled in the global AROMA registry (NCT04959448).

Methods:
AROMA enrolled adults with CRSwNP initiating dupilumab in real-world clinical practice, monitoring them for up to 36 months (M).

Results:
AROMA enrolled a total of 691 patients, with 370 patients enrolled within the US. Mean (SD) age was 48.6 (14.00) years, 46.5% were male, and 70.5% were white. Nasal congestion scores (range 0–3) decreased from mean 1.6 (SD 0.87; n=325) at baseline, to 0.9 (0.79; n=280) at M3, 0.8 (0.78; n=172) at M12, 0.8 (0.74; n=96) at M18, and 0.7 (0.74; n=44) at M24. Loss of smell scores (range 0–3) decreased from mean (SD) 1.9 (1.17; n=325) at baseline, to 1.0 (1.05; n=280) at M3, 0.9 (1.06; n=172) at M12, 0.9 (1.06; n=96) at M18, and 1.1 (0.98; n=44) at M24. 22-item sino-nasal outcome test scores (range 0–110) changed from mean (SD) 41.8 (21.15; n=288) at baseline, to 21.1 (15.53; n=218) at M3, 17.0 (15.68; n=107) at M12, 17.4 (16.29; n=40) at M18, and 22.2 (15.72; n=19) at M24. Patients reporting “no symptoms” on the global patient assessment were 4.6% (n=13) at baseline, 29.1% (n=66) at M6, 33.1% (n=45) at M12, 33.3% (n=18) at M18, and 30.4% (n=7) at M24.

Conclusion:
For patients in the US in the global AROMA registry, dupilumab initiation rapidly improved disease severity, assessed by patient-reported outcomes and maintained up to 24-months’ follow-up. Patients in the US in AROMA had less severe CRSwNP disease at baseline compared with patients in pivotal SINUS-24/52 phase 3 trials.

Poster #A030
Dupilumab efficacy in adults vs seniors with CRSwNP
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Introduction:
Dupilumab is a biologic that improves polyp burden and quality of life of patients with chronic rhinosinusitis with nasal polyps (CRSwNP); however, data on its effect on senior patients is limited. This is the first study to compare its efficacy in seniors with nasal polyposis.

Methods:
A retrospective chart review was conducted on adult patients (≥ 18 and < 65) and senior patients (≥ 65) with CRSwNP treated with dupilumab. Outcomes included SNOT-22,

rhinologic, and nasal polyp scores (NPS) at 3, 6, and 12 months as well as medication use, revision surgery rates, and adverse events. T-tests and Chi-squared tests were used to compare groups at baseline and follow-up.

Results:
101 adults and 36 senior patients (mean age =44.4 vs 71.5) were included. SNOT-22, rhinologic, and polyp scores improved at all follow-up time points ($p < 0.001$), with no significant differences between age groups ($p > 0.05$). Senior patients showed greater percent improvement in NPS at 6 and 12 months (51.76% vs 81.49%, $p =0.027$; 62.44% vs 81.88%, $p =0.004$), respectively. Medication use, including nasal and oral steroids, antihistamines, and antibiotics decreased across all timepoints ($p < 0.001$), with similar reductions in both groups. Revision surgery rates were similar between age groups (13.8%); however, adverse events were more common in seniors (25.0% vs 10.9%, $p =0.040$). 45% (N=9) of these patients discontinued dupilumab use due to side effects.

Discussion:
This is the first study to show dupilumab improves symptoms and polyp burden while reducing medication use in senior patients with CRSwNP. While adverse events tended to be more frequent in seniors, dupilumab remains an effective, well-tolerated treatment for nasal polyposis.

Poster #A031

Dupilumab improved CRSwNP and asthma outcomes more than omalizumab: EVEREST head-to-head trial

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Objective:
To compare efficacy and safety of dupilumab vs omalizumab in patients with severe CRSwNP and coexisting asthma.

Methods:
EVEREST (NCT04998604), a multicentre, double-blind trial, randomized adults with severe CRSwNP and coexisting asthma to dupilumab 300 mg every 2 weeks (W) or omalizumab 75–600 mg every 2W or 4W for 24W on background mometasone furoate nasal spray. Primary endpoints were W24 change in nasal polyp score (NPS) and University of Pennsylvania Smell Identification Test (UPSIT).

Results:
360 patients were randomized (dupilumab, n=181; omalizumab, n=179). Baseline characteristics were comparable between groups. Improvements were significantly greater with dupilumab than omalizumab for all primary and secondary efficacy endpoints. Least squares mean differences [LSMDs] in change from baseline at W24, dupilumab over omalizumab, were –1.60 [95% CI –1.96, –1.25], $p<0.001$ for NPS, and 8.0 [6.3, 9.7], $p<0.001$ for UPSIT. Sino-Nasal Outcome Test (SNOT-22) nasal domain score improvements were substantially better with dupilumab than omalizumab: W24 LSMD –0.8 [95% CI –1.0, –0.6]. Improvements in asthma outcomes were also greater with dupilumab than omalizumab: W24 LSMDs, dupilumab over omalizumab, were 0.15 L [95% CI 0.05, 0.26] for pre-bronchodilator forced expiratory volume in 1 s, and –0.48 [–0.65, –0.31] for 7-item Asthma Control Questionnaire. Safety profiles were comparable.

Conclusions:
Dupilumab was superior to omalizumab in patients with severe CRSwNP and coexisting asthma, showing greater improvements in CRSwNP and asthma outcomes. These findings support the efficacy of dupilumab in type 2 respiratory diseases vs an active biologic comparator and support the known safety profiles of dupilumab and omalizumab.

POSTERS

Poster #A032

Dupilumab real-world effectiveness through two years in patients with CRSwNP: Global AROMA registry

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Objective:
Chronic rhinosinusitis with nasal polyps (CRSwNP) has a high symptom burden, severely impacting health-related quality of life. Dupilumab significantly reduced symptoms in clinical trials, but real-world evidence is limited.

Methods:
AROMA (NCT04959448) is a phase 4, prospective global registry study of adults with CRSwNP initiating dupilumab in real-world practice in the USA, Canada, Germany, Italy, Japan, and the Netherlands.

Results:
691 patients initiated dupilumab (median age 53 years [IQR 42−61], 55.7% male, 69.5% White, 69.2% with asthma, 74.1% with prior sinonasal surgery). Nasal congestion score improved from mean 1.8 (SD 0.86) at baseline (n=609) to 0.9 (0.75), 0.7 (0.74), and 0.5 (0.66) at month (M) 3 (n=521), M12 (n=326), and M24 (n=76), respectively. Loss of smell score improved from mean 2.2 (SD 1.06) at baseline (n=609) to 1.2 (1.04), 1.0 (1.02), and 0.9 (0.96) at M3 (n=521), M12 (n=326), and M24 (n=76), respectively. SNOT-22 improved from mean 45.9 (SD 21.37) at baseline (n=552) to 21.3 (15.67), 17.0 (14.31), and 18.4 (14.55) at M3 (n=443), M12 (n=224), and M24 (n=29), respectively. MiniRQLQ scores improved from mean 33.0 (SD 17.28) at baseline (n=330) to 14.1 (12.43), 13.0 (11.54), and 12.7 (10.95) at M6 (n=219), M12 (n=143), and M18 (n=66). The proportions of patients reporting “no symptoms” (patient global assessment of symptom severity) increased from 3.3% at baseline (n=545) to 32.6% at M12 (n=267) and 42.9% at M24 (n=35). Safety was consistent with the known dupilumab safety profile.

Conclusion:
Dupilumab rapidly improved symptoms and health-related quality of life with continued improvements through 24 months of follow-up, supporting its long-term effectiveness in CRSwNP in real-world practice.

Poster #A033

Early and sustained improvements in nasal obstruction and loss of smell with depemokimab in CRSwNP

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Background:
Depemokimab is the first ultra-long-acting biologic with enhanced IL-5 binding affinity, high potency, and extended half-life, enabling sustained suppression of type 2 inflammation and twice-yearly dosing. Early and sustained improvements of depemokimab in nasal obstruction (NO) and loss of smell (LoS) were assessed in the integrated ANCHOR-1/2 population.

Methods:
Adults with inadequately controlled CRSwNP were randomized (1:1) to depemokimab (100 mg subcutaneous; n=272) or placebo (n=256), plus standard of care, once every 26 weeks (wks) for
52 wks. The proportion of patients (responder analysis) achieving meaningful within-patient change on the 4-point NO (≥1-point decrease) and LoS (≥0.8-point decrease) 1-wk mean verbal response scale (VRS; 0–3) scores, and change from baseline in mean NO and LoS VRS scores were assessed over 52 wks. The 1-wk mean VRS scores were derived from daily scores.

Results:
Depemokimab showed a higher proportion of NO responders vs placebo starting from Wk 1 (5% vs 2%; OR [95% CI]: 3.17 [1.09, 9.24];

nominal p=0.035), reaching 50% vs 38% at Wk 52 (OR [95% CI]: 1.53 [1.05, 2.23]; nominal p=0.028). Rate of responders in LoS also increased with depemokimab vs placebo from 5% vs 2% at Wk 1 (OR [95% CI]: 3.06 [1.09, 8.62]; nominal p=0.035) to 37% vs 23% at Wk 52 (OR [95% CI]: 1.86 [1.25, 2.79]; nominal p=0.003). Improvements from baseline with depemokimab were observed in mean NO at Wk 3 (difference vs placebo [95% CI]: –0.15 [–0.29, –0.02]; nominal p=0.028) and LoS at Wk 4 (–0.15 [–0.26, –0.03]; nominal p=0.012), and were sustained through Wk 52.

Conclusion:
Twice-yearly depemokimab provided early and sustained improvements in NO and LoS in CRSwNP.

Poster #A034
Early onset juvenile nasopharyngeal angiofibroma mistaken for adenoid hypertrophy: A case report
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Objective:
We present a unique case of stage IV early-onset JNA referred to our institution after an aborted adenoidectomy.

Study Design:
Case Report

Methods:
Retrospective chart review of patient clinical data.

Results:
An 8-year-old male presented to clinic with a sinonasal tumor. The patient initially suffered from recurrent otitis media with symptom relief following bilateral tympanostomy tube placement one year prior. Subsequently, he was diagnosed with obstructive sleep apnea confirmed with polysomnography and offered tonsillectomy and adenoidectomy. Upon attempted excision of adenoid tissue, the outside surgeon encountered an unexpected nasopharyngeal mass and aborted the surgery. Diagnostic imaging revealed a right hypervascular sinonasal tumor measuring 4.8 x 5.2 x 6.2 cm. The patient was urgently referred to our tertiary care center for further evaluation of a presumed sphenoid sinus mass. Interestingly, the patient denied any history of a sentinel bleed or recurrent epistaxis. His mother recalled a diagnosis of “nasal polyps” in 2022 but he received no additional work-up at that time. The patient was scheduled for pre-operative embolization by interventional radiology and underwent endoscopic tumor resection the following day. Post-operative imaging revealed complete tumor removal. Final pathology confirmed sinonasal tract angiofibroma. At his two-month follow-up visit, the patient continued to do well with no evidence of maxillary numbness, mass recurrence or epistaxis.

Conclusions:
Prompt and accurate diagnosis of JNAs is critical to prevent procedural complications and potentially fatal hemorrhage. JNAs should remain on the differential for sleep apnea in the setting of significant nasal obstruction.

Poster #A035
Effect of body mass index on sinonasal symptoms and imaging results
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Background:
Despite the inflammatory and anatomical contributions of obesity to rhinologic disease, little is known about how obesity influences subjective sinonasal symptoms and their association with radiographic severity. We sought to determine whether BMI affects sinonasal symptom severity and functions as an effect modifier of the association between symptoms and imaging findings. Subjective symptom measures can have limited discriminatory capacity for objective imaging, and other effect modifiers have been identified that influence whether these two measures align.

Methods:
Consecutive patients presenting to a tertiary medical center with sinonasal symptoms completed 22-item Sinonasal Outcome Test (SNOT-22) questionnaires and underwent CT imaging scored using the Lund-Mackay (LM) system. Linear regression and ANCOVA were utilized to evaluate the impact of BMI on SNOT-22, adjusting for LM scores, Charlson Comorbidity Index, and sex. Receiver-operator characteristic area under the curve (ROC-AUC) evaluated whether BMI modifies the relationship between SNOT-22 and LM scores.

Results:
185 patients were categorized as normal weight (n=62), overweight (n=61), and obese (n=62). No differences were found in overall (P=0.33) or domain-specific (nasal, ear, sleep, psychological; P=0.16–0.90) SNOT-22 scores across BMI categories, nor when evaluating BMI continuously (P>0.05). ROC-AUC values for overall and domain-specific SNOT-22 scores did not differ by BMI category (P>0.05). Continuous BMI did not modify the association between SNOT-22 and LM scores (P>0.05).

Conclusions:
BMI does not influence sinonasal symptom severity nor modify the relationship between SNOT-22 scores and imaging measures in patients with sinonasal complaints.

Poster #A036
Elevated intranasal mucosal sensitivity to air-puff among pre-surgical septo-turb patients
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Objectives:
This study aims to examine mucosal sensitivity to air-puff stimulation among pre-surgical patients with septal deviation and/or turbinate hypertrophy (septo-turb).

Methods:
14 pre-surgical septo-turb patients, with significant symptoms evaluated via nasal obstruction symptom evaluation (NOSE: 63.75±15.3) and sinonasal outcomes score (SNOT-22: 43±9.4), were enrolled. Precise, 15 ms air jets with flow rates ranging 0.5 to 5 L/min were delivered via 25-gauge microcannula, with a 0.01 x 0.03-inch side opening placed 2 mm from the mucosal surface at predetermined sites. Detection thresholds were determined using single-staircase method in 0.5 L/min steps.

Results:
Pre-surgical patients have significantly higher (worse) thresholds when compared to normative values in literature at all sites, e.g. nasal valve (pre: 0.75±0.37 air volume in3, healthy: 0.29±0.26, $p<0.05$), head of inferior turbinate (pre: 0.90±0.31 healthy: 0.40±0.29, $p<0.05$), and middle of inferior turbinate (pre: 0.90±0.32 healthy: 0.40±0.29, $p<0.05$). Within the patient cohort, the nasal valve has significantly lower (better) threshold compared to other sites: e.g. inferior turbinate head ($z=-2.38$, $p=0.017$), middle of inferior turbinate ($z=-2.28$, $p=0.022$). Significant correlations were found between airpuff thresholds and symptom scores (NOSE vs nasal valve: $r=-0.41$, $p=0.03$; SNOT22 vs inferior turbinate head: $r=0.43$ $p=0.02$, opposite septum: $r=0.42$ $p=0.03$).

Conclusion:
This study tested and confirmed a potential mechanism for nasal obstruction: significantly diminished mucosal sensitivity to airflow as compared to healthy subjects - which significantly correlated to patients' subjective symptoms.

Poster #A037
Empty nose syndrome and nasal aerodynamics post turbinate surgery: A systematic review
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POSTERS

Background:
Turbinate surgery, encompassing both reduction and resection techniques, is intended to optimize nasal airflow by alleviating anatomical blockages within the nasal passage. However, a subset of patients may develop empty nose syndrome (ENS), wherein they experience sensations of nasal obstruction and impaired airflow perception despite the absence of physical impediments.

Objective:
This systematic review sought to complete a comprehensive analysis of post-surgical alterations in nasal aerodynamics, with emphasis on shifts in regional airflow distribution in individuals experiencing ENS.

Methods:
PubMed, Embase, and Medline databases were queried to identify studies examining nasal airflow dynamics following turbinate surgery-examining airflow distribution and wall shear stress (WSS) in patients with empty nose syndrome (ENS) using computational fluid dynamics (CFD).

Results:
A total of 890 studies were identified with 11 meeting inclusion criteria. Reported surgical/ treatment interventions included inferior turbinate reduction, middle turbinate resection, and endoscopic medial maxillectomy. All techniques demonstrated an increased airflow focused towards the middle meatus while reducing nasal resistance. Patients with aggressive ITR but without symptoms of ENS showed higher inferior meatus airflow than symptomatic ENS patients. Symptomatic ENS patients experienced a disproportionately higher percentage of airflow in the middle meatus compared to controls and non-ENS cohorts.

Conclusions:
The cumulative evidence supports the notion that in ENS, airflow shifts predominantly to the middle meatus, accompanied by reduced airflow and WSS in the inferior meatus, which correlates with symptomatic severity.

Poster #A038

Eosinophilic esophagitis & sinonasal inflammatory disease: A retrospective TtriNetX analysis

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Background:
Eosinophilic esophagitis (EoE) is a chronic immune-mediated disorder of the esophagus, frequently associated with atopic conditions. The relationship between EoE and sinonasal inflammatory diseases such as allergic rhinitis (AR), chronic rhinosinusitis (CRS), and nasal polyps (NP) remains underexplored. This study investigates the prevalence of these conditions in EoE patients compared to matched controls, with a focus on their occurrence prior to EoE diagnosis.

Methods:
We conducted a retrospective cohort analysis using the TriNetX research network. Patients with EoE (ICD-10: K20.0) (n=4,137) were identified and compared to a non-EoE control cohort (n=2,343,446). The prevalence of AR (J30.x), CRS (J32.x), and NP (J33.x) was assessed before EoE diagnosis. Statistical comparisons were performed using chi-square tests, with significance set at $p<0.05$.

Results:
35% of patients who later developed EoE had a prior AR diagnosis compared to 20% of the general population ($p<0.0001$), 14% had CRS compared to 10% of controls ($p<0.0001$), and 1.4% had NP compared to 0.6% of controls ($p<0.0001$). These findings suggest a significantly higher prevalence of sinonasal inflammatory disease in patients who subsequently develop EoE.

Conclusion:
Patients with EoE have a significantly higher burden of AR, CRS, and NP prior to their EoE diagnosis, supporting a shared pathophysiologic mechanism. Early screening for sinonasal disease in at-risk populations may help identify individuals predisposed to

developing EoE. Further research is needed to explore the impact of sinonasal inflammation on EoE progression and treatment response.

Poster #A039

Eustachian tube balloon dilations and factors associated with secondary procedures

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Objective:
Eustachian tube balloon dilation (ETBD) is a relatively new method to treat patients with eustachian tube dysfunction (ETD) and so its long-term efficacy is unclear. This study aims to study the patients who required subsequent procedures for ETD after receiving an initial ETBD.

Methods:
TriNetX, a global collaborative research database, was queried to identify all patients who received a ETBD without any other procedure to treat ETD the same day at least 1 year prior to this query. This group was then analyzed for patients who did and did not require a subsequent procedure with either a repeat balloon dilation, tympanoplasty, tympanostomy tubes, or adenoidectomy.

Results:
A total of 1015 patients were found to have had a ETBD without any other ETD treatment on the same day. Of these, 862 did not have a subsequent procedure, while 22 had a repeat ETBD, 30 had a tympanoplasty, and 107 had tympanostomy tubes placed at least 1 month after the initial ETBD. This suggests a failure rate of 15% in this cohort. Additionally, those with secondary procedures had higher rates of prior inferior turbinate reduction, septoplasty, or sinus surgery. Of note, there were 1052 patients who received a ETBD with an additional same day ETD procedure at least 1 year prior to this query. Ultimately, 21% of these patients had another procedure at least 1 month after their initial surgeries.

Conclusion:
This is the first large database study analyzing the rates of secondary procedures after an initial ETBD. Patients receiving a ETBD with another ETD procedure the same day had a higher failure rate than those without same day ETD procedures, but further studies are needed to further characterize long term results after ETBD.

Poster #A040

Factors associated with work productivity improvement after ESS - A retrospective cohort study

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Introduction:
Chronic rhinosinusitis, a costly disease with direct annual costs of $8.6 billion and indirect costs like word productivity loss, absenteeism, and physical disability. Long-term improvements in productivity after (ESS) have been demonstrated. Little is known about the factors associated with short-term work productivity improvement after ESS in the initial period after healing. This study will look at the short-term work productivity in the 3-6 months after ESS.

Methods:
Retrospective cohort study. Inclusion criteria: CRS patients undergoing ESS who completed pre-ESS and 3-6 months post-ESS productivity questionnaires. The percent change in work productivity (% change) was calculated and a priori a 10% change was considered clinically significant. The population was divided into quartiles based on % change. The smallest two % change quartiles and the largest % change quartile were compared on disease features, rinse compliance, and number of antibiotic courses in the perioperative period.

Results:
109 subjects met criteria: 40% female, mean age 57.16 (SD=16.05), 15% Black, 41% Hispanic, 49% CRSwNP, 39% revision surgery. Over 10% short-term productivity change was

seen in 39% of subjects. Lowest two %change quartiles (n=50; mean %change=-25) was compared to the highest %change quartile (n=30; mean %change=4681). Number of workdays missed at preop (Small: mean 1.9; Large mean 11.90, pvalue 0.019) and number of total sinuses operated on (Small: mean 5.56; Large mean 6.77, pvalue 0.040) demonstrated significance.

Conclusion:
Patients with higher disease burden and abseinteeism at baseline while needing surgery on avg of 6 sinuses showed larger improvement in their percent work productivity at their 3-6 month fup."

Poster #A041
Forehead cellulitis after modified Lothrop: A case presentation
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Introduction:
Revision endoscopic sinus surgery for chronic rhinosinusitis with polyps (CRSwNP) presents a challenging situation for the rhinologist when considering frontal sinus disease and the utility of a modified Lothrop procedure. The creation of a large common frontonasal communication requires frontal sinus drill out with thinning of the anterior table to clear disease and improve postoperative nasal care efficacy. The overlying soft tissue of the forehead is in close proximity to the surgical site; here we present a case with postoperative cellulitis and management.

Methods:
Case report of a 76-year-old woman with CRSwNP after revision sinus surgery including modified Lothrop. We discuss her clinical course including procedural technique, postoperative care, complication development and management with clinical pearls regarding soft tissue infection following frontal sinus drill out.

Results:
The patient underwent uncomplicated revision endoscopic sinus surgery with modified Lothrop and discharged home on ten-day course of doxycycline and her home budesonide nasal rinse regimen. She developed forehead and bilateral periorbital swelling with tenderness on postoperative day 14 and was placed on a second course of oral antibiotics. She then presented one month postoperatively with increased edema and tenderness with new erythema and CT imaging demonstrating hypoenhancement and inflammatory changes of the overlying forehead skin without abscess. She responded well to a 3-day course of intravenous antibiotics and steroids, transitioned to full oral regimen. No long-term complications noted, follow-up at 8 weeks showed no recurrence of infection.

Conclusion:
Forehead cellulitis following a modified Lothrop

Poster #042
Frontal sinus balloon dilation for long-term frontal sinus headache relief
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Background:
Frontal sinus headaches (FSHA) are not distinctly addressed in standardized sinonasal symptom scores within SNOT-20/22. This retrospective review and pilot study expanded questioning to include patient complaints of FSHA, and the effect of frontal sinus balloon dilation (FSBD) as a long-term treatment option for FSHA.

Methods:
A single-practitioner chart review identified 67 patients with FSHA unresponsive to medical therapy. FSHA was defined as frontal/orbital pain exacerbated by weather, barometric, or altitude changes, and temporally relieved by decongestants/analgesics. Standard medical therapy included topical steroids and culture/DNA-guided antimicrobials. FSBD was performed using stereotactic navigation. Patients completed SNOT-20 before and after medical and surgical treatment. FSHA and SNOT-20 scores were tracked through structured follow up at 14 weeks after medical therapy, 23 weeks and 109 weeks after surgical therapy.

Results:
Of the 67 patients (mean age 44), all reported FSHA at baseline and continued to have FSHA after medical treatment. At 23 weeks after FSBD, 100% (n = 67) reported FSHA improvement or resolution (49% partial, 51% complete); and at long-term follow-up, 87% (n = 40) maintained improvement or resolution (57% partial, 30% complete). SNOT-20 scores decreased from a mean of 44 (pre-treatment, n = 67) to 31 (post-medical, n = 17), and 11 (post-surgery, n = 67). There was a strong association between high SNOT-20 scores and FSHA presence. All measures showed a statistically significant result ($p < 0.001$) based on statistical procedures that included a linear mixed effects model and a binary logistic model.

Conclusion:
FSBD is associated with significant, sustained improvement in FSHA and

Poster #A043
Gender differences in patients with recurrent acute rhinosinusitis
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Background:
Prior evidence has shown that female patients with chronic rhinosinusitis (CRS) suffer a worse disease-specific quality of life (QoL).

Objective:
To study the gender-specific differences on the QoL of patients with recurrent acute rhinosinusitis (RARS).

Methods:
Retrospective cohort study of patients presenting to the otolaryngology clinic with RARS defined by at least one objective evidence of rhinosinusitis (CT scan or endoscopy findings). Patients' characteristics and comorbidities were reviewed. The SNOT-22 and its subdomains were analyses for gender-based differences at baseline and post-treatment.

Results:
160 patients with RARS were included (mean age of 41.5 years, 68.1% female). There was no difference in CT scores (2.9 vs 4.1, p=0.139) or endoscopy scores (2.2 vs 2.5, p=0.523). Female patients were more likely to have asthma, autoimmune, primary antibody deficiency, headache, and anxiety disorders. Females had significantly worse baseline SNOT-22 scores (48.2 vs 38.1, p=0.001) and its subdomains except the rhinologic domain which was similar in both groups. Similar findings were also seen after treatment (SNOT-22 score of 37.6 vs 25.8, p=0.001). Multivariate regression analysis of the SNOT-22 scores and its domains adjusting for confounders showed that female gender and presence of anxiety disorder were strongly independently associated with worse QoL (SNOT-22: coef 6.4, 95% CI of 0.56 to 12.33 for female gender; and coef 11.4, 95% CI of 5.78 to 17.11 for anxiety disorder).

Conclusion:
Female patients with RARS show higher subjective disease burden. The presence of anxiety disorder seems to play a major contributor to the worse QoL in these patients.

Poster #A044
Gene expression in chronic rhinosinusitis varies by environmental exposure: Transcriptomic analysis
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Objectives:
To identify unique gene expression profiles related to upregulated intracellular pro-inflammatory pathways in nasal tissue of patients with chronic rhinosinusitis (CRS) and high inhalational exposure history.

Methods:
Sinonasal tissues from adult patients undergoing endoscopic sinus surgery for CRS or transsphenoidal approach for pituitary resection (control) were collected intraoperatively. Patients completed the Sinonasal Occupational and Airborne Pollutant Exposure (SOAPE) survey preoperatively. Demographic information and medical history were retrospectively collected. Bulk RNA sequencing with untargeted gene expression analysis of sinonasal tissues is underway.

Results:
Sinonasal tissues were collected from 76 patients: 24 CRS patients with polyps (CRSwNP), 24 without polyps (CRSsNP), and 28 control patients. Nine (32%) control patients had a high exposure history compared to 29 CRS patients (60%). CRSwNP patients had more asthma and allergy co-morbidities, and prior oral steroid courses. Kruskal-Wallis test showed significant difference (p=0.043) in SOAPE scores among CRSwNP (median, 35.5), CRSsNP (24.5), and control groups (15). Preliminary data shows high differential gene expressions between CRSwNP/CRSsNP and CRS/controls. Further comparisons will be based on the interplay of SOAPE score, CRS phenotype, and disease state. Ingenuity Pathway Analysis will be performed on ranked gene lists to generate enriched canonical pathways and upstream regulators.

Conclusion:
SOAPE score differences suggest a link between airborne pollutants and disease severity. RNA sequencing and pathway analysis may uncover key regulatory networks, offer insights into personalized treatment, and improve outcomes.

Poster #A045
Geriatric rhinitis
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Introduction:
With improvement in medical science, life expectancy has increased, percentage wise old age population is increasing on every continent.

Rhinitis at the old age population is one of the diseases given less attention with respect to all the management steps including, diagnosis, examination, investigation, and treatment with respect to younger age population. Geriatric or old age rhinitis is peculiar in comparison to other age group nasal and paranasal inflammation in that, with age there is change in anatomy of nasal cavity for example cartilage lose strength, change in mucous gland viability and response to inflammatory agents on exposure.

Another factor contributing to the different presentation of old age rhinitis after anatomical change is the physiological change, most important the change in the sympathetic and parasympathetic nervous system balance. It is now common knowledge that with age parasympathetic take precedence over sympathetic, this physiological changeover manifests in the form of patient's symptoms suggestive of rhinitis.

One important factor contributing to the onset as well as severity of nasal and paranasal inflammation is the medicines patients take for cardiovascular system pathologies and other systemic diseases. These medicines themselves lead to neural and vascular changes in situ in nasal cavity and paranasal sinuses, and the change manifest as symptoms and signs suggestive of rhinitis and sinusitis.

Poster #A046
Global sinus surgery in the Dominican Republic
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Background:
Treating surgical pathologies in resource-limited areas is difficult due to limited endoscopic equipment and post-operative care. Sustainable practices face logistical and safety hurdles. This study reports the best practices and logistics of performing endoscopic sinus surgery (ESS) during short-term surgical service trips.

Methods:
A multi-institutional team traveled to Azua, Dominican Republic, to perform ESS for chronic rhinosinusitis and sinonasal masses. High-quality

equipment like angled endoscopes, a 4k video tower, microdebriders, drills, and specialized endonasal instruments, was transported with extensive planning. Image-guided navigation was unavailable. Dominican physicians served as interpreters. After imaging and evaluation, consent was obtained, and post-operative care, including sinus irrigation and antibiotics, was reviewed. A local general surgeon was trained to manage severe complications like epistaxis. Post-operative monitoring was done by community health workers, with follow-up debridement by another ENT team after 4 weeks.

Results:
In one week, 7 ESS were performed in the order of complexity: 3 septoplasties/turbinate reductions, 2 FESS with Draf IIb procedures, 1 sinonasal tumor resection (inverted papilloma), and 1 endoscopic-aided oroantral fistula repair. At the 3-week follow-up, all patients had no adverse outcomes.

Conclusions:
ESS can be safely and successful in low-resource settings with careful planning and a tailored care model. Seven patients received high-quality ESS through thorough preparation and coordination. Collaboration with local practitioners and access to trained professionals and equipment are essential for success. Further studies on safety and outcomes are needed.

Poster #A047
Headache Burden in CF with CRS
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Background:
In people with cystic fibrosis (CF) and chronic rhinosinusitis (PwCF+CRS), headaches are common, but their impact is under characterized. This study seeks to examine headache severity and disease/treatment-related associations with headache severity among PwCF+CRS.

Methods:
Secondary analysis of a 2019-2023 prospective, multi-center cohort study. PwCF+CRS completed the 6-item Headache Impact Test(HIT-6), 22-question SinoNasal Outcome Test(SNOT-22), Patient Health Questionnaire-9 Revised(PHQ-9R), and EQ-5D self-care survey. Univariate and multivariable associations between headache severity and study surveys were evaluated, while adjusting for CF modulator therapy status, demographics, Lund-Mackay, Lund-Kennedy scores.

Results:
A total of 100 PwCF+CRS were included. On HIT-6, 35% and 21% of participants reported severe headache or some/substantial headache impact, respectively. Severe headache impact was significantly associated with worse SNOT-22 mean scores($p<0.001$), median PHQ-9R ($p=0.005$), and EQ-5D scores($p<0.001$). Multivariable regression confirmed significant associations ($p<0.05$) between worse SNOT-22 total and all subdomain scores, and worse HIT-6 scores after covariate adjustment. A significant correlation between higher numbers of prior sinus surgeries and HIT-6 total score ($Rs=0.29$,95%CI:0.094-0.46;$p=0.004$) was observed. HIT-6 scores were not significantly associated with CF modulator therapy use.

Conclusions:
In PwCF+CRS, headache severity independently predicted worse sinonasal and depressive symptom severity and general quality-of-life. Worse HIT-6 scores were weakly associated with a greater number of previous sinus surgeries. No associations between modulator therapy use and HIT-6 scores were identified.

POSTERS

Poster #A048

Heterogeneity in remission and recurrence criteria following surgery for prolactinomas

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Introduction:
Prolactinomas are the most common functioning pituitary adenomas. Transsphenoidal surgery (TSS) is often required in cases of medical resistance, intolerance, or when tumor debulking is needed. Postoperative management depends on clearly defined remission and recurrence, yet there is no standardization of these definitions. This systematic review examines the heterogeneity in how these outcomes are defined post-operatively and their implications for patient care and outcome reporting.

Methods:
We conducted a systematic review through February 2024, in accordance with PRISMA guidelines. Studies were included if they reported both remission and recurrence outcomes following TSS with ≥1-year follow-up. Definitions were categorized by criteria type (biochemical, radiographic, symptomatic), threshold values, timing, and analyzed descriptively.

Results:
Thirty-seven studies met inclusion criteria. All defined remission using biochemical measures, though thresholds varied (<20–50 ng/mL or <150–800 mU/L), and 9 (24%) used sex-specific cutoffs. Only 3 studies (8%) incorporated biochemical, radiographic, and symptomatic criteria. Assessment timing ranged from postoperative day 1 to 12 months. For recurrence, 35 studies (97%) included biochemical criteria, but thresholds and follow-up intervals varied. Only 7 studies (19%) incorporated radiographic or symptomatic features. Definitions were missing in 8 studies (24%).

Conclusion:
There is substantial variability in defining remission and recurrence following TSS. These findings identify key domains requiring standardization and inform early efforts to develop evidence-based recommendations on timing, thresholds, and postoperative surveillance.

Poster #A049

Highly effective modulator therapy and host microbiome, inflammation, and olfaction in CF

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Background:
Cystic fibrosis (CF) is mediated by mutations in the cystic fibrosis transmembrane conductance regulator protein, resulting in chronic bacterial airway infections. Highly effective modulator therapies (HEMT) potentiate CFTR function and reduce disease burden, but do not eradicate airway pathogens. Monitoring of airway microbiota remains essential in CF care.

Methods:
In a prospective, single-institution study, we conducted a baseline cross-sectional analysis of pwCF. Nasal endoscopy was used to collect bacterial culture and mucous samples and Lund-Kennedy score was recorded. Sinonasal microbiome speciation was quantified by 16S rRNA sequencing. Cytokines IL5, CXCL5, IL13, IL10, TNF-alpha were quantified from middle meatus and olfactory cleft by ELISA. Patients completed the University of Pennsylvania Smell Identification Test or Sniffin' Sticks test, and the Questionnaire of Olfactory Disorders - Negative Statements.

Results:
25 participants have been enrolled (HEMT n=24, no-HEMT n=1). Pseudomonas aeruginosa was detected in two subjects at low relative abundance. The most prevalent genus was Streptococcus spp (17 species). The most abundant bacterial genus was Staphylococcus spp.. One participant had severe microsmia, ten had mild to moderate microsmia, and the remaining patients had normosmia (n=14). Moraxella spp. was predominant in those with poorer smell. Cytokine data will be correlated using mixed-effect linear modeling.

Conclusion:
Olfaction may be improved and sinonasal microbial communities vary considerably in pwCF on HEMT. We observed both commensal and pathogenic bacterial specie and reduced P. aeruginosa, suggesting that pathogenic bacteria persist in the airways of pwCF using HEMT.

Poster #A050
Histopathologic analysis of chronic rhinosinusitis in patients with specific antibody deficiency
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Background:
Specific antibody deficiency (SAD) is a primary immune deficiency characterized by inability to produce specific antibodies to polysaccharide antigens. This condition is closely associated with recurrent or chronic sinopulmonary infections. The pathophysiology of chronic rhinosinusitis (CRS) in the setting of SAD is not well understood. This study describes the histopathologic features of patients with CRS and SAD in order to understand the inflammatory endotype.

Methods:
A retrospective review of patients with CRS who underwent endoscopic sinus surgery (ESS) at a single institution from 2015 to 2024 was performed. Diagnosis of SAD based on evaluation by an immunologist was recorded. Demographic variables, clinical data, and structured histopathology reports from intraoperative sinonasal specimens were collected. Variables were compared between CRS patients with and without SAD.

Results:
A total of 531 patients with CRS who underwent ESS were included. SAD was diagnosed in 26 of these patients while 505 had no immunodeficiency. Histopathologic analysis of sinonasal specimens in patients with medically refractory CRS and SAD had higher prevalence of neutrophil infiltrate (26.9% vs 10.7%, p=0.008), basement membrane thickening (76.9% vs 31.0%, p<0.001), subepithelial edema (76.9% vs 25.8%, p<0.001), and fibrosis (42.3% vs 16.9%, p=0.002) compared to patients without SAD.

Conclusion:
Our study demonstrates that CRS patients with SAD overall display non-type 2 sinonasal inflammation.

Poster #A051
Histopathological & clinical predictors of type 2 CRSsNP
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Background:
Among patients with chronic rhinosinusitis without nasal polyps (CRSsNP), type 2 (T2) inflammation is more prevalent than type 1 (T1) or type 3 (T3) inflammation. High tissue eosinophilia (>10/high-power field) is thought to correlate with T2 inflammation and has been proposed as a biomarker, but its reliability remains uncertain.

Methods:
99 adult CRSsNP patients undergoing surgery between 2009 and 2015 were enrolled. Tissue samples were evaluated for the presence of IFN-γ (T1), CLC mRNA and ECP (T2), and IL-17A (T3), defined by a greater than 90% cutoff compared to normal controls. Clinical features (symptoms and comorbidities) and structured histopathological reports were compared across endotype groups.

Results:
Of the 99 patients, 41 were classified as T2 and 11 as T3. There were no T1, and 47 were untypeable (Tun). T2 patients had higher rates of tissue eosinophilia (80.5%), eosinophil aggregates (65.9%), and basement membrane

thickening (>15 µm) (92.7%). T3 patients had a lower tissue eosinophilia rate (27.3%). Tissue eosinophilia alone showed moderate predictive value for T2 inflammation in CRSsNP (AUC= 0.73, p<0.001). Predictive accuracy improved when combined with asthma, olfactory dysfunction, Lund-Mackay (LM) CT score, and basement membrane thickening (AUC = 0.821, p < 0.001).

Conclusions:
Tissue eosinophilia and basement membrane thickening, along with asthma status, smell loss, and LM CT score, are useful markers of T2 inflammation in CRSsNP. Identifying T2 endotypes may guide tailored treatment strategies.

Poster #A052
Histopathological features of CRS patients with recalcitrant purulent rhinosinusitis
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Introduction:
Recalcitrant Purulent Rhinosinusitis (RPR) has clinical relevance due to its ability to cause significant resistance against antimicrobial therapy and host defenses. Recalcitrant Chronic Rhinosinuisits (CRS) is associated with S. aureus dominant biofilm. However, S. aureus RPR is also present in healthy patients without CRS. Thus, it is possible that host factors influence the disease pathogenesis. Despite a growing body of research exploring the pathogenesis and clinical relevance of RPR in CRS, no study to date has explored the structured histopathology (SHP) of CRS patients with RPR.

Methods:
Retrospective chart review was conducted on CRS with and without nasal polyp patients who underwent functional endoscopic sinus surgery (FESS). Data was collected on SHP, demographics, and comorbidities.

Results:
10 CRS patients with RPR were identified. The cohort was 100% female. Mean age was 52 years. 50.0% were diagnosed with CRS with nasal polyps. On SHP, 80.0% of patients demonstrated moderate-severe degree of inflammation. 80.0% demonstrated <5 eosinophils per high powered field, 75.0% demonstrated subepithelial edema, 70.0% demonstrated basement membrane thickening. 100% lacked hyperplastic and papillary changes and 90% lacked mucosal ulceration. 88.9% of patients with available cultures grew S. Aureus or P. Aeruginosa. RPR was diagnosed using nasal endoscopy during post FESS follow up visits.

Conclusion:
RPR may be a complication primarily observed in post-FESS patients that is associated with several SHP variables that may influence the disease pathogenesis. Understanding the inflammatory environment using structured histopathology may allow clinicians to understand which patients are predisposed to RPR.

Poster #A053
Holistic staging for JNA
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Background:
The debatable staging of nasopharyngeal angiofibroma (NA) have shown variations in anatomical prioritization and also failed to assess functional aspect.

Methods:
In retrospective review of 145 patients, demography, clinical features and radiology were recorded. Through imaging, a composite anatomical status (CAS) was developed that comprised of extent of tumour in anterior, posterior, lateral and superior directions. In addition, a Composite symptom score (CSS) and functional performance status (FPS) was developed based upon symptomatology and subjective opinions of patient vs surgeon (considering feasibility of surgery). Eight staging systems were compared analysed and correlated with clinical parameters, CAS, CSS and FPS.

Results:
All staging systems correlated with one another and also with volume of tumour. CSS correlated with lateral and superior extensions while FPS with only anterior extension. Recurrence correlated with lateral extension and Onerci staging only. CSS suggested a reflection of advanced stage by CAS, lateral/ superior extensions, but not by any other classification. FPS (subjective preference) although parallels CSS, but does not reflect any staging-hierarchy It showed correlation with anterior-extension component only. Many sub-sites that are not included in previous staging but deemed important in defining extensions are also defined in Holistic classification.

Conclusion:
Holistic staging assesses all '3 dimensions' (CAS, CSS & FPS) and hence overcomes limitations of staging in literature. The CAS truly denotes disease advancement in every direction suggesting increasing complexities of surgical considerations. It can provide a common platform to compare disease status across studies.

Poster #A054
Impact of hurricane events on particulate matter and air quality index
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Introduction:
Hurricanes can disturb air quality and increase the circulation of pollutants, potentially exacerbating respiratory illnesses including sinusitis, allergic rhinitis, and asthma. We investigated the effects of recent hurricanes on particulate matter (PM) and air quality index (AQI).

Methods:
Hurricane, PM, and AQI data were gathered from the National Oceanic and Atmospheric Administration and the Environmental Protection Agency (EPA). Four recent Florida hurricanes (Ian, Nicole, Idalia, and Debby) were analyzed. EPA data from both affected and unaffected areas were examined for trends from the pre-storm (30 days prior to landfall) and post-storm (30 days from landfall) periods. To account for seasonal variation, post-storm periods were compared to the same time frame in the same locations of the preceding and following years. Data was also compared to non-affected areas to serve as controls. Statistical analyses included t-tests, linear regression, and ANOVA.

Results:
PM 2.5, PM 10 and AQI significantly increased post-storm for Ian but decreased for Idalia and Debby. Accounting for seasonality, Nicole and Idalia's 4-week storm periods showed higher PM and AQI levels compared to the same period in the previous and following years. Comparing hurricane-affected vs. non-affected areas, Ian showed a significantly greater AQI increase in affected regions.

Conclusion:
Hurricanes appear to impact PM and AQI in certain cases, sometimes increasing or decreasing post-storm. When accounting for seasonal variations, a more consistent pattern of elevated PM and AQI levels post-storm was observed. Ongoing analyses will include the comparison of PM and AQI levels with rates of sinus infections in hurricane-affected regions.

Poster #A055
Impact of osteitis on surgical complexity and clinical outcomes in CRS patients
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Introduction:
Osteitis occurs in 36-53% of chronic rhinosinusitis (CRS) patients and is associated with worse CT and endoscopic scores. Research on how osteitis should be addressed surgically to optimize CRS outcomes is limited. This study seeks to address this gap by using an observational cohort to understand current practice and surgical outcomes by comparing the osteitis and non-osteitis cohorts on disease severity, extent of endoscopic sinus surgery (ESS), and clinical outcomes.

Methods:
This retrospective cohort study included CRS

patients who underwent ESS from 2021-2023. Preoperative CT scans were reviewed, and patients were divided into osteitis (GOS > 0) and non-osteitis (GOS = 0) groups. Extended surgical approaches, Lund-McKay scores (LMK), preoperative and postoperative Sino-Nasal Outcome Test (SNOT-22), and Lund-Kennedy endoscopy (LKE) scores were compared using Fisher's exact, chi-square, and Wilcoxon tests.

Results:
The cohort (n=196) was 59% male, with an average age of 50 years. Osteitis was present in 53%(N=104), mainly in the frontal (63%) and posterior ethmoid (49%) sinuses. Osteitis patients had higher preoperative LMK and LKE scores ($p<0.05$). Postoperative SNOT-22 scores were higher in the osteitis group ($p=0.007$). Osteitis patients were more likely to undergo extended surgeries (frontal OR=4.62, sphenoid OR=3.75, $p<0.05$). Osteitis had a higher incidence in revision surgery (57%, $p<0.001$). Drilling was more common in osteitis patients($p<0.001$).

Conclusion:
Osteitis increased the odds patient had an extended surgical approach. Contrary to existing literature, we found that the osteitis group demonstrated less improvement, as measured by SNOT-22, despite similar overall outcomes after 12 months.

Poster #A056
Indications for CSF shunting in spontaneous CSF rhinorrhea
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Introduction:
Spontaneous cerebrospinal fluid (sCSF) leaks are associated with elevated intracranial pressure (ICP) and idiopathic intracranial hypertension (IIH). Despite undergoing primary repair, there is risk of leak recurrence if IIH is not effectively managed. Ventriculoperitoneal (VP) and lumboperitoneal (LP) shunts have been used as adjuncts without clear consensus on their indications. The objective of this study was to systematically review the evidence to determine indications and outcomes for CSF shunting after endonasal repair.

Methods:
PubMed, Scopus, and Embase databases were searched from inception to December 2024 to identify relevant articles. Studies were included if patients were treated for sCSF rhinorrhea and if CSF shunting was part of management.

Results:
30 studies were included, with 842 total patients treated for sCSF rhinorrhea. 79% were female with mean age of 50.8 years and average body mass index of 35.3 kg/m2. Mean opening pressure was 27.4 cmH2O. The most common defect sites were cribriform (n=172) and lateral sphenoid (n=160), and 89 patients had multifocal sites of leak. 23% of patients received shunts (158 VPS and 37 LPS performed). CSF leak recurrence rate after shunting was 11% vs 19% in patients without a shunt ($p<0.05$) with mean follow-up time of 28 months. The most common indications for shunt were recurrent CSF leak (after failed primary repair or multiple surgical attempts), persistently elevated ICP (>25–35 cmH2O) despite medical treatment, and IIH diagnosis with refractory symptoms (e.g. papilledema).

Conclusion:
CSF shunting can be considered for patients with sCSF rhinorrhea after failed primary repair, persistently elevated ICP, or known IIH diagnosis with failed medical management.

Poster #A057
Inverted papilloma vs respiratory epithelial adenomatoid hamartoma
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Background:
Inverted papilloma (IP) and respiratory epithelial adenomatoid hamartoma (REAH) are sinonasal lesions that can present diagnostic challenges due to overlapping histologic features. Accurate diagnosis is essential because treatment differs substantially. This case series includes 4 patients who were diagnosed with IP but, after

surgical intervention and histologic examination, were rediagnosed with REAH.

Methods:
Retrospective review.

Results:
In case 1, the patient presented with a posterior nasal septal mass. Imaging and frozen section biopsy suggested IP. However, pathology revealed a benign epithelial proliferation, originally favored to correspond to REAH. Subsequent pathologic review showed increased epithelial thickness, raising concern for IP. The patient in case 2 had a history of IP and exhibited a bilateral nasal mass in the olfactory cleft that, again, from frozen section biopsy findings, was thought to be IP. A microscopic focus of REAH was identified on the final pathology report. In case 3, the patient presented with conflicting polypoid vs IP biopsy results, with imaging showing a sinonasal mass extending from the cribriform plate. After surgical resection, the patient was ultimately diagnosed with REAH. Case 4 involved a patient with a bilateral olfactory cleft polypoid mass that was similarly positive for IP on frozen section biopsy, but final pathology revealed a sinonasal hamartoma.

Conclusions:
These cases underscore the difficulty of distinguishing between IP and REAH, and emphasize the need for careful evaluation and collaboration between otolaryngologists and pathologists to ensure patients receive the most appropriate treatment.

Poster #058
Is there a role for office biopsy prior to resection of inverted papilloma?
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Background:
Inverted papilloma (IP) are benign sinonasal tumors that harbor a 7-10% potential for malignant transformation to squamous cell carcinoma (SCC). The treatment of IP is surgical resection. Biopsy of IP can be helpful for diagnosis, but its accuracy may be affected by the co-existence of inflammatory processes. The objective of this study was to determine the diagnostic accuracy of office biopsy in patients who underwent surgical resection for IP.

Methods:
This was a retrospective review of patients who underwent resection of IP at a tertiary care center over a 10-year period from January 2015 to December 2024 and who had an office biopsy prior to surgery. Patient demographic and tumor characteristics were obtained. We investigated the accuracy of office biopsy and compared it against the final pathology results from tumor resection.

Results:
121 patients met the inclusion criteria. Final pathology demonstrated 85 (70.2%) IP without dysplasia, 10 (8.3%) other papilloma subtypes without dysplasia, 22 (18.2%) papilloma with dysplasia, 3 (2.5%) SCC in situ, and 1 (0.83%) SCC. The maxillary sinus was the most common attachment site (69.4%), followed by skull base (24.0%) and turbinates (15.7%). The accuracy of office biopsy showing papilloma without dysplasia was 85.1% (80/94) and for papilloma with dysplasia was 68.8% (11/16). 11.8% (10/85) of the IP without dysplasia cases had false negative biopsies showing inflammatory lesions, while none of the pre-malignant or malignant IP cases had a false negative (non-neoplastic) biopsy ($p<0.001$).

Conclusion:
With a false negative rate of 12% on office biopsy for IP, proceeding to surgical resection in the operating room is warranted when there is a strong clinical suspicion."

Poster #059
Isolation and reactivation of cilia directly from human sinonasal tissue
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POSTERS

Rationale:
Mucociliary dysfunction is a hallmark of chronic rhinosinusitis (CRS), yet dissecting the intrinsic contribution of ciliary impairment is limited by confounding mucus and epithelial factors. Protist and mammalian models have shown that isolated cilia retain motility and waveform when reactivated with ATP. In human cell culture, cAMP-mediated activation of protein kinase A (PKA) is a known stimulant of ciliary beat frequency (CBF). We aimed to optimize a system for analyzing CBF in axonemes isolated directly from human sinonasal tissue.

Hypothesis:
Axonemes isolated from human sinonasal tissue retain intrinsic motility and exhibit temperature-dependent increases in CBF in response to ion and cAMP stimulation, consistent with known airway signaling mechanisms.

Methods:
Axonemes were isolated from sinonasal tissue discarded during transnasal pituitary surgery and reactivated using a cell-culture validated system. High-speed video microscopy and Sisson-Ammons Video Analysis (SAVA) measured baseline and cAMP-stimulated CBF across various ion concentrations, temperatures (25 °C, 30 °C, 37 °C), and 10 mM cAMP.

Results:
Axonemes reactivated with ATP preserved motility waveform, with baseline CBF of 3.5 Hz at 25 °C. Temperature increases alone did not significantly change CBF. Ion concentration enhanced CBF in a sigmoidal, temperature-independent manner. cAMP stimulation increased CBF in a temperature-dependent fashion (ΔCBF = 0 Hz at 25 °C; 0.41 Hz at 30 °C; 1.03 Hz at 37 °C).

Conclusions:
Isolated human sinonasal axonemes preserve intrinsic motility and exhibit reproducible, temperature- and cAMP-responsive CBF. This system enables mucus-independent analysis of ciliary function and may support future CRS phenotyping.

Poster #060
Lacrimal sulcus as anatomical landmark for frontal sinusotomy
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Background:
Performing a safe endoscopic frontal sinusotomy can be challenging in the presence of distorted anatomy (extensive nasal polyposis, neoplasms, or revision sinus surgery). Establishing a reliable, consistent anatomical landmark would be helpful in those cases. The lacrimal sulcus (LS) is a groove easy to define during ESS, located between the lacrimal and ethmoid bones. This study evaluates the reliability of the LS as a safe, consistent landmark, to direct the surgeon in the correct trajectory to the frontal infundibulum and away from the anterior skull base (ASB).

Methods:
Descriptive study of the LS as a novel landmark for frontal sinusotomy, with analysis of sagittal CT scan of 14 patients (28 sides). A radiologist and otolaryngologist identified a line representing the coronal plane of the LS, its intersection with the frontal infundibulum and its distance from ASB were determined. Interrater variability was assessed using intraclass correlation coefficient (ICC), and variability across sides and subjects was analyzed.

Results:
The LS, located posterior to the posterior lacrimal crest and the nasolacrimal duct, extends superiorly as an oblique line crossing the frontal sinus infundibulum. The average distance from the LS coronal plane to ASB at the frontal infundibulum was 11.1 mm (SD 1.97) on the right and 11.4 mm (SD 2.77) on the left, with no significant difference (P= 0.236). Subjects variability was minimal (P= 0.938 right, P =0.708 left). Excellent inter-rater agreement was observed (ICC 0.89–0.95; P < 0.001).

Conclusion:
The LS is a reliable anatomical landmark. Its superior trajectory consistently directs the surgeon through the anterior half of the frontal infundibulum and away from the ASB during ESS.

POSTERS

Poster #A061

Medication adherence and postoperative outcomes in CRSwNP

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Medication adherence is critical for optimizing outcomes following functional endoscopic sinus surgery (FESS) in chronic rhinosinusitis with nasal polyps (CRSwNP).

This retrospective study analyzed 127 patients who underwent primary FESS at a tertiary academic center between 2010 and 2018 to evaluate the impact of compliance on surgical outcomes. Among these patients, 69.3% were compliant with postoperative medical therapy, while 30.7% were noncompliant. Noncompliant patients had a significantly higher revision surgery rate (35.9%) compared to compliant patients (6.82%; $p < 0.001$) and were 7.7 times more likely to require revision surgery (OR = 7.7, 95% CI = 2.7–22.0, $p < 0.001$). When stratified by CRS subtype, noncompliance was not significantly associated with a higher risk of revision surgery in CRSwNP patients ($p = 0.234$); however, noncompliant patients with allergic fungal sinusitis (AFS) had a 27.5-fold increased likelihood of revision surgery compared to compliant AFS patients (OR = 27.5, 95% CI = 4.78–158.21, $p < 0.001$). Notably, AFS patients had a significantly higher revision rate (23.5%) than CRSwNP patients (10.5%; $p = 0.049$) despite similar compliance rates ($p = 0.894$), suggesting inherent disease differences. Additionally, non-white patients were significantly more likely to be noncompliant than white patients ($p = 0.007$), indicating potential disparities in adherence.

These findings highlight the critical role of medication adherence in reducing revision surgery risk and emphasize the need for targeted interventions to improve compliance, particularly among high-risk groups. Addressing barriers to adherence may enhance long-term surgical success and disease control.

Poster #A062

Mentorship in ENT: What really matters

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Mentorship is integral to medical education, offering benefits such as increased research output, job satisfaction, and reduced stress. However, mentorship remains less accessible for women, minorities, and non-traditional students, contributing to their underrepresentation in surgical specialties like otolaryngology.

This national interview-based study explored mentorship dynamics among otolaryngology residents, fellows, and faculty at all levels across various programs. Twenty interviews have been completed to date, with additional interviews scheduled and ongoing.

Thematic analysis revealed five key findings. Firstly, successful mentorships were goal-driven, with a strong preference for direct, clear communication over emotional rapport. Second, while demographic similarities initially fostered comfort, deeper connections were more often built on shared experiences or mindsets both within and outside the workplace. Third, participants noted that mentorship goals evolve over time, and strong mentorships adapted accordingly. Fourth, informal mentorships often proved more impactful than structured ones, especially when mentors and mentees connected through non-work activities. Finally, ENT's limited diversity and small field size were commonly acknowledged as barriers to inclusive mentorship, particularly when pursuing more specialized areas within the field.

These findings underscore the importance of ongoing development towards intentional relationship-building in fostering effective mentorship. As the field of otolaryngology continues to strive for greater diversity and inclusion, understanding the nuanced dynamics that define successful mentorship can inform more equitable and supportive structures for future trainees.

POSTERS

Poster #A063

Metastatic HPV-related multiphenotypic sinonasal carcinoma: A case report

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Introduction:
Human papillomavirus (HPV)–related multiphenotypic sinonasal carcinoma (HMSC) is a rare neoplasm characterized by a paradoxical clinical course. Despite its high-grade histologic features, HMSC exhibits an unexpectedly indolent clinical behavior, marked by frequent local recurrences but limited metastatic potential. We report the first case of HMSC metastasis to the liver with earliest known distant progression.

Case:
A 53-year-old male who presented with unilateral epistaxis was found to have T4aN0M0 HPV35-positive HMSC of the left maxillary sinus, with erosion into the orbital floor. He underwent induction chemotherapy, endoscopic-assisted maxillectomy with negative margins, and adjuvant chemoradiation. He did well until surveillance PET-CT at 10 months revealed asymptomatic hepatic metastases confirmed by biopsy. He was treated with transarterial chemoembolization and pembrolizumab before developing locoregional recurrence involving the orbital apex and cavernous sinus five months later.

Discussion:
Several case reports highlight HMSC's potential for aggressive behavior, including intracranial extension and rapid recurrence. However, distant metastases are rare, with only three documented cases involving the lungs and finger, occurring years after initial treatment. We present the first reported case of HMSC with metastasis to the liver, marking the earliest known distant recurrence and underscoring HMSC's potential for aggressive systemic progression. Molecularly, this case harbored high-risk HPV35, a rarely reported subtype.

Conclusion:
Despite HMSC's typically indolent course, this case underscores the importance of vigilant surveillance to detect early distant metastases and guide treatment strategy.

Poster #A064

Nasal scarring following radiofrequency treatment of the nasal valve,

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Introduction:
Nasal airway obstruction (NAO) is a highly prevalent complaint in the ENT outpatient setting. Severe NAO is highly correlated with nasal valve collapse (NVC). Since the recognition of the contribution of NVC to NAO, new treatments have received FDA approval to avoid the need for complex nasal surgery. We report an uncommon complication of nasal scarring following RF treatment and discuss the pathogenesis of the condition and strategies to avoid it.

Presentation of case:
A 70-year-old WF was seen for nasal obstruction and found to have a positive modified Cottle sign, enlarged turbinates and prominent septal swell bodies. She was treated with RF therapy to the nasal targets in an office setting and was seen back 3 months later. Her right nasal cavity was significantly improved, but she complained the left side remained obstructed. She was found to have an adhesion of the left lateral nasal wall to the nasal septum, causing a fixed obstruction of the left nasal cavity. The scarring was released with a minor outpatient office procedure.

Discussion: RF treatment of nasal cavity tissue is an effective treatment for NAO. Treatment of the nasal valve laterally and the septum medially can create opposing tissue injury that leads to swelling in the immediate post-treatment period. Contact of tissues that are injured can lead to undesirable scarring. Avoidance of treating opposing surfaces, early follow up and use of nasal dilators can all mitigate this undesirable complication.

POSTERS

Poster #A065
Nasal surgery success prediction using CFD analysis of nasal airflow
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Introduction:
Persistent nasal obstruction after nasal surgery is a common problem that significantly affects patients' quality of life. Computational Fluid Mechanics (CFD) of nasal airflow offers objective measures to predict success of surgical interventions. This retrospective study evaluates the use of CFD analysis in five patients undergoing nasal surgery to identify limitations in surgical planning and propose a more objective and predictable approach to this type of procedure.

Methods:
Five patients who had persistent symptoms of nasal obstruction after undergoing nasal surgery were included. CFD analysis was performed on CT scans before (CT1) and after (CT2) surgery and flow resistance (R) and flow asymmetry (Φ) were calculated. These analyses were performed retrospectively, i.e., without surgeons having access to CFD results during surgical planning.

Results:
CFD analysis of preoperative CT scans revealed significant obstruction in all patients, evidenced by elevated values of the R and Φ parameters. After surgery, all patients had slight improvement in R (CT1 mean=12.1, CT2 mean=4.5) and Φ (CT1 mean=3.2, CT2 mean=2.2). However, Φ values still remained outside normality ranges (R=4.5-18.3, Φ=0.97-1.7) associated with a balanced nasal airflow.

Conclusions:
CFD tools for pre-operative planning using virtual surgery developed by the authors could provide surgeons with crucial information to make sure patients have significant improvements in objective (R and Φ) and subjective measures.
This work underscores the need to integrate CFD analysis and virtual simulations into surgical practice to improve clinical outcomes and optimize the treatment of nasal obstruction.

Poster #A066
WITHDRAWN

Poster #A067
WITHDRAWN

Poster #A068
Neutrophilic inflammation and infection outcomes in immunosuppressed CRS
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Background:
Neutrophilic inflammation is increasingly recognized as a key contributor to chronic rhinosinusitis (CRS), particularly in patients with recalcitrant disease. It has been linked to tissue damage, epithelial dysfunction, and poor response to standard therapies. Recalcitrant CRS presents a unique challenge in immunosuppressed patients, yet the role of neutrophilic inflammation in this population remains poorly understood.

Objective:
To determine whether immunosuppression (due to primary immunodeficiency or medications related to transplant or autoimmune disease) is associated with neutrophilic infiltration on structured histopathology in CRS. A secondary aim was to assess infection clearance after 8 weeks of culture-directed topical antibiotic therapy.

Methods:
CRS patients undergoing full-house endoscopic sinus surgery (ESS) were included. Structured histopathologic analysis was performed on excised sinonasal tissue. All patients received topical antibiotic therapy for infection following surgery. Demographic, clinical, and histologic data were collected and analyzed.

Results:
Twenty-four patients were included (mean age: 56.0 years; M:F ratio: 1.4:1). Six (25%) were

immunosuppressed: 2 transplant recipients, 2 on rituximab, 1 with common variable immunodeficiency, and 1 on pazopanib. Neutrophilic infiltrate was more common in immunosuppressed patients compared to controls (4/6, 66.7% vs 7/18, 38.9%). Among patients with neutrophilic infiltrate (n=19), infection clearance was lower in immunosuppressed patients (3/9, 33.3%) than in controls (5/10, 50.0%).

Conclusion:
Immunosuppressed CRS patients are more likely to exhibit neutrophilic inflammation and persistent infection after topical antibiotic therapy.

Poster #A069
Non-gestational risk factors for pituitary apoplexy
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Background:
Pregnancy is a known risk factor for Pituitary Apoplexy (PA), but there is a lack of consistency in the literature regarding non-gestational risk factors responsible for PA.

Methods:
We did a systematic review following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to identify the non-gestational risk factors associated with the development of PA in adult patients with pituitary adenoma.

Results:
As per screening and eligibility criteria, seven studies with 4937 study participants were included in this systematic review, out of which 490 (9.92%) patients had PA, including asymptomatic subclinical PA (SPA) and symptomatic clinical PA (CPA). The macroadenomas and negative staining of the tumor were found to be a significant risk factor consistently in multivariate analysis in three and two retrospective studies, respectively. However, the results were varied for any significant difference in the risk factors for apoplexy between SPA and CPA. Similarly, there was no consistency among the studies for risk factors significantly responsible for CPA or PA compared to controls.

Conclusion:
No single non-gestational risk factor is solely responsible for the development of PA in a pituitary adenoma
compared to the control population. Tumor size (macroadenoma) and the non-functioning status of the adenoma are the only significant factors contributing independently toward an apoplectic event in most patients. Such patients can be prioritized for early pituitary tumor resection.

Poster #A070
Non-protective pneumococcal antibodies: Culture data and impact of vaccination on sinusitis
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Introduction:
Pneumococcal antibody deficiency is common among sinusitis patients. S. pneumoniae is a common microbe in sinusitis, but it remains unclear if the benefits of pneumococcal vaccination stem from reduced S. pneumoniae infections. We examined cultures and sinusitis outcomes before and after vaccination.

Methods:
We retrospectively reviewed patients with chronic rhinosinusitis (CRS) or recurrent acute rhinosinusitis (RARS) with pneumococcal titers tested from 2011 to 2024. Baseline demographics and sinonasal cultures were collected. Pre- and post-vaccination data on sinusitis-related encounters, antibiotic courses, and corticosteroids (per year) were recorded if at least one year of pre- or post-vaccine data was available.

Results:
Of 167 patients with CRS or RARS and pneumococcal titers, 88% had nonprotective levels. Preliminary analysis was performed on 86 patients, who were mostly female (82.6%) and White (90.7%), with a mean age of 48.1 years. A total of 76 organisms were cultured: 33 gram-positive, 24 gram-negative, 10 normal flora, and 9 fungi. 5/66 (7.6%) non-normal pathogens were S. pneumoniae. Of 44 vaccinated patients, post-vaccine annual sinusitis encounters decreased from 3.5 to 1.3 (-2.2, p=0.0004), antibiotic courses from 2.5 to

1.0 (-1.5, p=0.01), and corticosteroid courses from 1.1 to 0.2 (-0.9, p=0.0003).

Conclusion:
S. pneumoniae was not highly prevalent. Pneumococcal vaccination was associated with reduced healthcare utilization for sinusitis. To explore the reasons for the benefit of the pneumococcal vaccine, we are the first to examine cultures among patients with low pneumococcal antibody titers. Data collection is ongoing and future analysis will compare pre- to post-vaccine cultures.

Poster #A071
NPC radiotherapy patients' experience of dysarthria-related symptoms
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Background:
Radiation to the adjacent parts of the tumor and radiation to the larynx may lead to voice changes and the development of dysarthria, however, dysarthria is often overlooked compared to other complications. It is necessary to understand the experience of nasopharyngeal cancer patients with symptoms related to dysarthria after radiotherapy.

Methods:
This qualitative descriptive study enrolled 33 patients NPC radiotherapy patients who experienced dysarthria were recruited from May to August 2024. Data were collected using semi-structured interviews. The interviews were audio-recorded and converted verbatim into standard text, and the data were iteratively thematically analyzed.

Results:
Changes in speech and language quality after radiotherapy for nasopharyngeal carcinoma are common, but there are differences in the degree of symptoms perceived by patients. At the same time, dysarthria is often accompanied by other diverse oropharyngeal symptoms, and the trajectory-varying nature of these symptom experiences imposes a dual physical and psychological burden on patients. Lack of awareness of dysarthria and inadequate emotional support may lead to very different coping styles and a desire for professional ongoing voice management.

Conclusion:
This study helps to elucidate the current status of dysarthria faced by patients undergoing radiotherapy for nasopharyngeal cancer and provides multiple dimensions of dysarthria assessment and management goals for quantitative research. We call attention to the need for healthcare professionals to pay attention to patients' perspectives and related needs and to develop targeted management strategies that match patients' needs.

Poster #A072
Olfactory dysfunction in nasopharyngeal carcinoma patients following radiotherapy
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Introduction:
Nasopharyngeal carcinoma (NPC) is an aggressive disease with a long established treatment regimen focused on radiation therapy and adjuvant chemotherapy. Based on tumor staging, radiation is supplied to the nasopharyngeal area, often damaging surrounding structures. One lesser studied region is the olfactory bulb and cleft, with many patients reporting changes in smell following NPC treatment. This work aims to explore the association between NPC radiotherapy with or without chemotherapy and subsequent olfactory dysfunction.

Methods:
Patients were recruited at the Otorhinolaryngology Outpatients Canselor Tuanku Muhruz Hospital, a tertiary referral center in Kuala Lumpur, Malaysia. Patients were asked to complete a Sniffin Stick smell test, a validated objective smell test that demonstrates olfactory function through the minimum threshold detection and differentiation abilities of patients. While patients with other known risk factors for olfactory dysfunction were excluded, 35 patients who have completed NPC treatment within the last ten

years were compared against 35 matched controls.

Results:
We found the average Sniffin Stick score in NPC patients to be significantly decreased ($p<0.05$) when compared to age and sex-matched controls. There is an association between the use of radiation therapy and olfactory dysfunction.

Conclusions:
This clinical presentation is underreported and underemphasized, and while it does not usurp radiotherapy treatment, it constitutes an important discussion to have with patients. Patients reported that hyposmia following treatment has negatively impacted their quality of life in multiple ways, suggesting the importance of exploring this topic further in future research works.

Poster #A073
Olfactory outcomes in anterior skull base reconstruction
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Introduction:
Endoscopic Endonasal Skull Base Surgery (EESBS) is a minimally invasive approach to the anterior skull base. While outcomes and complication rates between endoscopic and open approaches are comparable, EESBS's impact on quality of life (QoL) remains unclear. This study evaluates the effect of EESBS reconstruction techniques on olfaction between patients undergoing reverse septal flap versus rescue flap reconstruction.

Method:
A retrospective and prospective chart review of University of Maryland Medical Center's records examined EESBS patients (2022-2025), comparing reverse septal and rescue flap techniques for management of the contralateral septal mucosa.

Results:
45 patients met criteria: 29 reverse flaps and 16 rescue flaps. Age, sex, BMI, and pathologies were similar between the two groups. Only 6 in the reverse group and 5 in the rescue group had both pre- and post-operative University of Pennsylvania Smell Identification Test (UPSIT) scores. There was a non-significant reduction in sense of smell in the rescue flap group compared to the reverse septal flap group (mean change: -3.8 for reverse septal flaps, -4.6 for rescue flaps, $p = 0.89$). Intraoperative CSF leak, lumbar drainage, external ventricular drainage, postoperative CSF leak, and sinusitis requiring antibiotics occurred at similar rates.

Conclusion:
EESBS is effective for treating skull base pathologies, but further research is needed to assess its impact on QoL. Our findings suggest that there may be a difference in olfactory outcomes between reverse septal flaps and rescue flaps. While these findings are not statistically significant, further data collection is needed to fully understand olfactory outcomes in patients undergoing EESBS.

Poster #A074
Otolaryngologists' confidence in utilizing biologic therapy for CRSwNP
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Michael Beyer, Vice President, Educational Outcomes
Mary Grecco, Senior Medical Director
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PeerView Institute for Medical Education

Rationale:
The rise of biologic therapies for CRSwNP necessitates an evolving skill set among the otolaryngology (ENT) community, which is reflected in varying levels of confidence observed in application.

Goals/Methods:
PVI developed an online adaptive learning activity to support ENTs' clinical decision-making skills regarding integration of biologic therapy into individualized treatment plans for eligible patients. Outcomes measurement included pre- and post-activity questions, with associated self-assessment of confidence in each response.

Results:
859 ENTs have participated. Learners demonstrated significant improvement in knowledge and skills from pre- to post-activity: identifying candidates for biologic therapy (60% to 79%, P<.05), engaging patients in shared decision-making (68% to 78%, P<.05), and timeframe for assessing biologic response (66% to 90%, P<.05); however, low reported confidence levels reveal uncertainty. Although modest confidence gains were observed post-training, (~10% absolute improvement), confidence improvements noticeably lagged behind knowledge and skill gains. Open-ended feedback from a smaller group of ENTs (N=25) suggests lower-confidence ENTs favor a co-management model, remaining central in patient identification, yet relying on allergists or pulmonologists for biologic initiation and management. High-confidence ENTs are more likely to independently initiate and manage biologic therapy.

Conclusions:
Findings highlight a need for targeted reinforcement to bridge the confidence gap, empowering ENTs to integrate biologics appropriately into management plans, including considerations of which therapy to choose, discussing options with patients, and monitoring response to improve outcomes.

Poster #A075
Outcomes in spontaneous CSF rhinorrhea repair: A 20-year population-based analysis
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Max Hyman, Senior Research Analyst

Background:
Surgical repair is the standard treatment for spontaneous cerebrospinal fluid (CSF) rhinorrhea. However, the rate of recurrent/secondary leaks remains unclear, and there is limited information about the effectiveness of adjunctive lumbar drain (LD) or acetazolamide use. We quantified treatment failure in spontaneous CSF rhinorrhea repair on a population level and investigated the utility of adjunctive therapies and predictors of subsequent repair.

Methods:
The Merative MarketScan Research Database (>250 million patients, 2003-23) was queried to identify patients who underwent endoscopic repair for spontaneous CSF rhinorrhea (ethmoid or sphenoid). Treatment failure was defined as subsequent CSF leak repair. Kaplan-Meier analysis calculated the rate and timing of treatment failure. Univariate analysis identified adjunctive therapies associated with repair failure.

Result:
Among 867 patients who underwent endoscopic CSF repair, the rate of treatment failure at 5 years was 12%. Subsequent repairs were more frequent at the sphenoid vs. ethmoid sinus (p=0.014). LD placement after surgery was significantly higher in patients with subsequent treatment failure vs. those without (10.5% vs. 3.9%; p=0.008), while acetazolamide use showed no difference (9.2% vs. 16.4%; p=0.10).

Conclusion:
Endoscopic repair of spontaneous CSF rhinorrhea is successful with a low 5-year failure rate. The counterintuitive relationship between LD placement and repair outcomes suggests LD may be a marker of more complex pathophysiology. This large population approach provides unique insights compared to single-institution studies and offers evidence that could contribute to clinical decision-making.

Poster #A076
Patient sentiments and emotions regarding Dupixent and endoscopic sinus surgery in nasal polyposis
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Cleveland Clinic

Introduction:
The rise of biologics has introduced controversy in the long-term management of chronic rhinosinusitis with nasal polyposis (CRSwNP), particularly regarding indications for surgery versus biologics. Patient perspectives on these treatment options remain underexplored. Social media platforms like Reddit offer a lens into

real-world experiences and may inform shared decision-making.
Methods:
Top posts since 2019 from the 4100-member subreddit r/NasalPolyps were analyzed. Descriptive statistics compared content mentioning surgery and dupilumab. Sentiment was assessed using the Valence Aware Dictionary and sEntiment Reasoner (VADER), and emotion mapping was performed using the NRC Emotion Lexicon. Sentiment and discrete emotion frequencies were compared using pairwise z-tests ($\alpha = 0.05$).
Results:
A total of 981 posts were included, of which 32.7% mentioned surgery only, 13.0% dupilumab only, and 10.1% both. Overall, 62.7% of posts were neutral, 19.2% positive, and 18.0% negative. “Surgery” was the most frequent word in both positive and negative posts. Treatment failure was reported in 7.6% of surgery posts and 6.2% of dupilumab posts ($p > 0.05$). The ratio of positive to negative sentiment did not differ significantly between groups ($p > 0.05$), and no significant differences were found in emotion profiles.
Conclusion:
Patients generally express neutral to positive sentiment toward both surgery and dupilumab for CRSwNP. Sentiment and emotion analyses suggest comparable patient-perceived experiences between treatment groups. Social media offers a potential tool for assessing patient perspectives, but future patient-centered research is needed to guide decision-making in CRSwNP management.

Poster #A077
Pediatric intracranial mixed germ cell tumor with extracranial extension
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Background:
Primary intracranial germ cell tumors (GCT) are rare, accounting for 3-4% of pediatric intracranial tumors. Incidence peaks in the second decade of life, occurring more commonly in males than females. Most common tumor locations include the pineal and suprasellar regions. Here, we present a rare case of an intracranial mixed GCT localized to the anterior cranial fossa with extension into the paranasal sinuses. This case combines a unique tumor composition and tumor location with atypical patient characteristics for this pathology.

Case Presentation:
Patient is a 7-year-old female who presented to the emergency department with one-week history of headaches, neck pain, and fatigue. Imaging showed a 4.4 cm anterior cranial fossa mass with erosion of the cribriform plate and extension into the ethmoidal and sphenoidal sinuses. Combining patient’s elevated beta human chorionic gonadotropin (β-hCG) and biopsy results of the sinonasal component of the mass, final diagnosis was consistent with a mixed germ cell tumor with germinoma and choriocarcinoma components. Neoadjuvant chemotherapy with carboplatin and etoposide is currently underway with plans for surgical resection and adjuvant radiation therapy.

Conclusion:
Comprehensive literature review reveals that there are no prior reported cases of mixed germ cell tumor localized to the anterior cranial fossa with extension to the paranasal sinuses, as described in this case. Diagnosis of GCTs combines clinical, radiological, and histological findings along with tumor markers. Accurate diagnosis is important as treatment of mixed GCTs requires aggressive chemoradiation therapy and often involves one or more surgical resections.

Poster #A078
Perinatal outcomes in pregnancy with allergic rhinitis
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Background:
Allergic rhinitis (AR) is a globally prevalent chronic disease characterized by an inflammatory response triggered by exposure to inhaled particulate matter. During pregnancy, increased blood volume and hormonal fluctuations may exacerbate AR symptoms in

about one-third of women. Mothers with AR in the United States are at risk of having low birth weight and preterm babies. Although numerous studies have explored the link between AR and depression, fewer have specifically examined the relationship between AR and PPD.

Methods:
This retrospective study analyzed data from June 2015 to June 2019 across the PARTNERS system. AR (Allergic Rhinitis) was diagnosed based on laboratory tests, clinical symptoms, and documented allergies during pregnancy, as recorded in hospital files.

Results:
The total number of pregnant women with AR was 216.The Mann-Whitney U test revealed statistically significant differences in gravidity, parity, and gestational weight gain ($P < 0.05$). The chi-square test revealed statistical significance ($P < 0.05$) for categorical variables including pregnancy during pollen season, history of preterm birth, history of spontaneous abortion, and use of anti-allergy medication during pregnancy.We developed a binary logistic regression model, including pregnancy during the pollen season (OR = 1.514, 95% CI: 0.771–2.973), history of preterm birth (OR = 2.723, 95% CI: 1.157–6.406), number of pregnancies (OR = 2.104, 95% CI: 1.356–3.267), and use of anti-allergy medication during pregnancy (OR = 2.975, 95% CI: 1.521–5.819).

Conclusions:
In summary, this study indicates that multiparity, a maternal history of premature delivery, and allergy treatments during pregnancy are significant risk factors for PPD.

Poster #A079
Pituitary apoplexy is associated with adverse area deprivation index (ADI)
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Background:
Pituitary apoplexy is associated with worse outcomes than pituitary adenomas that present without apoplexy. Previous studies have suggested a link between pituitary apoplexy and limited access to care. However, the association between socioeconomic status and pituitary apoplexy has not been well established.

Methods:
This was a retrospective study including patients with pituitary adenomas who underwent surgery at a tertiary care center from 2023 to 2025. Presentation with apoplexy was determined by clinical presentation and radiologic evidence of tumor hemorrhage. Disease presentation and peri-operative variables were recorded. Area deprivation index (ADI) was assigned to the patients based on their home addresses, with higher values representing increased socioeconomic disadvantage. Statistical analyses included student's t-test across outcome variables with an alpha value of 0.05.

Results:
52 patients met the inclusion criteria, with 11.5% (N=6) of the patients presenting with apoplexy. The mean age was 57.3 +/- 16.9 years old, with 67.3% (N=35) female, 57.7% (N=30) white, and 73.1% (N=38) privately insured. The mean ADI of the study population was 43.0 +/- 27.2. Most tumors exhibited suprasellar (N=32, 61.5%) but not cavernous sinus extension (N=19, 36.5%). An intraoperative repair of a CSF leak was performed in 32.7% of the cases (N=17). The average length of stay was 3.3 +/- 1.6 days. Patients presenting with pituitary apoplexy displayed significantly higher ADI values (72.0 vs 39.2, p=0.022) than patients without apoplexy.
Conclusion: Socioeconomic status may be a predictor of pituitary apoplexy among patients with pituitary adenoma.

POSTERS

Poster #A080

Planum sphenoidale injuries with cerebrospinal rhinorrhea following office balloon dilatation

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Background:
Balloon-assisted dilation (BAD) of paranasal sinus ostia is a minimally invasive procedure used to treat medically refractory chronic rhinosinusitis. Although associated with low reported complication rates, serious adverse events, such as cerebrospinal fluid (CSF) leak, can occur. This case series highlights 2 instances of CSF leaks with pneumocephalus following office-based BAD.

Methods:
Retrospective review.

Results:
In case 1, a 51-year-old woman presented with persistent CSF leak and headaches after bilateral sphenoid BAD. Imaging revealed a defect in the planum sphenoidale near the carotid arteries. Intraoperatively, the sphenoid was filled with clear fluid, and a high-flow leak was identified. Surgical repair using a nasoseptal flap successfully resolved the complication. Case 2 involved a 41-year-old woman who experienced severe headaches after BAD of her right sphenoid sinus. Imaging revealed a defect in the right planum sphenoidale with moderate pneumocephalus. Surgical repair with a pedicled nasoseptal flap led to complete resolution. Both patients recovered from surgery without long-term complications or neurologic sequelae.

Conclusions:
Although BAD is generally considered safe, this case series demonstrates its potential for severe complications, particularly in hyperpneumatized sphenoid sinuses with dehiscent bone. Preoperative anatomic evaluation is crucial to identify at-risk patients. During BAD, trauma to critical structures—the internal carotid artery, optic nerve, and injury to the skull base—may cause CSF leak; surgeons should be aware of the potential risk. This knowledge is important for improving surgical decision-making and patient counseling.

Poster #A081

Platelet count as predictor of PRP response in post-viral anosmia

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Introduction:
Platelet-rich plasma (PRP) is a promising treatment for post-viral anosmia; however, there is significant variability in patient response. This study aims to determine if baseline platelet levels predict response to PRP in these patients.

Methods:
A retrospective chart review was conducted on patients who received PRP for post-viral anosmia. Data included demographics, baseline serum platelet count, smell loss duration, and Brief Smell Identification Test (BSIT) scores. Patients were categorized by platelet count (low <200,000, mid-range ≥200,000-300,000, high ≥300,000). Regression analysis was used to assess predictors of response after 3 treatments.

Results:
87 patients were included in the study (61.6% female). Patients with higher platelet counts had a more robust response to PRP, with higher follow-up BSIT scores (low=5.86, mid-range=7.65, high=8.00; p=0.014), despite similar baseline BSIT scores (p=0.275). Though response rates increased with higher platelet count, this did not reach statistical significance (low=38.1%, mid-range=62.8%, high=70.6%, p=0.085). Multiple linear regression showed baseline BSIT score was the only significant predictor of BSIT at follow-up ($p < 0.001$). Age and smell loss duration (min=3 months, max=37 months) were not predictors of follow-up BSIT score (p=0.164, p=0.551).

Discussion:
This is the first study to investigate biomarkers predicting response to PRP for post-viral anosmia. Our findings show baseline smell function is a predictor of treatment response. Baseline platelet counts trended toward clinical significance as a predictive biomarker but did

not meet statistical significance. Future studies with greater power may be necessary to support these findings.

Poster #A082
PM2.5 exposure and risk of esthesioneuroblastoma
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Background:
Airborne particulate matter 2.5 (PM2.5) is a noxious part of air pollution linked to various cancers, chronic rhinosinusitis, and anosmia. Olfactory neuroblastoma (ONB), or esthesioneuroblastoma, is a rare upper sinonasal malignancy thought to arise from olfactory neuroepithelium. Given PM2.5's known impacts, we hypothesized that PM2.5 may increase ONB risk.

Methods:
This retrospective case-control study used four matched controls per case via nearest neighbor. ONB cases were identified in a tertiary care center's EMR using ICD codes. PM2.5 exposure based on postal code prior to diagnosis was estimated using validated spatiotemporal models. Conditional logistic regression evaluated the association between long-term PM2.5 exposure and ONB risk.

Results:
ONB cases (n=38) and controls (n=152) showed no demographic or medical history differences. In models adjusting for age, gender, and race, odds of ONB were lower with 1-year (OR 0.51, CI: 0.18–1.44), 2-year (OR 0.52, CI: 0.19–1.38), 3-year (OR 0.48, CI: 0.19–1.23), and 5-year (OR 0.36, CI: 0.14–0.94) PM2.5 exposure. Adjusting for BMI, alcohol use, and tobacco use, regression showed similarly decreased odds at 1-year (OR 0.50, CI: 0.17–1.46), 2-year (OR 0.49, CI: 0.18–1.35), 3-year (OR 0.46, CI: 0.18–1.20), and 5-year (OR 0.35, CI: 0.13–0.95).

Conclusion:
PM2.5 exposure was unexpectedly associated with decreased odds of developing ONB. As previous work has shown that PM2.5 is associated with primary anosmia, these findings may suggest that PM2.5 may be protective by damaging the critical cell type in the olfactory epithelium that give rise to ONB. Further studies are needed to elucidate this possible mechanism.

Poster #A083
Pneumatization of the maxillary sinuses: Implications in presentation and surgical management
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The anatomy of the sinonasal passages is highly complex and demonstrates marked variability between individuals. Such variability may impact the presentation of symptoms and increase the difficulty of surgical management. Understanding such variability is imperative to providing safe and effective surgical outcomes.

Pneumatization of the sinuses is one such area of variation, and determining the potential implications for the patient and surgeon warrants further investigation. Enlargement of the sinuses in chronic infection or the presence of a tumor are known to be potential contributors to the increased difficulty of surgical management and the perception of nasal obstruction. We propose that enlargement of the sinuses due to excessive pneumatization may have similar effects. In this study, we utilize CT images to quantify the degree of maxillary sinus pneumatization and determine whether a correlation exists between the degree of pneumatization and patient reports of nasal obstruction. We also seek to investigate whether increased pneumatization of the maxillary sinuses may contribute to more technically challenging surgical management due to decreased nasal cavity volume leading to an increased risk of inadvertent damage to sinonasal structures. 159 consecutive CT scans were reviewed, 62% of subjects met a previously proposed definition for extensive maxillary sinus pneumatization. Additionally, specific cases are reviewed to highlight special features of this anatomical variant.

This work seeks to enhance our understanding of this understudied variant and its relevance to rhinologic practice, potentially informing future diagnostic and therapeutic strategies.

Poster #A084

Post-operative outcomes of in-office endoscopic sinus procedures for CRS and nasal obstruction

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Background:
In-office endoscopic sinus surgery (ESS) with local anesthesia is gaining popularity due to reduced wait times and cost. However, concerns about safety and efficacy persist. Our objective was to investigate the safety and efficacy of in-office ESS for chronic rhinosinusitis (CRS) and nasal obstruction up to one-year post operation.

Methods:
Patients were included if they were ≥18 years of age, diagnosed with CRS or nasal obstruction, and had undergone in-office ESS between January 2020 and December 2023. We excluded individuals scheduled for tumour biopsies or unrelated procedures.

Results:
A total of 349 patients were included: 165 from the CRS cohort and 184 from the nasal obstruction cohort. All procedures were carried out using bupivacaine or lidocaine for local anesthesia. Two (1.2%) intraoperative complications occurred in the CRS cohort, and one (0.5%) intraoperative complication occurred in the nasal obstruction group. No episodes of post-operative pain were noted. Four (2.5%) episodes of postoperative bleeding occurred in the CRS cohort and three episodes (1.6%) occurred in the nasal obstruction cohort. Out of the seven postoperative bleeding cases, four (1.2%) required an emergency department visit, and of those four, three (0.9%) required admission. At 3 months post-operation for the CRS cohort, the median (5/12) Modified Lund-Kennedy (MLK) score had decreased by one point (p=0.0003) which was sustained at 12-months (p=0.0015). At 12 months post-operation, SNOT-22 scores had decreased by 14.9% (32.2 ± 24.2 vs. 37.8 ± 27.2).

Conclusion:
In-office ESS for CRS and nasal obstruction is a safe, effective, and well tolerated treatment alternative for well selected patients.

Poster #A085

Predictors of severity in odontogenic sinusitis

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Introduction:
While the microbiology and histopathology of odontogenic sinusitis has been detailed, there is not yet a study that correlates these variables to disease severity.

Methods:
Patients diagnosed with OS between 2013 and 2024 were searched in the electronic universal medical records. Demographics, CT Lund Mackay scores (LMS), 22-item sinonasal outcome test (SNOT-22) scores, and overall degree of inflammation (ODI) on histopathology was collected. Linear regression (LR) analysis was used to assess the associations between microbiologic, inflammatory, and demographic variables with disease severity measures (LMS and SNOT-22 scores).

Results:
The search yielded 118 patients. There was no correlation between LMS, SNOT-22 scores, and ODI ($|r| < 0.2$). Of the 35 unique cultured bacteria, most common species were: Streptococcus anginosus (15), Prevotella sp (14), Staphylococcus sp (12), Propionibacterium (11), and Streptococcus intermedius (7). Of those, only S. intermedius was associated with a significant increase in ODI ($p < 0.1$), LMS ($p < 0.1$), and SNOT-22 score ($p < 0.05$). Fungi, anaerobic, gram-positive, and gram-negative bacteria were not associated with SNOT-22. Reverse stepwise LR showed that previous CRS history and age were associated with

increased LM scores ($p < 0.01$).

Discussion:
OS is characterized by several microbial colonizers. Given the prevalence and strong association between S. intermedius and increased severity of inflammation, empiric therapy should correspondingly ensure coverage. Older age and a history of CRS also may warrant additional clinical consideration.

Poster #A086
Prednisone's effect on CRS endotype
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Objectives:
Oral prednisone is commonly used preoperatively in chronic rhinosinusitis with nasal polyps (CRSwNP) to reduce symptoms and improve surgical outcomes by decreasing blood loss, enhancing visualization, and minimizing postoperative discomfort. However, it is unclear whether prednisone alters the inflammatory profile of nasal tissue enough to affect classification as non–type 2 (neutrophilic) or type 2 (eosinophilic) inflammation, which may influence treatment decisions and prognosis. This study investigates whether a short course of oral prednisone changes eosinophil counts in nasal biopsies and, by extension, CRS endotype classification.

Methods:
This prospective experimental study included 30 CRSwNP; interim analysis includes 28 who completed the protocol. Nasal polyp biopsies and SNOT-22 questionnaires were collected before and after a 5-day course of oral prednisone (30 mg daily). Biopsies were analyzed for inflammatory markers. A Wilcoxon signed-rank test and Stuart-Maxwell test were used to assess changes in SNOT-22 scores and eosinophil counts, respectively.

Results:
SNOT-22 scores significantly improved following prednisone ($p = 0.0047$), with continued significance after excluding patients who completed surveys outside the intended timeline ($p = 0.0404$). No significant change was observed in tissue eosinophil counts ($p = 0.317$). Individual eosinophil changes were balanced across the cohort.

Conclusions:
A short course of oral prednisone improves CRS symptoms without significantly affecting eosinophilic inflammation. These findings suggest prednisone does not alter CRS endotype classification, supporting its continued use without compromising diagnostic accuracy.

Poster #A087
Prescribing and utilization of topical corticosteroids in chronic rhinosinusitis: A survey study
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Introduction:
The use of topical corticosteroids for symptom and disease control in patients is the central pillar for treatment of chronic rhinosinusitis (CRS). Several delivery methods exist, such as sprays and high-volume, low-pressure irrigations. Despite common use, there is little real-world data on prescribing practices and the decision making on their use.

Methods:
A 17-item questionnaire consisting of multiple choice and written text answers was distributed to active attending physician members of the Canadian Society of Otolaryngology - Head & Neck Surgery (CSOHNS). The questions examined respondents' area of specialty, prescribing practices of both standard and non-standard delivery of topical corticosteroids for CRS, and decision-making considerations.

Results:
A total of 57 responses were collected. The common sprays prescribed were mometasone furoate (91.2%), fluticasone furoate (73.7%), and fluticasone propionate – azelastine hydrochloride (73.7%). The most common factors considered when prescribing include drug availability (66.7%), insurance coverage

(64.9%), physician preference or experience (64.9%), and patient tolerance (61.4%). Of those that use budesonide irrigations (96.5%), 0.5mg/dose (76.4%) and twice daily irrigations (76.4%) were most prescribed. Finally, 83.5% of respondents report counselling patients on medication use.

Conclusions:
A variety of preferred topical corticosteroids, doses, and duration of use exists amongst Canadian otolaryngologists who treat patients with CRS. Most report some degree of patient counselling, and this may represent a potential quality improvement initiative. Despite safety data, most otolaryngologists also believe more research on nasal steroid use is needed.

Poster #A088
Prevalence of immunodeficiency in macrolide responders with recalcitrant chronic sinusitis
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Background:
Chronic sinusitis without nasal polyposis (CRSsNP) can be challenging to manage, with repeated need for antibiotics. Macrolide antibiotics have an undefined role but has demonstrated benefit in case series. Evidence of immunodeficiency among patient with recalcitrant CRSsNP that respond to macrolide therapy is sparse.

Methods:
Retrospective chart review. Patients with recalcitrant CRSsNP that failed surgery, who then had favorable response to macrolide therapy, with follow up period of > 1 year were included.

Results:
13 macrolide responders with CRSsNP with included. All 13 underwent complete bilateral sinus surgery, and 3 patients underwent modified Lothrop. 2 patients were placed on azithromycin. 11 patients were prescribed Clarithrmycin. The average duration of treatment was 8.7 months. 8/13 demonstrated abnormalities in immunodeficiency workup, one patient had solid organ transplant, and one had active sarcoidosis on methotrexate. Among the 8 patients with abnormal immunity labs, 1 patient had low total IgG, 5 patients had low IgG subclass 2 and 3 levels, 5 had confirmatory specific antibody deficiency testing by pneumococcal titers, and 1 had low mannose binding lectin. Four patients required re-starting macrolide therapy within 1 year of completing the initial course, all with good response with reinitiation.

Conclusion:
Macrolide therapy may play a role in the management of a subset of patients with CRSsNP, and immunodeficiency workup may help select candidates. Immune abnormalities are found in a high percentage among CRSsNP who respond to macrolide treatment. Future studies are warranted to evaluate for more specific markers and standardized immunology panels to help select patients for treatment.

Poster #089
Prevalence of radiation-induced sinusitis in nasopharyngeal carcinoma
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Introduction:
An association between radiation to the head and neck and development of sinusitis is clinically common but has not been thoroughly investigated. Herein, we investigated the rates of radiation-induced chronic sinusitis (RI-CRS) amongst patients with nasopharyngeal carcinoma (NPC) treated with radiation therapy.

Methods:
We performed a retrospective review of 39 patients with NPC treated at our institution between 2020 to 2023 after Institutional Review Board approval. Pre- and post-radiation radiographs (at a minimum of 12 months post-treatment) were scored based on the Lund-Mackay (LM) radiologic scoring system for chronic rhinosinusitis. Collected data (demographics, radiographs [CT or MRI], radiation dosing, and oncologic outcomes) were analyzed by linear regression, paired t-test, and

univariate analysis.

Results:
Mean age at diagnosis was 51.8 years (SD, 18.2) and 66.7% of patients were male. Most patients had stage of II, III, or IVA disease (27.8%, 22.2%, 38.9%, respectively), and only 2 of 36 (5.6%) patients were treated with palliative intent. Median radiation dose amongst patients was 70 Gy (SD, 14.73 Gy) with the majority of patients receiving proton therapy (86.1%). 8 of 36 patients died from their disease (22.2%). There was a significant increase in post-treatment LM scores (3.7 [SD, 4.0] vs 1.0 [SD, 2.1]; p <0.001). There was no association between radiation dose and LM scores.

Conclusions:
Our data suggests that radiation treatment of the nasopharynx is associated with increased LM scores amongst patients with NPC. Future research is needed to outline the symptom burden for these patients and investigate possible treatments.

Poster #090
Prognosis of chemosensory recovery among Long COVID-19 patients – 3-, 6- and 12-month follow-ups
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Introduction:
Chemosensory dysfunction is a hallmark symptom of COVID-19 infection, with many patients experiencing symptoms beyond initial infection. This ongoing study aims to capture the timeline in chemosensory recovery following :
post-acute sequelae of SARS-CoV-2 infection (PASC).

Methods:
27 patients (30-74 years old, median: 56) who contracted COVID-19 from 3/2020 to 11/2023 with symptoms persisting 8-51 months (median: 32) were recruited. All completed a 3-month follow-up, 16 completed a 6-month follow-up, and 9 completed a 12-month follow-up. Patients received objective testing of 1) smell function using the 9-Item NIH Toolbox Odor Identification (ID) Test, odor detection threshold (ODT) to phenyl-ethyl alcohol (PEA), and retro-nasal flavor identification (candy test); 2) taste function using the modified NIH toolbox; 3) chemesthesis using menthol lateralization thresholds.

Results:
Patients self-reported a high prevalence of smell (77%) and taste (67%) losses. 76% confirmed objective smell loss, while only 22% confirmed objective taste loss. At 3-month follow-up, patients significantly improved in smell (Odor ID, p=0.0107) but not taste functions (NIH Toolbox, p=0.0863), yet total chemosensory losses remained high (smell 48%, taste 15%). From 3- to 6-month follow-up, patients significantly declined in smell (Odor ID, p=0.0483) function, with 56% smell and 38% taste losses. At 12-month follow-up, 67% exhibited smell loss while only 11% taste losses.

Conclusion:
These findings suggest significant fluctuations in chemosensory function following COVID-19 infection, with prognosis prolonged and uncertain, and self-report unreliable, especially for taste loss.

Poster #A091
WITHDRAWN

Poster #A092
Recurrent extramedullary plasmacytoma with coexistence of squamous cell carcinoma: A case report
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Extramedullary plasmacytoma (EMP) is a rare neoplasm made of proliferation of plasma cells outside of the bone marrow. The reported rates of EMP recurrence and conversion to multiple myeloma (MM) vary. Although EMP is localized, it can rarely be associated with other malignancies which complicates diagnosis and requires a comprehensive approach to treatment and monitoring. We present the case of a 68-year-old woman with a history of

biopsy-proven extramedullary plasmacytoma associated with amyloidosis of the nasopharynx and larynx, treated with surgical excision, who presented 34 months later after being lost to follow-up, with dysphagia, otalgia, and pharyngitis.

Imaging and physical examination revealed new nasopharyngeal and oropharyngeal masses, suggestive of recurrent EMP. Nasopharyngeal and oropharyngeal biopsies revealed EMP and P16 positive squamous cell carcinoma respectively. Further testing revealed no evidence of MM on bone marrow biopsy. EMP is a challenging diagnosis requiring histopathology for confirmation, however, it often presents in the head and neck region, requiring this in the differential diagnosis of unusual appearing masses.

In this case, the patient presented with the unique combination of recurrence along with a secondary squamous cell carcinoma without previous radiation. It is recommended that long-term follow up is crucial to monitor for EMP recurrence, progression to systemic disease or MM, and occurrence of synchronous head and neck cancers.

Further studies are needed to ameliorate understanding of the relationships between EMP and other cancers, as well as therapeutic strategies to manage these complex cases.

Poster #A093

Repair of nasal septal perforations with anterior ethmoid artery flap with temporalis fascia graft

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Background:
Nasal septal perforations can impact patient quality of life. Perforations can be challenging to repair with many techniques existing to accomplish closure with varying success rates. In this study, we outline a method for surgical closure of nasal septal perforations endoscopically with anterior ethmoid artery flap with temporalis fascia autograft.

Methods:
In this series, two patients underwent evaluation of nasal septal perforations to determine etiology, symptomatology, and impact on quality of life using patient reported outcomes measures. Surgical closure was completed in the operating room with pedicled anterior ethmoid artery flap with interposition graft of temporalis fascia placed covering the perforation defect extending between the mucoperichondrial and mucoperiosteal planes of the remnant septum.

Results:
Patients presented with symptoms of epistaxis, whistling, and dryness. Etiology of perforations included iatrogenic from septoplasty and cauterization as well as idiopathic. Size of perforations were 0.4 cm and 1.4 cm at the anterior nasal septum. Preoperative NOSE-Perf scores were 21 and 9 and Septal Perforation Quality of Life Questionnaire (SEPEQOL) scores were 21 and 9. At one month post-operatively, the perforations remained closed. Dryness was improved and no episodes of epistaxis were noted. Temporalis fascia donor site discomfort was noted to be mild or absent.

Conclusions:
In select patients, closure of nasal septal perforations can be completed endoscopically with combination of anterior ethmoid artery flap and temporalis fascia interposition graft with good success. In the future we aim to continue to collect additional patient reported quality of life outcomes measures over time.

Poster #A094

Risk factors and health literacy

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Background:
Inadequate health literacy is associated with poorer patient outcomes. Rhinologic complaints significantly impact patients' quality of life and may interfere with their engagement in their medical treatment. The purpose of this study is to examine risk factors for inadequate health

literacy in rhinology patients

Methods:
A cross-sectional study of rhinology patients was performed by prospectively administering the validated 4-item Brief Health Literacy Screen(BHLS) with chart review. The BHLS gauges health literacy with individual items scored from 1-5 (composite score range: 4-20). Health literacy is considered inadequate in a component if scored ≤3 or globally inadequate if scored ≤15

Results:
372 patients were included with a mean age of 53.6±17.7 years, 48.4% male, 69.1% White, 17.7% Hispanic, and 89.0% primary English-speakers. The majority(327,87.9%) had at least some college education. 18.8% of patients reported inadequate health literacy in at least one BHLS component with 5.9% reporting overall inadequate health literacy. Hispanic/Latino ethnicity and non-English primary language were associated with inadequate overall health literacy ($p<0.05$). The diagnoses commonly associated with inadequate health literacy in BHLS components were sinonasal malignancy(50.0%), epistaxis(35.3%), and nasal airway obstruction(25.4%). Patients with sinonasal malignancy(OR 7.6,95% CI2.44-23.89) and epistaxis(OR5.8,95% CI1.71-19.45) were more likely to report inadequate global health literacy.

Conclusion:
Patients evaluated for sinonasal malignancy and epistaxis were more likely to report inadequate health literacy with demographic differences noted. These patients may warrant additional counseling regarding diagnosis/intervention.

Poster #A095
Risk factors and predictors of recurrent disease/surgery in CRSwNP patient populations
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Background:
Patients with chronic rhinosinusitis with nasal polyps (CRSwNP) experience recurrent symptoms, imposing a burden on patients and healthcare systems. Despite the advent of new treatments such as biologics, unmet needs persist. This targeted literature review (TLR) assessed CRSwNP epidemiology, treatment patterns, and natural disease course.

Methods:
A TLR was performed using Ovid Embase, supplemented with handsearching. Post-screening, eligible references underwent data extraction and 25% were dual-reviewed for quality assurance. Systematic reviews, meta-analyses, and treatment guidelines were prioritized over primary observational studies. Herein, the findings on the risk factors, disease recurrence and surgery recurrence in patients with CRSwNP are summarized.

Results:
A total of 22 publications were included. Elevated blood eosinophils (EOS) and comorbid asthma, characteristic of type 2 (T2) inflammation, were identified as key risk factors for developing CRSwNP, whereas blood and tissue EOS were predictors of post-surgery recurrent CRSwNP. Overall, 19–59% of patients experienced revision surgery. Surgical revision rates were higher for patients who had undergone prior polypectomy versus prior endoscopic sinus surgery (ESS) (26% vs 17%, respectively; $p<0.0001$) and for patients undergoing revision versus primary ESS (26% vs 14%, respectively, $p<0.0001$). Revision rates varied by geographical region and were higher in North America and Oceania (19.1–21.7%) versus Asia and Europe (14.9–16.8%).

Conclusion:
EOS levels (biomarkers for T2 inflammation) and prior surgery are predictors of CRSwNP recurrence. High surgical revision rates highlight the need to optimize treatment options for CRSwNP.
Funding: GSK (217518)

POSTERS

Poster #096

Risk factors for spontaneous epistaxis in adults

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Introduction:
Epistaxis is a common condition in the otolaryngology practice, however research on risk factors is limited. The objective of this study was to evaluate potential risk factors, including nasal septal deviation (NSD) and intranasal corticosteroid sprays, associated with epistaxis in adult patients.

Methods:
Retrospective case-control study of all adult patients presenting to the otolaryngology clinic between July 2020 and July 2024 was performed. Cases included adults presenting in the outpatient setting for spontaneous epistaxis. Controls were all other adults presenting for various other rhinologic concerns. Patients' characteristics, comorbidities, and medications were reviewed. Patients with chronic rhinosinusitis, bleeding disorders, sinonasal tumors, or nasal septal perforation were excluded.

Results:
A total of 517 adult patients (242 with epistaxis and 275 controls) were included. The sample was predominantly middle aged (M=50.3, SD=18.5) and female (61%). In a multivariate logistic regression controlling for all other covariates, NSD, male gender , antiplatelet and anticoagulation therapy were significant independent risk factors for epistaxis (OR=1.50, 95%CI: 1.21-1.86 ; OR=1.74, 95%CI: 1.15-2.61; OR=2.15, 95%CI: 1.27-3.65; and OR=3.08, 95%CI: 1.27-7.49 respectively). However, patients currently smoking or receiving intranasal corticosteroid spray were less likely to experience epistaxis (OR=0.36, 95%CI: 0.18-0.71 and OR=0.34, 95%CI: 0.22-0.53, respectively).

Conclusion:
Nasal septal deviation, male gender, and the use of antiplatelet/anticoagulation therapy was associated with risk for epistaxis in adult patients. Future research should focus on how these factors affect treatment outcome of epistaxis.

Poster #A097

Role of fibrin sealant in rhinoplasty: A metanalysis

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Background:
Fibrin sealants have gained traction in rhinoplasty as a means of minimizing postoperative edema, ecchymosis, and overall recovery time. Despite growing clinical adoption, the evidence supporting their efficacy remains fragmented. This systematic review and meta-analysis aims to critically evaluate the impact of fibrin sealant use on postoperative recovery parameters in rhinoplasty patients.

Methods:
A comprehensive search was conducted across PubMed, Embase, and the Cochrane Library from inception to April 5, 2025, adhering to PRISMA-SR guidelines. Eligible studies included randomized controlled trials and cohort studies comparing fibrin sealant versus no sealant in rhinoplasty. Outcomes of interest were postoperative nasal swelling and facial bruising. Data were synthesized using random-effects meta-analysis, and heterogeneity was assessed using the I^2 statistic.

Results:
Seven studies comprising 178 patients met inclusion criteria, including four randomized controlled trials and three cohort studies. Fibrin sealant use was associated with a reduction in nasal edema on postoperative day 1 (I^2 = 25%, p = 0.26) and day 7 (I^2 = 0%, p = 0.66). Facial bruising also decreased with sealant use, with effects noted on day 1 (I^2 = 48%, p = 0.15) and significantly on day 7 (I^2 = 75%, p = 0.02).

Conclusion:
This study demonstrates that fibrin sealant use in rhinoplasty is associated with a meaningful reduction in early postoperative swelling and bruising. These findings support the adjunctive use of fibrin sealants to enhance patient

recovery and satisfaction.

Poster #098
Role of HPV in sinonasal papilloma with mixed endophytic and exophytic features
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Introduction:
Sinonasal papilloma is characterized by three histologically unique types: exophytic, inverted, and oncocytic. Existing data on the role of Human Papilloma Virus (HPV) in the pathogenesis of inverted papilloma (IP) has been mixed, but includes the notion that high-risk HPV may increase the rate of malignant transformation. A histological subset of IP that displays mixed features of both IP and exophytic papilloma (EP) has been sparsely reported. To assess high-risk HPV positivity, we conducted a histopathological analysis of mixed IP/EP at our institution.

Methods:
We retrospectively reviewed cases of IP that underwent surgical excision at our institution from 2011 through 2024. We identified cases that were pathologically reported as IP with concurrent features of EP within the same specimen. Both the surgeon and pathologist reviewed the p16 immunohistochemistry (IHC) and HPV-mRNA in-situ hybridization (ISH) findings of these cases. Demographic and clinical characteristics were also collected.

Results:
There were 9 cases of mixed IP/EP, with most patients being male (78%) and White (89%) with a mean age of 64.8 years. Of the 9 cases, 5 were recurrent and undergoing revision treatment. Eight cases demonstrated variable expression of p16, but only 2 had >70% positivity. All 9 cases were negative for HPV ISH. In the available surveillance period (mean 2.5 years), 2 cases developed subsequent recurrence.

Conclusion:
This is the largest series to date of mixed IP/EP. These cases do not appear to be associated with high-risk HPV subtypes but were frequently recurrent. While further research is needed, mixed IP/EP may not be associated with high-risk HPV but may be more aggressive than typical IP.

Poster #A099
Rosai dorfman disease presenting in the paranasal sinuses
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Introduction:
Sinonasal Rosai-Dorfman disease (RDD) is a rare histiocytic disorder which can present a diagnostic challenge due to diverse clinical presentations and non-specific imaging. We describe a case of RDD presenting in the paranasal sinuses.

Methods:
Retrospective chart and histopathological review.

Results:
A 40-year-old man presented to Rhinology clinic with four years of chronic nasal congestion, hyposmia and postnasal drip. Nasal endoscopy revealed a polypoid lesion in the right middle meatus. CT imaging demonstrated acute-on-chronic sinusitis with a right middle meatal polyp. MRI imaging showed a T2 hyperintense, peripherally-enhancing lesion in the right nasal cavity, again consistent with an inflammatory polyp.
His nasal congestion was refractory to trials of medical management, so he underwent functional endoscopic sinus surgery including bilateral maxillary antrostomies, total ethmoidectomies, and sphenoidotomies. He had inflamed mucosa and polyps throughout the paranasal sinuses bilaterally. Pathology demonstrated polypoid chronic rhinosinusitis with abundant eosinophils.
Immunohistochemistry staining showed cells positive for S100, CD68, and CD163 with high expression of Oct2 and cyclin D1, indicative of sinonasal RDD. The patient continues on saline sinus irrigations and is awaiting hematology oncology consultation to assess for systemic RDD.

Conclusion:
This case demonstrates RDD presenting as chronic rhinosinusitis, diagnosed on histopathologic examination after surgery. RDD most commonly presents with lymphadenopathy but can have extranodal involvement (skin, sinonasal, soft tissue, bone, GI, CNS) and systemic symptoms. RDD, although rare, should be considered in the differential of recurrent sinusitis.

Poster #A100
Rurality, access, and outcomes in endoscopic sinus surgery
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Background:
Rural populations are known to experience a higher burden of chronic disease; however, the influence of rurality on the management of chronic rhinosinusitis (CRS) remains unclear. This retrospective cohort study aims to evaluate differences in access to care and surgical outcomes between rural and urban patients undergoing endoscopic sinus surgery (ESS) for CRS.

Methods:
A retrospective review was conducted on patients who underwent ESS at a tertiary academic center between July 2019 and March 2025. Rural or urban status was determined using Rural-Urban Commuting Area (RUCA) codes. Socioeconomic disadvantage was assessed using the Area Deprivation Index (ADI), and driving distance to care (DTC) was calculated using routing software. Rural patients (n=18) were identified and matched to urban counterparts (n=21) based on preoperative Sinonasal Outcome Test (SNOT-22) scores (±6), age (±5 years), and sex. Postoperative SNOT-22 scores were compared using paired t-tests.

Results:
Rural patients attended fewer postoperative follow-up visits compared to their urban counterparts (3.27 vs. 4.0 visits; $p < 0.05$). They also exhibited greater socioeconomic disadvantage, (35.3 vs. 15.1; $p < 0.05$), and had a significantly longer average driving distance to care (310 vs. 21 miles; $p < 0.05$). Despite these disparities, rural and urban patients experienced comparable improvements in SNOT-22 scores following ESS (18 vs. 22-point improvement; $p = 0.51$).

Conclusions:
Rural and urban CRS patients had equivalent ESS outcomes, despite greater barriers faced by rural patients. These findings support further research on ESS delivery to promote equitable access across care settings.

Poster #A101
Sclerotherapy for oral telangiectasias in hereditary hemorrhagic telangiectasia
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Introduction:
Mucocutaneous regions affected in hereditary hemorrhagic telangiectasia (HHT) include the nasal and oral cavity. Sclerotherapy, which involves injecting a sclerosing agent into a vascular lesion to induce intravascular scarring and collapse, is effectively utilized to reduce epistaxis. However, oral telangiectasias can significantly impact quality of life, but very few reports on sclerotherapy in the oral cavity exist. We aimed to evaluate the efficacy of sclerotherapy for oral telangiectasias.

Methods:
A retrospective chart review was conducted on HHT patients who underwent sclerotherapy of the oral cavity. Demographic and clinical data, along with photo documentation, were collected to assess treatment response. In all cases, a 1:4 mixture of 3% sotradecol with air was injected into the lesion(s).

Results:
Ten patients underwent sclerotherapy of oral cavity telangiectasias in the operating room (60%) or in-office (40%) as either a standalone treatment (30%) or co-treatment with nasal telangiectasias (70%). They were predominantly female (70%) with a mean age of 50.5 years and a predominant genotype of ACVRL1 (80%).

Presenting symptoms included oral bleeding, dietary limitations, and one case of significant weight loss due to difficulty eating. Treatment sites included lip (40%), tongue (30%), hard palate (20%), and gingiva (10%). Adverse effects included short-term tongue burning (n=1) and lip swelling (n=2). At an average of 6.0 months post-sclerotherapy, all lesions resolved based on symptoms and physical exam.

Conclusion:
Oral telangiectasias in HHT are common and negatively impact quality of life. In our experience, sclerotherapy is a reasonable alternative to cautery or laser treatments.

Poster #A102
Sinonasal involvement in ANCA-associated vasculitis
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Introduction:
Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV) comprises a group of multisystem autoimmune disorders. Currently, there are three phenotypes defined: granulomatosis with polyangiitis (GPA, formerly Wegener's granulomatosis), microscopic polyangiitis (MPA), and eosinophilic granulomatosis with polyangiitis (EGPA, Churg-Strauss syndrome). Any organ or tissue may be involved in AAV, some life-threatening. The most frequently observed ENT clinical manifestations in GPA and EGPA are those affecting the nasosinusal mucosa, with or without nasal polyps.

Material and Methods:
This was a prospective, descriptive, observational study in a tertiary care hospital. Thirteen patients diagnosed with GPA (2)/EGPA (11) by the Rheumatology Department over 3 years were visited by the same rhinologist. Demographic and nasal symptom data were obtained. Nasal endoscopy, nasal cytology, SNOT-22, and olfactometry were also performed.

Results:
The mean age was 57.23 (+/- 14.14). Lung involvement was present in 92.3% (11/12) of patients. Nasal endoscopy showed polyps in seven patients (53.8%). Nasal cytology findings showed significant neutrophils and epithelial metaplasia in 92.3% of cases, but not eosinophils in 69.2% of total samples. The SNOT-22 score averaged 40.85. The Sniffing Stick Test averaged 8.38 (3.7 SD).

Conclusion:
Sinonasal involvement is one of the most common abnormalities in AAV. The significant impact on quality of life and sense of smell in these patients confirms the importance of early diagnosis, facilitated by nasal endoscopy and cytology. Multidisciplinary collaboration is crucial for prompt diagnosis and the selection of the most appropriate treatment.

Poster #103
Sinus surgery complications
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Background:
The potential complications of endoscopic sinus surgery are well documented and remain a critical surgical consideration. This study aims to examine complication rates and identify trends in endoscopic sinus surgery-related complications over time.

Methods:
The TriNetX network was queried for patients undergoing endoscopic sinus surgery between 2005-2024. Diagnosis and procedural codes identified patients with new post-operative diagnoses relating to epistaxis, CSF leak, meningitis, and orbital injury. Complication rates were calculated. Relative risk (RR) for demographic differences in complication rates were assessed in propensity score matched populations. Join point regression analysis determined trends in complication rates.

Results:
127,082 patients undergoing ESS were

included. 30-day readmission rates and emergency department visit rates were 1.45% and 1.67%, respectively. CSF leaks occurred in 0.31%, meningitis in 0.25%, orbital injury and sequalae in 2.09%, and hemorrhage requiring intervention in 2.24% of patients. There were multiple differences in the relative risk of complications based on gender, race/ethnicity, and patient age. There was no difference in CSF leak rate, orbital injury rate, or readmission rates over the study period. Rates of meningitis decreased ($p=0.006$) over the 20-year period while rates of hemorrhage requiring intervention ($p<0.001$) and emergency room visits have both ($p=0.001$) increased

Conclusions:
There are age-related and demographic differences in complication rates related to ESS. The majority of complication rates have remained stable over 20 years, with only meningitis rates decreasing while rates of hemorrhage requiring intervention and emergency room visits have increased

Poster #A104
Skull base metastasis as a late manifestation of papillary thyroid cancer
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Introduction:
Distant metastases from papillary thyroid carcinoma (PTC) are uncommon, with skull base metastasis being especially rare. We report a case of skull base metastasis occurring four years after PTC management.

Methods:
Case report of patient with delayed presentation of skull base metastasis of PTC with literature review.

Results:
A 58-year-old male initially presented with a 6.8 cm PTC of the left thyroid lobe, treated with total thyroidectomy and bilateral neck dissection. Intra-operatively, there was unresectable bulky nodal disease due to adherence to the phrenic nerve, carotid artery, and brachial plexus. The patient underwent post-operative radiotherapy and received radioactive iodine. The patient had no evidence of disease on surveillance, but developed left-sided post-nasal drip, ptosis, and proptosis four years after initial treatment. MRI revealed a 2.4 x 2.1 x 2.6 cm skull base mass with invasion of the nasal septum, bilateral frontal and ethmoid sinuses, cribriform, and left orbit with post-obstructive mucocele causing further erosion of the left orbital roof. Biopsy of the sinonasal mass was consistent with metastatic PTC. The patient subsequently underwent endoscopic debulking of the sinonasal mass and began post-operative radiation therapy. To date, only five prior cases of PTC with skull base metastasis have been reported, with a majority presenting with cranial neuropathies more than two years after treatment of their primary tumor.

Conclusion:
Skull base metastasis of PTC is rare and may present years after initial treatment. This case emphasizes the need for continued surveillance in patients with PTC and highlights the possibility of delayed sinonasal metastasis in this patient population.

Poster #A105
Smell and taste impairment as markers of frailty: A systematic review and meta-analysis
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Background:
Olfactory and gustatory impairment are increasingly recognized as markers of frailty in older adults, signaling health decline and decreased physiologic resilience. This study aimed to synthesize evidence on the association between smell and taste impairment with frailty.

Methods:
A systematic search of PubMed, Embase, Cochrane, Web of Science, and Scopus was conducted using terms related to smell, taste, and frailty. The primary outcome was the association between sensory impairment and frailty. Studies reporting multiple odds ratios (ORs) were first pooled using fixed-effects models, then combined using a random-effects

model for overall estimates.

Results:
Of 1,228 articles screened, 86 underwent full-text review, and 21 studies (n = 19,057 participants) met inclusion criteria. Eleven assessed smell alone, two assessed taste alone, and eight assessed both. Psychophysical smell (n = 12) and taste (n = 3) tests were used in 15 studies, while 17 studies included self-reported assessments of smell (n = 9) and taste (n = 8). Eight studies were included in the meta-analysis on smell and frailty, demonstrating smell impairment was significantly associated with increased odds of frailty (OR 1.83, 95% CI: 1.43–2.34; I^2 = 49.3%), with consistent associations for both psychophysical (OR 1.79, 95% CI: 1.22–2.62) and self-reported (OR 2.02, 95% CI: 1.35–3.04) measures. Studies on taste impairment showed trends toward association with frailty, though significance varied and studies were limited.

Conclusion:
Although the relationship between taste and frailty is unclear, smell function is significantly associated with frailty status. Smell testing may help identify at-risk older adults and offer an opportunity for intervention.

Poster #A106
Social determinants of health in allergic fungal sinusitis
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Incarcerated individuals represent a profoundly vulnerable and underserved population within the healthcare system, often facing substantial barriers to timely, effective, and equitable care. Social determinants of health—including limited access to specialty services, institutional policies, socioeconomic constraints, and systemic marginalization—contribute significantly to healthcare disparities in this group, particularly for those with complex chronic illnesses. We present two cases of incarcerated patients with extensive allergic fungal sinusitis (AFS), each with severe ophthalmologic complications: one with irreversible optic nerve damage and the other with marked proptosis. Despite the need for timely surgical intervention and longitudinal multidisciplinary follow-up, their care has been repeatedly compromised by institutional limitations, including difficulties coordinating transportation to our hospital, inconsistent administration of prescribed medications, and restricted flexibility in post-operative scheduling.

To better understand the broader context of these challenges, we conducted a review of the literature on social determinants of health in patients with AFS. While data are limited, existing literature suggests that delayed diagnosis, fragmented follow-up, and disparities in access to subspecialty care may contribute to worsened outcomes, especially in marginalized populations. These findings, combined with our clinical experience, underscore the critical need for increased access for these patients to allow for equitable care for incarcerated individuals with complex medical conditions.

Poster #A107
The CARE-PIFRS study: Multicenter retrospective analysis of pediatric invasive fungal rhinosinusitis
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Objective:
The Collaborative Alliance in Research and Epidemiology in Pediatric Invasive Fungal Rhinosinusitis (CARE-PIFRS) was formed to conduct a multicenter retrospective analysis to better understand the clinical features, management, and outcomes of pediatric IFRS.

Methods:
Retrospective review of patients under 18 diagnosed with IFRS across multiple tertiary centers. Data included demographics, underlying conditions, presenting symptoms, diagnostics,

fungal species, treatments, and outcomes.

Results:
Of 34 patients identified, median age was 11 years (IQR 6–14); 44% were female. Most were immunocompromised (94%), with hematologic malignancy in 74% and neutropenia in 91%. Common symptoms included fever (59%), nasal congestion/discharge (24%), and headache (18%). Disease involved the nasal cavity only (12%), sinuses only (29%), or both (53%), with orbital and cerebral involvement each in 12%. Histopathology confirmed diagnosis in 79% and cultures were positive in 74%, most often identifying Mucorales (47%) and Aspergillus (18%). PCR and next-generation sequencing were used in 24% and 21%, respectively. Amphotericin B was given in 91%, with 83% receiving combination antifungal therapy. Voriconazole, posaconazole, and isavuconazole were used in 65%, 74%, and 3%, respectively. Surgical debridement occured in 91%, with a median of 5 (IQR 3–7) days to surgery and 3 surgeries (IQR 2–4) per patient. Overall survival was 53%, with 21% mortality attributed to IFRS.

Conclusion:
Pediatric IFRS is associated with significant immunocompromise, invasive disease, and high treatment burden. Continued data collection and analysis will further inform diagnosis, therapy, and outcomes in this vulnerable population.

Poster #A108
The effect of iodine concentration on smell function in endoscopic transsphenoidal surgery patients
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Introduction:
Endoscopic endonasal transsphenoidal surgery is a safe and effective approach for treating sella lesions. Olfactory outcomes are a significant concern for these patients. This study is the first to demonstrate that the concentration of povidone-iodine used during presurgical antisepsis has an impact on postoperative smell recovery.

Study design:
Retrospective study

Setting:
Single academic medical center.

Materials & Methods:
We included patients with sellar tumors who underwent endoscopic endonasal transsphenoidal surgery at Mackay Memorial Hospital between August 2015 and March 2022. Seventeen patients received a commercial aqueous 10% povidone-iodine (PVP-I) solution, while a diluted 1% PVP-I solution was used in 52 patients. Olfactory outcomes were evaluated using the validated Taiwan Smell Identification Test.

Results:
The average Taiwan Smell Identification Test result for the 10% PVP-I group three-month after surgery was 31.3, showing a significant decline from baseline (mean:-9.8, SD:± 12.8; P =. 03). In contrast, the 1% PVP-I group demonstrated no significant change from baseline (mean: -2.1, SD: ± 7.6, P = .13). This difference is still seen postoperative 6 months.

Conclusion:
Olfactory function in the 1% PVP-I group is expected to return after 3 months, which is not seen in the 10% PVP-I group. It is reasonable to use diluted 1% PVP-I solution during surgery without compromising the olfactory recovery.

Poster #A109
The impact of mometasone nasal rinses on SNOT-22 scores in chronic rhinosinusitis patients
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Introduction:
Steroids, both oral and in nasal rinse form, are used for chronic rhinosinusitis management. Whether steroid rinses can reduce oral steroid requirements is currently understudied. In this ongoing study, we compare Sinus and Nasal Outcome Test-22 (SNOT-22) scores before and after initiating mometasone rinses.

Methods:

The electronic medical records of 100 patients started on mometasone rinses were retrospectively reviewed to collect SNOT-22 scores before and 1, 6, and 12 months after starting mometasone rinses. Paired sample t-test was used to analyze changes in SNOT-22 scores after starting mometasone. As an ongoing study, the oral steroid requirements continue to be collected.

Results:
Patients with SNOT-22 scores documented before mometasone initiation were included. 62 patients completed a 1-month post-mometasone initiation SNOT-22 survey. The average pre-mometasone score was 33.05, average 1-month post-mometasone score was 21.29, and mean difference was 11.76 with a 95% CI [7.02, 16.50], p<0.001. 52 patients completed a 6-month post-mometasone SNOT-22 survey. The average pre-mometasone score was 33.15, average 6-month post-mometasone score was 21.79, and mean difference was 11.37 with a 95% CI [4.10, 18.63], p=0.001. 32 patients completed a 1-year post-mometasone SNOT-22 survey. The average pre-mometasone score was 38.69, average 1-year post-mometasone score was 18.16, and mean difference was 20.53 with a 95% CI [11.93, 29.13], p<0.001.

Conclusion:
The study demonstrates a reduction in SNOT-22 scores with mometasone rinses, and stable symptom reduction after 1 year. While nasal steroid rinses provide more localized inflammatory control, its co-relationship with oral steroid requirements is being studied.

Poster #A110
Treating post-radiation sinusitis – A meta analysis
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Radiation-induced rhinosinusitis (RIR) is one of the most common complications after radiotherapy, and has been reported to affect up to 70% of patients who have been treated for nasopharyngeal carcinoma. To date, there is no universally accepted treatment protocol for RIR. We performed a systematic review and meta-analysis to synthesize existing evidence to evaluate management strategies for RIR.

Following PRISMA guidelines, we searched PubMed, Embase, CNKI and Web of Science for studies assessing RIR interventions. Data was extracted from 12 studies (1,391 patients) and analyzed using standardized mean differences (SMD) for outcomes including SNOT and VAS scoring, Lund-Mackay (LM), and Lund-Kennedy (LK) scores.

Results demonstrated that nasal irrigations (NSI), intranasal corticosteroids (INS) and surgery were effective in improving SNOT scores, with surgery having the greatest impact (SMD: 19.03, 95% CI 17.74 – 20.32, p<0.05). LK scores generally improved sans one study (Overall SMD: -0.45, 95%CI: -0.63 – -09.28, p<0.05; Sans outlier study SMD: 3.31, 95%CI 2.88-3.74, p<0.05). LM scores generally improved across all modalities (SMD: 4.52, 95% CI: 1.78-7.26, p<0.05), most significantly with the use of macrolide antibiotics (SMD: 7.72, 95%CI: 6.74 – 8.70, p<0.05). However, surgery was associated with a greater risk of adverse events compared to medical therapies.

Our findings suggest that NSI, INS, and macrolides are effective options to manage RIR, with surgery offering the greatest impact on quality of life for suitable patients.

Poster #A111
Treatment patterns in patients with CRSwNP in the USA
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Background:
Clinical management and treatment patterns vary widely for patients with CRSwNP; this study assessed both aspects in a USA-based population.

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Methods:
This retrospective, cross-sectional study used data from the Adelphi Real World CRS Disease Specific Program (collected Mar–Sep 2023). Physicians completed record forms for patients with bilateral moderate-to-severe CRSwNP consulting for routine care.

Results:
In total, 62 physicians reported data for a random sample of 140 patients. Nasal polyps (NP) were moderate/severe in 89%/11% of patients, respectively, while 66% had severe or very severe airflow limitation. Most common symptoms were nasal blockage (79%) and post-nasal discharge (64%). Overall, 86% were receiving CRSwNP-specific treatments, including topical nasal corticosteroids (spray; 74%), biologics (29%), nasal saline irrigation (27%), and systemic corticosteroids (SCS; 17%). NP size reduction was the primary reason for treatment choice (85%). Prior sino-nasal surgery was reported in 28% of patients (mean [SD] number of surgical procedures, 1 [1]). Complications following the most recent surgery occurred in 62% of patients, with crusting (24%) and bleeding (24%) most common.
Post-surgery, topical corticosteroids, nasal saline irrigation, SCS, and biologics were used by 78%, 52%, 17%, and 13% of patients, respectively.

Conclusion:
There is reliance on corticosteroids in CRSwNP management, while biologics are underutilized. Frequent surgeries increase complication risks and disease burden for patients. Effective treatments are needed to reduce reliance on SCS and surgery, improve outcomes, and decrease healthcare resource use.
Funding: GSK (217519).

Poster #A112
Treatment-resistant DEK::AFF2 Sinonasal squamous cell carcinoma
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Introduction:
DEK::AFF2 fusion-associated sinonasal squamous cell carcinoma (SCC) is a rare, recently recognized entity characterized by frequent local recurrence and limited treatment response. We present one of the first cases of treatment-resistant DEK::AFF2 sinonasal SCC with multiple recurrences despite accurate diagnosis and aggressive treatment.

Case:
A 67-year-old male with right-sided epistaxis was diagnosed with DEK::AFF2 SCC confined to the right middle meatus. At 5 months following primary resection with negative margins, there was local recurrence, and the patient underwent revision endoscopic resection with adjuvant radiation. A year later, a second local recurrence within the radiated area, now invading the orbit, right maxillary sinus, and masticator space. Despite neoadjuvant chemoimmunotherapy and open craniofacial resection with negative margins, there was disease recurrence in the right masseter muscle 5 months postoperatively that was treated with salvage resection.

Discussion:
DEK::AFF2 sinonasal SCC has been defined in literature as an aggressive malignancy with an erratic clinical course, frequent local recurrence and limited immunotherapy response. However, existing studies are limited to retrospective analyses of initially misdiagnosed tumors. We present the first prospective case of treatment-resistant DEK::AFF2 sinonasal SCC marked by intrinsic radioresistance and persistent recurrence despite accurate initial diagnosis, timely initiation of aggressive multimodal therapy and uninterrupted follow-up.

Conclusion:
Larger cohort studies and multidisciplinary collaboration are essential to characterize the immune landscape of DEK::AFF2 SCC and identify reliable predictive biomarkers and treatment targets.

Poster #A113
WITHDRAWN

POSTERS

Poster #114

Trends in extramural funding for sinusitis research

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Background:
Chronic rhinosinusitis (CRS) poses a significant health burden in the United States, with knowledge gaps requiring further research. The objective of our study is to characterize trends in extramural funding and associated publications for CRS research.

Methods:
We searched for projects awarded between 1992 and 2024, and ensuing publications, in National Institutes of Health (NIH) RePORTER, using the terms “”chronic sinusitis””, “”rhinosinusitis””, and “”nasal polyposis”. Data was extracted and descriptively analyzed using Microsoft Excel.

Results:
23,171 publications from 1,772 projects were identified, with 106 projects still active. Both the number of projects awarded and their proportion relative to the total NIH projects has gradually increased since 1992, reaching a plateau in 2015 and remaining relatively stable between 93 and 109 projects, over the past 10 years. In contrast, the number of publications resulting from these projects increased gradually from 1992, peaking at 1198 in 2008, followed by a steady decrease reaching just 547 in 2024. The top journals publishing CRS research in the past decade were Journal of Allergy and Clinical Immunology (972, 10.9%) and International Forum of Allergy & Rhinology (377, 4.2%).

Conclusion:
Extramural funding for CRS research has remained relatively stable over the past decade, while publication output has declined. This incongruity may be related to multiple factors, including longer duration of research projects, rising standards for manuscript publication, and/or shifting research priorities. This trend highlights the need for further investigation to understand the underlying factors at play to support stability and growth of scientific output and funding in CRS.

Poster #A115

Ultrafine PM induces eosinophilic inclusions in murine sinonasal epithelium

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Background:
Chronic exposure to ultrafine particulate matter (PM) poses potential health risks, yet its long-term effects on the upper respiratory tract remain inadequately understood. In prior studies, inhalation of synthetic amorphous silica induced eosinophilic intracytoplasmic inclusions and protein crystalloids in rat nasal mucosa. Here, we investigated whether extended exposure to ultrafine PM induces similar adaptations in the sinonasal epithelium of mice.

Methods:
Eighteen C57BL/6J mice were randomized to either ultrafine PM at 109 μg/m³ (n=9) or filtered air (n=9) exposures for 12 months (5 h/day, 4 days/week). Ultrafine PM was collected using a versatile aerosol concentration and enrichment system (VACES). Controls received HEPA-filtered air. Mice were exposed in whole-body chambers with real-time monitoring of temperature, flow rate, and particle concentrations. After 12 months, sinonasal tissues were harvested, processed, and evaluated histologically using protocols established in a prior 14-week exposure study.

Results: Histopathological examination showed eosinophilic inclusions and inflammatory infiltrates in 6/9 PM-exposed mice, compared with 1/9 controls. The inclusions resembled cytoplasmic accumulations of chitinase, a carboxylesterase-family proteins. These globules are often linked to innate immunity and detoxification pathways.

Conclusion:
Chronic ultrafine PM inhalation promoted eosinophilic inclusions in murine sinonasal epithelium, suggesting an adaptive response to persistent toxicant exposure. Further

investigations are needed to clarify the clinical significance of these findings and to elucidate the mechanisms underlying these proteinaceous accumulations.

Poster #116
Unilateral neurogenic rhinitis
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Introduction:
Chronic rhinitis is a highly prevalent condition primarily caused by environmental allergens or rhinosinusitis. Less commonly, hyperactivity of the posterior nasal nerve is a trigger for the runny nose. Although generally assumed to be a bilateral condition, we present a unique case where a patient suffered severe, unilateral symptoms and was successfully treated with radiofrequency therapy targeting a single posterior nasal nerve.

Presentation of case:
A 76-year-old WF was referred for evaluation of left-sided, profuse watery rhinorrhea for greater than 6 months. Allergy testing, CT sinus imaging and lab testing for CSF was unremarkable and failing all attempted medical management, targeted, left posterior nasal nerve treatment was accomplished in the office. 3 months after treatment, the patient reported complete resolution of the rhinorrhea.

Discussion:
Radiofrequency treatment of the posterior nasal nerves (PNN) is proven in several published studies to be effective at reducing chronic rhinitis. Appropriately selected patients are almost always treated in a bilateral fashion. This case illustrates the imbalance in neural activity between the two posterior nasal nerves and suggests PNN dysfunction is not always a bilateral condition.

Poster #A117
Unpublished literature searches by systematic reviewers of allergy related publications
Savannah Nicks, DO

Introduction:
In the United States alone, 50 million people are affected by allergies each year. Given the prevalence of allergic conditions, it is important to maximize research and to ensure that studies in the field are performed without bias. Clinical trial registries (CTR) searches prior to study enrollment can be used to ensure that unpublished research does not affect outcomes as a result of publication bias. This study aimed to quantify the degree to which CTR searches are performed in allergy-related publications.

Methods:
A retrospective analysis of allergy related research was performed. PubMed was used to extract systematic reviews and meta-analyses from top allergy journals according to their rating on the H-5 index. Systematic reviews published from 1/1/2006 to 2/19/2021 were included.. The primary objective was to determine if each systematic review conducted a CTR search. The secondary objective was to determine, from a subset of the studies that did not perform a search, if relevant trials existed during that time.

Results:
From the 282 included systematic reviews, 37 (37/282; 13.1%) performed a CTR search. Of the sample of 25 studies that did not perform a CTR search, there were 11 relevant studies that existed at the time of the search (11/25; 44%).

Conclusion:
The majority of allergy-related systematic reviews did not perform CTR searches prior to trial enrollment. The consistent use of CTR's is important to ensure transparency and accuracy in medical research. Moreover, the use of CTRs enables authors to capitalize on the unpublished literature that exists on their topic of interest to maximize established research. Given the results of this study, we recommend that authors of allergy-related studies.

Poster #A118
Use of fibrin sealant to temporarily close cerebrospinal fluid leak
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Introduction:
Delay in treatment of a cerebrospinal fluid (CSF) leak from a ventral skull base defect increases the risk of meningitis. In addition to comorbid conditions that need to be treated, surgery may be delayed by lack of equipment, expertise, and operating room time.

Methods:
A patient with a remote history of endoscopic endonasal surgery and proton beam irradiation for clival chordoma was seen in the office for a routine visit. She reported one week of clear rhinorrhea and was found to have a small defect of the lower clivus through which CSF leakage could be seen. Urgent operative repair was not logistically feasible due to personnel constraints. As such, fibrin sealant (Tisseal) was applied under endoscopic guidance in the office to the skull base defect with cessation of the CSF leak.

Results:
Four days after application of fibrin glue to the skull base defect, the patient underwent operative repair of the CSF leak; the fibrin glue remained in place over the defect with no apparent CSF leakage. This was removed and a vascularized flap was used for reconstruction.

Discussion:
In-office application of fibrin glue appeared to successfully stop the CSF leak for the duration required until operative repair could be performed. This temporization method may decrease the risk for meningitis when definitive repair is delayed. It may also have application in the early postoperative period as an adjunct to lumbar drainage for management of postoperative CSF leak.

Conclusion: Fibrin glue may be considered to temporize ventral skull base CSF leaks in situations where urgent operative repair is not feasible.

Poster #A119
Validating nasal spray dynamics via computational fluid simulations: A novel technique
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Background:
Computational Fluid Dynamics (CFD) simulations have been utilized to analyze nasal airflow dynamics and predict nasal spray distribution patterns, yet validation of these simulations remains challenging. We present a novel experimental technique developed to physically validate nasal spray distribution characteristics predicted by CFD simulations. Using fresh cadaver heads, outfracture of the inferior turbinates (IT) was performed. CT scans of the heads were performed pre/post-procedure. Subsequent CFD modeling was performed on the CT scans to predict airflow patterns and spray distributions within the modified nasal airway. CFD results demonstrate significant improvements in drug deposition after outfracture of the IT.

Methods:
To validate these computational predictions, nasal cavity models were fabricated from 3D printed materials (PETG and PLA). Due to the inherent hydrophobicity causing spray coalescence, surface modifications were explored to improve spray visibility within the model. Techniques including alkali etching with sodium hydroxide and oxygen plasma treatments were utilized to increase surface roughness, introduce functional groups, and enhance hydrophilicity. Alternative hydrophilic polymer coatings were also investigated to mimic nasal mucosal surface properties.

Results:
This novel validation model bridges the gap between CFD simulation predictions and real-world nasal spray distributions, providing a versatile tool to enhance the accuracy of simulation-driven nasal drug delivery research. Ongoing experimentation continues to refine this approach, with promising potential to inform better therapeutic outcomes through improved nasal spray delivery techniques.

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- Women in Rhinology, Mentorship, Residents & Fellows, and Diversity Programs
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