12th Annual Otolaryngology Literature Update
Pediatric Otolaryngology II

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Clarice S. Clemmens, M.D. joined the Department of Otolaryngology &- Head and Neck Surgery and MUSC Children's Hospital in 2015. Prior to joining MUSC, Dr. Clemmens completed a fellowship in pediatric otolaryngology at the Children's Hospital of Philadelphia. Dr. Clemmens grew up in Idaho, and graduated summa cum laude from Clemson University where she played varsity soccer.

In 2009, she graduated from medical school at the Medical University of South Carolina, and then completed a residency in otolaryngology at the University of Pennsylvania. Dr. Clemmens received her board certification from the American Board of Otolaryngology in 2015. Since completing her fellowship, Dr. Clemmens limited her clinical practice to the care of children.

As a mother of three children, Dr. Clemmens has developed a special appreciation for the care of children, and she has dedicated her practice to pediatric patients with all types of ear, nose, and throat problems, with a particular emphasis on neonatal airway disorders and thyroid disorders. She has authored multiple papers and book chapters and has given presentations at both the regional and national levels.

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Hazkani I, Siong TC, Hill R, Dautel J, Patel MD, Vaughn W, Patzer R, Raol N. The safety of respiratory positive pressure support immediately following pediatric tonsillectomy. Int J Pediatr Otorhinolaryngol. 2023 Apr;167:111487. doi: 10.1016/j.ijporl.2023.111487. Epub 2023 Feb 16. PMID: 36857847.

Hazkani I, Stein E, Ching Siong T, Hill R, Dautel J, Patel MD, Vaughn W, Cordray H, Patel E, Clark A, Raol N, Evans S. Incidence and Risk Factors Associated with Respiratory Compromise in Planned PICU Admissions Following Tonsillectomy. Ann Otol Rhinol Laryngol. 2023 Jul;132(7):777-782. doi: 10.1177/00034894221115754. Epub 2022 Aug 18. PMID: 35983621.

Schwartz TR, Adams MD, Wertz A. Systemic corticosteroids for orbital complications of pediatric rhinosinusitis: A systematic review. Int J Pediatr Otorhinolaryngol. 2023 Apr;167:111336. doi: 10.1016/j.ijporl.2022.111336. Epub 2022 Oct 7. PMID: 36868145.

Yan F, Levy DA, Wen CC, Melvin CL, Ford ME, Nietert PJ, Pecha PP. Rural Barriers to Surgical Care for Children With Sleep-Disordered Breathing. Otolaryngol Head Neck Surg. 2022 Jun;166(6):1127-1133. doi: 10.1177/0194599821993383. Epub 2021 Mar 2. PMID: 33648386; PMCID: PMC9531184.

Literature Course 2023

Clarice S. Clemmens, MD
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Literature

Original Article

Incidence and Risk Factors Associated with Respiratory Compromise in Planned PICU Admissions Following Tonsillectomy

Annals of Otology, Rhinology & Laryngology
2023, Vol. 132(7) 777–782

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Inbal Hazkani, MD[1,2], Eli Stein, BS[2], Tey Ching Siong, BSc[3], Robert Hill, MD[3], Jacob Dautel, BSc[4], Mital D. Patel, MD[4], William Vaughn, MD[4], Holly Cordray, BS[5,6], Eshan Patel, BS[6,7], Addison Clark[8], Nikhila Raol, MD, MPH[5,6], and Sean Evans, MD[5,6]

Introduction

- 500,000+ tonsillectomies performed annually in US
- AAO-HNS with defined criteria for admission
  - Age < 3 yo
  - AHI > 10, nadir < 80%
  - Medical co-morbidities
- Patients with OSA at higher risk for respiratory complications following tonsillectomy
  - May require conservative measures vs higher level of care
- Criteria for PICU admission lacking
  - Suggested AHI >30, complex medical history, age < 2, intraoperative respiratory complications, desaturations in postoperative recovery

Methods

- Retrospective review
- All planned post-op PICU admissions between 2015 – 2020
- Primary outcome analyzing all respiratory oompromise requiring ICU care
  - New onset need for BiPAP or CPAP
  - Re-intubation

Results

- N = 772
- Mean age 6.1 years
- 40.2% female
- Mean AHI 29/hour
- Mean nadir 77.1%
- 31% obese
- 31% hypotonia

Table 1. Baseline Patient Characteristics by Respiratory Complications.

	Complications (n = 29)	No complications (n = 743)	*P*-value
Sex			
Female, n (%)	12 (41)	299 (40)	.90
Male, n (%)	17 (59)	444 (60)	
Age in years, mean (SD)	6.36 (5.51)	6.05 (4.59)	.84
Ethnicity			
Hispanic n (%)	2 (6.9)	94 (13)	.64
Non-Hispanic n (%)	27 (93)	671 (87)	
Not sure n (%)	0 (0)	5 (.7)	
Race			
White n (%)	8 (28)	273 (37)	.61
Black n (%)	18 (62)	393 (53)	
Asian n (%)	1 (3.4)	18 (2.4)	
Multiracial n (%)	1 (3.4)	12 (1.6)	
Unknown n (%)	1 (3.4)	39 (5.2)	
Comorbidities			
Hypotonia n (%)	13 (45)	227 (31)	.049* (Any comorbidity)
Genetic/ syndrome disorders n (%)	5 (17.2)	66 (8.9)	
Respiratory disease	10 (34.5)	221 (29.7)	
Congenital cardiac disease	3 (10.3)	49 (6.6)	
Seizure disorder	3 (10.3)	47 (6.3)	
Obesity (>95th percentile) n (%)	11 (38)	198 (27)	.2
Feeding route			
Full PO n (%)	16 (59)	613 (86)	<.001*
Enteric feeds w/wo PO n (%)	11 (41)	95 (13)	
NPPV pre OP			
CPAP n (%)	1 (3.4)	71 (9.6)	.53
Polysomnography	25 (86)	638 (86)	>.99
Apnea Hypopnea Index (events/hour) Mean (SD)	39.4 (35.5)	28.5 (26.0)	.168
Pts with severe OSA (AHI > 10) n (%)	19 (65.5)	498 (67.0)	.84
Pts with very severe OSA (AHI > 30) n (%)	12 (41.1)	212 (28.5)	.15
Oxygen nadir Mean (SD) (%)	69.5 (16.9)	77.4 (11.2)	.014*

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Results

- 29 patients (3.7%) developed respiratory compromise requiring new ICU-level support
  - 25 (3.2%) required CPAP/BiPAP
  - 9 (1.2%) required re-intubation
  - 5 (17.2%) did not have a diagnosis of severe OSA
    - 4 without sleep study, 1 with mild OSA
  - Diagnosis: 2 genetic, 5 hypotonia, 1 respiratory disease
- No significant difference in this group and group with severe OSA in demographics, BMI, enteral feeding, hypotonia, comorbidities, or PICU admission length

Results

Table 3. Post-Operative Complications During PICU Admission.

Covariable	OR	*P* value	95% CI
Tube feeding	6.3	.001	2.36, 52.6
Surgical technique—Extracapsular	2.03	.34	0.54, 10.6
AHI	1.2	.28	0.81, 1.79
Oxygen nadir	0.97	.04	0.94, 0.99
Comorbidity hypotonia	1.54	.48	0.41, 4.88
Comorbidity obesity	2.04	.14	0.77, 5.28
Pre-operative PPV	1.2	.8	0.24, 4.31

Results

- Reintubations (9/29)
  - Mean age 6.6 yars
  - 6 hypotonia, 2 genetic, 6 respiratory disease, 2 congenital heart disease
  - 5 enteral feeding dependence
  - 5 AHI > 30./hour, 6 nadir < 80%
  - No difference in mean AHI, nadir, or “very severe” OSA vs those not requiring reintubation

Discussion

- Rate of respiratory compromise following tonsillectomy ranges in literature, up to 27%
  - Increased risk with severe OSA, comorbidities, age < 3, craniofacial abnormalities, and extremes of weight
- Guidelines for ICU admission remain limited
- This study suggests that lower pre-operative oxygen nadir and need for enteral feeds increase the risk for respiratory compromise following tonsillectomy.
- This study found no difference in pulmonary compromise based on age, BMI, or AHI severity

Contents lists available at ScienceDirect

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The safety of respiratory positive pressure support immediately following pediatric tonsillectomy☆

Inbal Hazkani [a,b], Tey Ching Siong [c], Robert Hill [d], Jacob Dautel [e], Mital D. Patel [f], William Vaughn [f], Rachel Patzer [g], Nikhila Raol [h,i,*]

Introduction

- Building on the previous article, post-operative tonsillectomy recovery may be complicated by respiratory symptoms ranging from mild swelling to respiratory distress
- Positive pressure respiratory support (PPS) may be necessary
  - Bilevel positive airway pressure (BiPAP)
  - Continuous positive airway pressure (CPAP)
  - High-flow nasal cannula (HFNC)
- Data regarding safety of PPS immediately post op is lacking
  - Theoretical concern for high-pressure air flow dissection of fascial plane of oropharyngeal fascial planes into neck and chest
  - May also dehydrate tissue, increasing pain, delayed wound healing, increased bleeding

Methods

- Retrospective review of patients admitted to PICU following tonsillectomy from 2015 - 2020
- Reviewed use of PPS prior to admission (baseline) and during admission immediately following surgery
- Primary outcome: life threatening complications following surgery
  - Pneumothorax or pneumomediastinum
  - Reintubation
  - Post-tonsillectomy bleeding requiring intervention
  - Pulmonary edema
  - death

Results

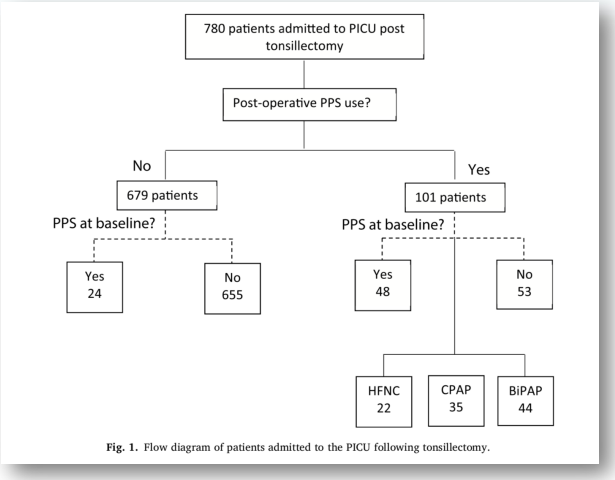


Fig. 1. Flow diagram of patients admitted to the PICU following tonsillectomy.

Results

	PPS (n = 101)	Non-PPS (n=679)
Age	7.4 years	5.92 years
Comorbidities	55% DD, CP, or T21	39.5% DD, CP, or T21
Obesity	38.6%	25.4%
AHI	38.1 events/hour	27.7 events/hour
Nadir	70.8%	78.1%

Results

- Life Threatening Complications (30 patients)
  - 30% < 3 years old
  - 50% black
  - 26.7% obese
  - 53.3% DD, CP, or T21
  - 40% enteral nutrition
  - 70% severe OSA
- Complications during PICU admission (18 patients)
  - 1 pneumothorax and pneumomediastinum
  - 3 pulmonary edema
  - 1 death
  - 7 reintubations
  - 1 bleed not requiring intervention
- Multivariable logistic regression analysis
  - PPS associated with higher odds of complications compared to those without PPS (OR 9.5, 95% CI 3.25 – 27.8)
  - BMI, surgical technique also associated

Discussion

- Low complication rate (4%0
  - 1% PTX following PPS
- BMI, Surgical technique, PPS all associated with increased risk for life threatening complications
- New onset PPS use associated with increased risk of life threatening complications
  - Patients using baseline PPS and requiring post op not associated with increased risk
  - Association likely not causal
- Bleeding and dehydration rates with no difference between groups
- PPS generally safe and does not appear to be independently associated with increased odds of life threatening complications

Original Research—Pediatric Otolaryngology

AMERICAN ACADEMY OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY FOUNDATION

High-Dose Celecoxib for Pain After Pediatric Tonsillectomy: A Randomized Controlled Trial

Otolaryngology–Head and Neck Surgery
2023, Vol. 168(2) 218–226

DOI:10.1177/01945998221091695
http://otojournal.org
WILEY

Teresa Giordano, DNP[1], Alexandra Durkin[1], Andrea Simi[1], Megan Shannon, MD[1], Julia Dailey[1], Hannah Facey, MD[1], Lance Ballester, MS[2], Ralph F. Wetmore, MD[1,3], and John A. Germiller, MD, PhD[1,3]

Introduction

- Post-operative pain following tonsillectomy is substantial
  - Regimens include:
    - Acetaminophen
    - Ibuprofen
    - Narcotics
- Significant bleeding risk following tonsillectomy
  - Rates between 1 – 10%
- Use of NSAIDs previously controversial due to concerns about possible increased bleeding
  - Large systematic reviews did not find increased risk
  - Recent trials and a meta-analysis continue to raise concerns
- Celecoxib
  - NSAID
  - Selective inhibitor of cyclooxygenase 2 (COX2)
  - Does not inhibit platelet function
  - Has been found to shorten recovery and reduce rates of hemorrhage in adult tonsillectomy
  - Standard dosing studied in one pediatric trial
  - This trial evaluates the efficacy and safety of higher dose Celecoxib, 6 mg/kg BID

Methods

- Double-blind, randomized, placebo-controlled trial at a single pediatric tertiary center (CHOP)
- Children age 3– 11 years
- 2016 – 2018
- Exclusion:
  - Coagulation disorders
  - Severe asthma
  - Sleep apnea requiring positive airway pressure
  - Sulfonamide allergy
  - Concomitant procedures other than tympanostomy tubes

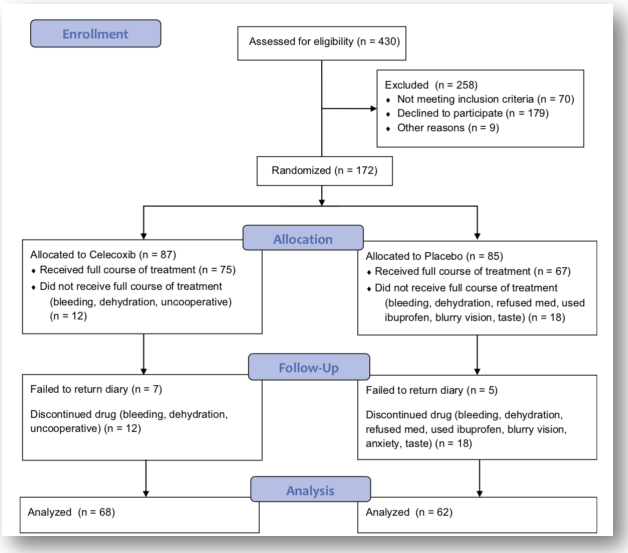
Protocol

- Celecoxib (20 mg/mL) and placebo suspensions prepared
- Subjects received a loading dose of Celecoxib (6 mg/kg) or placebo 1 hour before surgery
- Celecoxib vs placebo given at 8 PM following surgery and then every 12 hours for up to 10 days
  - Could stop prior to 10 days if no pain and Tylenol or oxycodone not needed for 24 hours
- Instructed to give Tylenol 10 mg/kg/dose every 4 hours for 5 days and then continue as needed.
- Instructed to give Oxycodone 0.075 mg/kg/dose every 4 hours as needed for breakthrough pain
- Study diary for 14 days completed by caregiver, study nurse contacted families on POD 3, 14, and 30

Methods

- Primary outcome: consumption of oxycodone during 14 day period
- Secondary outcomes: acetaminophen consumption, average pain scores, day of last oxycodone, and day when subject resumed normal diet and activity

Results



Results

- Pain scores did not differ significantly between groups
- Oxycodone consumption showed high variance
- Celecoxib group consumed 36% less oxycodone, but not statistically significant
- Celecoxib consumed less Tylenol and returned to normal activity 1.5 days earlier (both significant)
- No difference in adverse events

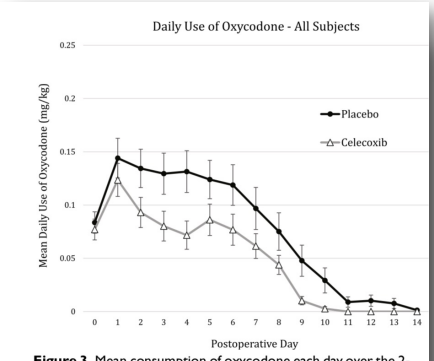


Figure 3. Mean consumption of oxycodone each day over the 2-week recovery period, normalized by body weight, for the entire study cohort (N = 130). Error bars represent SEM.

Results

- Subgroup analysis of "Prolonged pain" group
  - Required 9-10 days of pain medication
- 52% decrease in oxycodone use – statistically significant

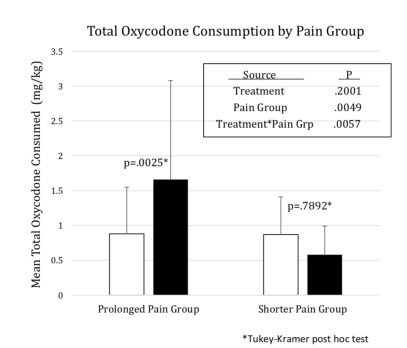


Figure 6. Oxycodone consumption by treatment and pain group in all 111 who consumed oxycodone. Error bars represent SD. *P* values show the effect of treatment group, pain group, and their interaction.

Discussion

- Celecoxib decreased oxycodone use on multivariate analysis, particularly in the subset of patients with prolonged pain
- High dose celecoxib more effective than standard dosing (previously studied)

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Original Research—Access

AMERICAN ACADEMY OF OTOLARYNGOLOGY-HEAD AND NECK SURGERY FOUNDATION

Otolaryngology–Head and Neck Surgery
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http://otojournal.org
SAGE

Rural Barriers to Surgical Care for Children With Sleep-Disordered Breathing

Flora Yan[1], Dylan A. Levy, MD[1], Chun-Che Wen, MS[2], Cathy L. Melvin, PhD, MPH[2], Marvella E. Ford, PhD[2], Paul J. Nietert, PhD[2], and Phayvanh P. Pecha, MD[1]

Introduction

- Obstructive sleep disordered breathing (SDB)
  - Prevalent condition in children
  - Spectrum of disorders
    - Primary snoring → obstructive sleep apnea (OSA)
- Associated with daytime sleepiness, cognitive deficits, behavioral problems, poor academic performance
- First line-treatment for SDB and OSA = tonsillectomy and adenoidectomy (T&A)
- Children with limited resources and African American children are at higher risk for SDB
  - Growing evidence that these groups do not attain equitable rates of surgery
- Poverty associated with greater distances to pediatric subspecialty care
  - Lack of geographic access the health care among underserved populations is virtually unexplored in pediatric SDB

Methods

- Retrospective chart review from 2016 – 2018
- Included children who did not require sleep study per guidelines prior to T&A
- Followed for 12 months after recommendation for T&A
- Geographic distance from home to institution determined by Google Maps
- Rural—urban status evaluated by zip code

Results

- N = 213 children
- Rural patients less likely to have private insurance
- 91% African American children insured by Medicaid
  - 73% other
  - 26% white
- Rural patients with longer drive to hospital (74.8 vs. 16.8 miles)

Characteristic	Value
Male	55%
Age	6 years +/- 2.9 years
Non-Hispanic white	57%
Non-Hispanic black	27%
Other race	16%
Medicaid	50%
Private Insurance	40%

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Results

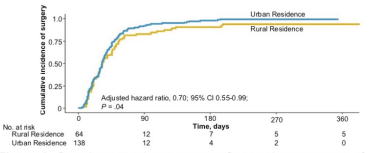

Figure 1. Cumulative incidence curves reflecting the proportion of patients who underwent tonsillectomy, stratified by rural vs urban residency. The hazard ratio reported adjusted for age, sex, insurance status, and race.

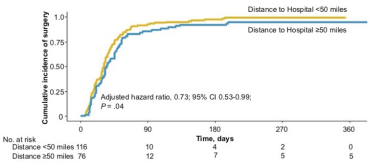

Figure 2. Cumulative incidence curves reflecting the proportion of patients who underwent tonsillectomy, stratified by distance from the patient's residence to the hospital. The hazard ratio reported adjusted for age, sex, insurance status, and race.

- Urban patients tend to receive surgery more quickly than rural
- Patients < 50 miles from a hospital receive surgery more quickly
- Example at 90 days postsurgical rec:
  - 92% urban and 92% living < 50 miles had surgery
  - 83% rural and 85% > 50 miles had surgery
- Rural patients with 30% lower rate of surgery over time

Discussion

- This study raises concern for equitable and timely surgical access for rural children compared to urban peers
- Demographic differences exist between rural and urban dwellers
  - Rural areas more likely to be insured by Medicaid
  - 58-mile median driving distance to hospital
- Geographic barriers may play an important role in access to surgical treatment for SDB independent of race or insurance type

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Systemic corticosteroids for orbital complications of pediatric rhinosinusitis: A systematic review

Tyler R. Schwartz [a,*], Matthew D. Adams [b], Aileen Wertz [a]

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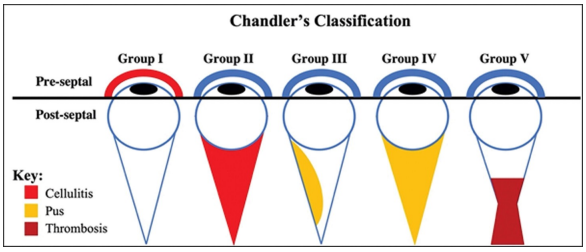
[b] Department of Otolaryngology, SUNY Downstate Health Sciences University, Brooklyn, NY, USA

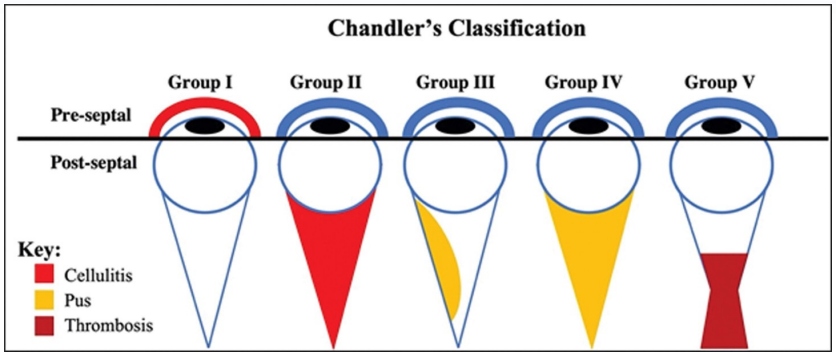
Introduction

- Estimated 9% of all antibiotics in children are for acute bacterial rhinosinusitis (ABRS)
- 5% ABRS complication rate
  - 74 – 85% orbital complications
  - ABRS is etiology of periorbital and orbital cellulits in 86 – 98% of cases



https://www.eyenews.uk.com/education/trainees/post/orbital-cellulitis-an-overview-of-the-diagnosis-and-management

Introduction



Antibiotics | Antibiotics vs Surgery | Surgery

Introduction

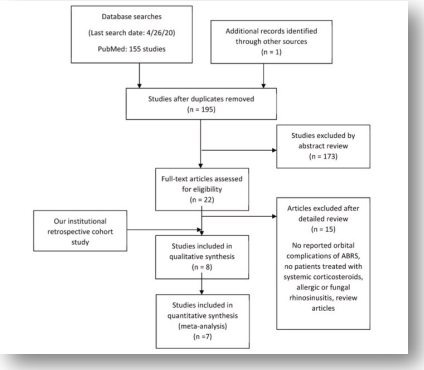
- Adjuvant treatments
  - Oxymetazoline
  - Intranasal corticosteroids
  - Systemic steroids
- No consensus statement regarding oral or IV steroids for ABRS or complications in children

Methods

- Systematic review and meta-analysis
  - Patient problem: pediatric patients with orbital complications of ABRS
  - Intervention: systemic corticosteroids used as adjunct treatment
  - Comparison: patients treated without systemic corticosteroids
  - Outcomes: hospital length of stay, need for surgery intervention, complications related to corticosteroids

Results

- 7 studies, 2005 – 2019
- 477 individuals
  - 144 with corticosteroids
  - 333 without corticosteroids



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Results

- Length of stay
  - Shorter with corticosteroids
- Need for surgical intervention
  - No difference between groups
- Presence of subperiosteal abscess
  - No difference between groups
- Adverse events
  - No difference between groups

Discussion

- This study adds to previous evidence that corticosteroids are associated with a decreased length of stay for children with orbital complications of ABRS
- Non-significant associated risk of immunosuppression or rebound symptoms
- Prospective RCT is needed to more clearly define role of corticosteroids in the treatment of complicated pediatric ABRS


Thank you!