12th Annual Otolaryngology Literature Update
Pediatric Otolaryngolgy IV

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Dr. White's practice focuses entirely on the care of children with ear, nose, and throat problems. He has authored over 100 articles and chapters in medical journals and textbooks and has won multiple research awards at national otolaryngology meetings. Dr. White has particular expertise in the treatment of children with ear/hearing problems, speech and swallowing disorders, and airway problems.

Dr. White is a member of the airway and aspiration center for children, craniofacial anomalies and cleft palate center, the velopharyngeal insufficiency and speech team, the cochlear implant center, and the vascular anomalies program at the Medical University of South Carolina.

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Cartabuke R, Tobias JD, Jatana KR; SECTION ON ANESTHESIOLOGY AND PAIN MEDICINE, SECTION ON OTOLARYNGOLOGY–HEAD AND NECK SURGERY. Topical Nasal Decongestant Oxymetazoline: Safety Considerations for Perioperative Pediatric Use. Pediatrics. 2021 Nov 1;148(5):e2021054271. doi: 10.1542/peds.2021-054271. Epub 2021 Oct 4. PMID: 34607935.

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Sim ES, Belsky MA, Konanur A, Yan A, Shaffer AD, Williams K, Martsolf GR, Chi DH, Jabbour N. Adherence to Tympanostomy Tube Clinical Practice Guidelines in an Advanced Practice Provider Clinic. Ann Otol Rhinol Laryngol. 2022 Nov 22:34894221135282. doi: 10.1177/00034894221135282. Epub ahead of print. PMID: 36412134.

Stanisce L, Ahmad N, Solomon DH, Kolia N, Garcia LD, Spalla TC, Gaughan JP, Koshkareva Y. Improving Outpatient Follow-Up Rates for New In-Hospital Consults. Laryngoscope. 2022 Dec 13. doi: 10.1002/lary.30519. Epub ahead of print. PMID: 36511340.

Pediatric Otolaryngology Literature Review

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The Topics

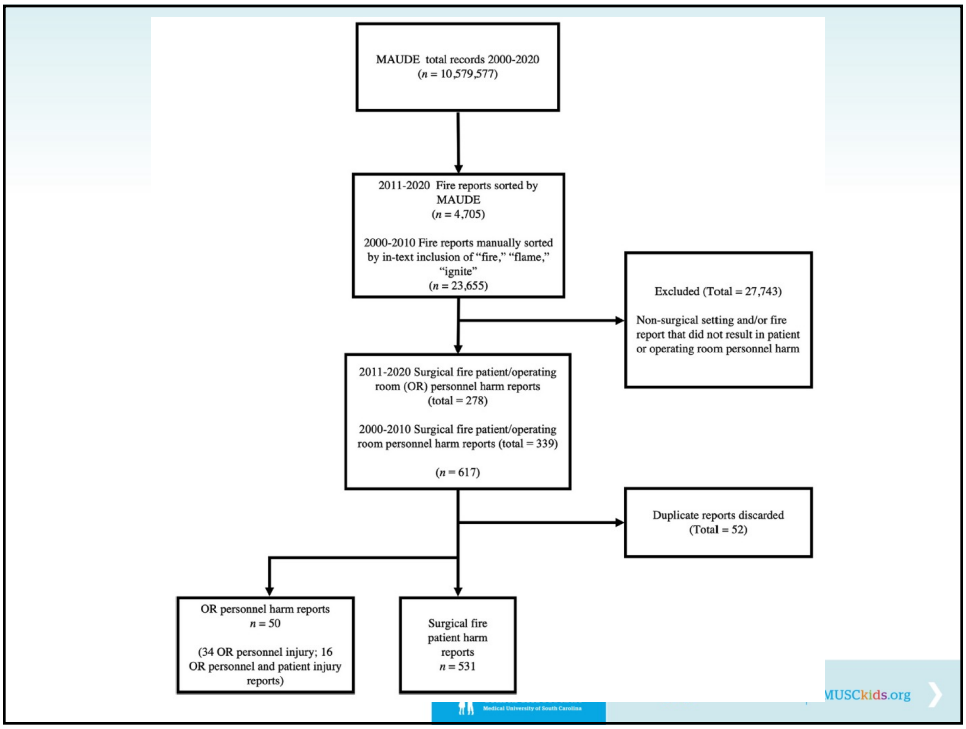
- Surgical fire in the US
- Oxymetazoline safety in children
- In-hospital consult follow-up
- APP guideline adherence
- Primary medical therapy for lymphatic malformations

Surgical Fire in the United States: 2000–2020

Jordan S. Grauer, MD[a], Lulia A. Kana, MD, MS[a], Suma J. Alzouhayli, BA[b], Soham Roy, MD[c], John D. Cramer, MD[a,*]

Surgery. 2022 Nov PMID: 36372572

- Objective:
  - To characterize the settings in which surgical fires occur, and to explore the causes of these fires
- Database analysis, 2000-2020.
  - Identified surgical fires reported to the Food and Drug Administration's Manufacturer and User Facility Device Experience database between 2000 and 2020.
  - Quantitative and descriptive content analyses were performed on free-text responses to identify contributing factors of surgical fire patient and personnel harm events.



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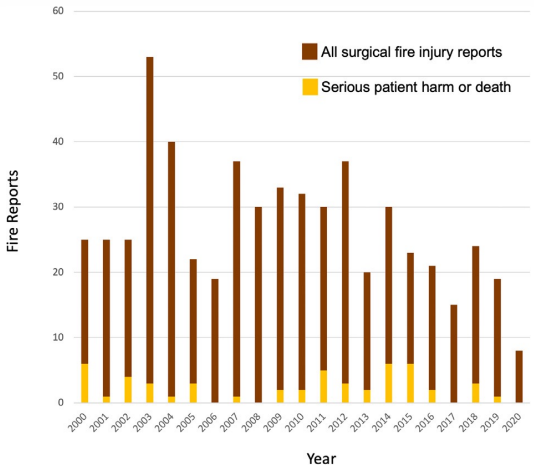

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Table I
Patient harm associated with surgical fire events

	Patient harm			
	All patient events (total = 531) *n* (%)	Patient injury requiring intervention (total = 427) *n* (%)	Patient life-threatening injury (total = 34) *n* (%)	Patient death (total = 17) *n* (%)
Procedure location				
Upper aerodigestive tract	116 (22)	90 (21)	14 (41)	8 (47)
Head and neck	149 (28)	129 (30)	7 (21)	1 (6)
Chest	41 (8)	29 (7)	6 (18)	5 (29)
Abdomen/pelvis	70 (13)	55 (13)	2 (6)	2 (12)
Extremities	26 (5)	25 (6)		
Unreported	129 (24)	99 (23)	5 (15)	1 (6)
Injury location				
Upper aerodigestive tract	92 (17)	66 (15)	15 (44)	6 (35)
Head and neck	220 (41)	191 (45)	11 (32)	3 (18)
Chest	44 (8)	33 (8)	4 (12)	5 (29)
Abdomen/pelvis	63 (12)	51 (12)	2 (6)	2 (12)
Extremities	46 (9)	43 (10)		
Unreported	66 (12)	43 (10)	2 (6)	1(6)

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Fuel source				
Alcohol-based	107 (20)	96 (22)	5 (15)	2 (12)
Drape/dressing	108 (20)	98 (23)	3 (9)	1 (6)
Endotracheal tube/ Mask/tubing	62 (12)	43 (10)	12 (35)	5 (29)
Unreported	254 (48)	190 (44)	14 (41)	9 (53)
Ignition source				
Electrosurgical device	437 (82)	365 (85)	19 (56)	12 (71)
Laser	32 (6)	18 (4)	9 (26)	3 (18)
Fiberoptic light source	6 (1)	4 (1)		
Defibrillator	4 (1)	4 (1)		
Unreported	52 (10)	36 (8)	6 (18)	2 (12)

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Surgery. 2022 Nov PMID: 36372572

Table II
Surgery location from our study compared with HCUP Surgeries in Hospital-Based Ambulatory Surgery and Hospital Inpatient Settings, 2014 report Statistical Brief #223.

	HCUP total *n* (%)	MAUDE total *n* (%)	Unadjusted OR	95% CI
	21,775,000 (100)	565 (100)		
Procedure location				
Head and neck	2,347,700 (11)	152 (27)	5.47	4.14–7.22
Upper aerodigestive tract	624,400 (3)	118 (21)	15.96	11.93–21.34
Chest	1,807,000 (8)	44 (8)	2.06	1.42–2.99
Abdomen and pelvis	6,247,900 (29)	74 (13)	1	
Extremities	6,583,800 (30)	28 (5)	0.36	0.23–0.55
All others	4,164,200 (19)	149 (26)	3.02	2.29–3.99

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Surgery. 2022 Nov PMID: 36372572

Discussion

- Upper aerodigestive and head and neck are the most common locations for surgical fires.
- Upper aerodigestive location associated with highest risk of life-threatening injuries and patient death.
- Electrosurgical devices are the most common ignition source (82%).
  - 56% of life threatening injuries
  - 71% of deaths

Surgical Fire in the United States: 2000–2020

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Surgery. 2022 Nov PMID: 36372572

- Fire triad
  - Oxygen, ignition source, fuel
  - <30% oxygen, suction in airway
- Intervention
  - Disconnect airway circuit, remove ETT
  - Flood airway with saline
  - Remove all burning/burned material
  - Resuscitate

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Topical Nasal Decongestant Oxymetazoline: Safety Considerations for Perioperative Pediatric Use

Richard Cartabuke, MD, FAAP,[a] Joseph D. Tobias, MD, FAAP,[b] Kris R. Jatana, MD, FAAP[c]
SECTION ON ANESTHESIOLOGY AND PAIN MEDICINE, SECTION ON OTOLARYNGOLOGY–HEAD AND NECK SURGERY

Pediatrics. 2021 Nov PMID: 34607935

- Background
  - To date, there are limited objective pediatric data on the safety and specific dosing of topical oxymetazoline (eg, Afrin).
  - An excessive unmonitored volume of nasal use could lead to serious adverse effects in children.
  - Ingested oxymetazoline can activate central adrenergic receptors and lead to life-threatening cardiovascular instability, respiratory depression, and sedation.
  - Several case reports exist with postoperative prolonged hypertension and tachycardia requiring prolonged anesthesia and IV beta blockers in young children.
- Objective
  - Multidisciplinary review of available data regarding oxymetazoline use in children.

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Pediatrics. 2021 Nov PMID: 34607935

- Key points
  - Oxymetazoline is FDA approved for use in children aged 6 years and older.
  - Off-label use in otolaryngologic surgery is common.
  - Alpha-adrenergic agonist with greater activity at the a2 versus a1 adrenergic receptor, results in vasoconstriction.
  - Two studies have demonstrated less effect on BP and HR compared to phenylephrine, epinephrine and cocaine.

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Pediatrics. 2021 Nov PMID: 34607935

- Key points
  - No recommended dosage/toxicity guidelines.
  - Oxymetazoline is rapidly absorbed across mucus membranes,
  - Plasma half-life of oxymetazoline was reported to vary from 1.72 to 2.32 hours in adults.
  - 75-fold increase in dosage of spray when bottle inverted.
  - Lower serum levels noted when applied on pledgets rather than spray method.

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Pediatrics. 2021 Nov PMID: 34607935

- Recommendations
  - Awareness of toxicity and variable dosing with bottle inversion.
  - Monitor total volume administered.
  - Communication between surgical and anesthesia teams regarding application (similar to epi use).
  - Consider use of pledgets.
  - Remove excess medication from pharynx.

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Adherence to Tympanostomy Tube Clinical Practice Guidelines in an Advanced Practice Provider Clinic

Annals of Otology, Rhinology & Laryngology
2023, Vol. 132(9) 1110–1116

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Edward S. Sim, MD[1], Michael A. Belsky, MD, MS[1], Anisha Konanur, MD[1], Annie Yan, MD, MS[1], Amber D. Shaffer, PhD[2], Kathryn Williams, CRNP[3], Grant R. Martsolf, PhD, MPH, NP, FAAN[3], David H. Chi, MD[2], and Noel Jabbour, MD, MS[2]

Ann Otol Rhinol Laryngol. 2022 Nov 22. PMID: 36412134

- Objective
  - Compared adherence rates by attending otolaryngologists and APPs to the 2013 American AAO-HNS clinical practice guideline for children with recurrent acute otitis media undergoing bilateral myringotomy and tympanostomy tube placement.
- Methods
  - Cross-sectional study
  - Reviewed EMR for patients 6 months-12 years who underwent BMT from 6/1/2017 to 5/31/2018 at the Children's Hospital of Pittsburgh of the University of Pittsburgh Medical Center
  - Pre-operative visit with either an APP or fellowship-trained pediatric OTO with RAOM listed as the only indication for surgery

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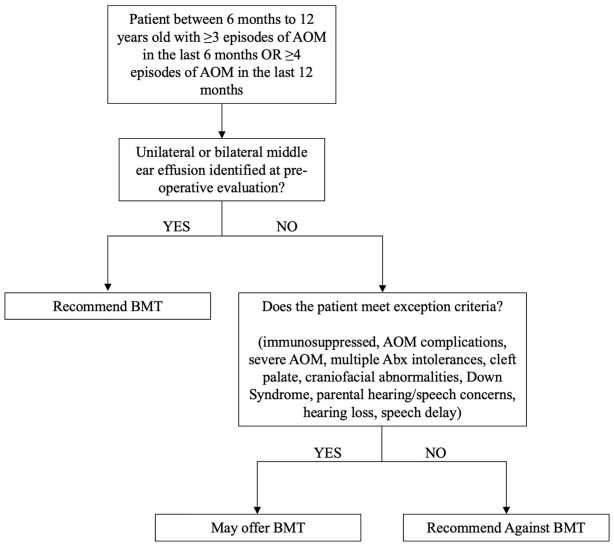

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Table 1. Patient Demographics.

	Total ($n=923$)	APP ($n=322$)	OTO ($n=601$)	*P*
Age at pre-op, years, median (IQR)	1.4 (1.0-2.2)	1.3 (1.0-1.8)	1.4 (1.1-2.3)	.016
Birth Sex, count (%)				.625
Male	532 (58)	182 (57)	350 (58)	
Female	391 (42)	140 (43)	251 (42)	
Race, count (%)				.628
White	814 (88)	286 (89)	528 (88)	
Black/African American	42 (5)	13 (4)	29 (5)	
Asian	11 (1)	3 (1)	8 (1)	
Native American/Alaskan Native	1 (0)	0 (0)	1 (0)	
More than one race	13 (1)	7 (2)	6 (1)	
Unknown/Not Reported/Declined	42 (5)	13 (4)	29 (5)	
Ethnicity, count (%)				.283
Non-Hispanic	829 (90)	292 (91)	537 (89)	
Hispanic	7 (1)	4 (1)	3 (1)	
Unknown/Not Reported/Declined	87 (9)	26 (8)	61 (10)	
Insurance type, count (%)				.234
Any private insurance	634 (69)	213 (66)	421 (70)	
Public insurance only	289 (31)	109 (34)	180 (30)	

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Ann Otol Rhinol Laryngol. 2022 Nov 22. PMID: 36412134

Table 2. Adherence Rates to CPG for Patients With RAOM.

	APP ($n=322$)	OTO ($n=601$)	*P* value
Effusion present at preoperative evaluation	270 (84%)	457 (76%)	.005
No effusion at preoperative evaluation but met exception criteria	26 (8%)	68 (11%)	.138
Met either criterion	296 (92%)	525 (87%)	.037

Note. Bonferroni correction critical value, $P=.017$.

Table 3. Univariate Logistic Regression Analysis of Agreement of Pre-operative and Intra-operative Middle Ear Effusion Determination by Pre-operative Provider Type.

	Pre-operative provider type			
	APP	OTO	*P* value	Odds ratio (95% CI)
Agreement on MEE identification	145 (45%)	285 (47%)	.488	1.101 (0.839-1.445)

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Ann Otol Rhinol Laryngol. 2022 Nov 22. PMID: 36412134

- Conclusions
  - Retrospective single-institution study
  - Independent APPs and attending OTOs similarly deliver effective evidence-based care for children with RAOM in accordance with the 2013 CPG recommendations.
  - Supports the positive utility of incorporating APPs into practice models for treating prevalent conditions such as RAOM.
  - Algorithmic design lends to APP management.

Improving Outpatient Follow-Up Rates for New In-Hospital Consults

Luke Stanisce, MD; Nadir Ahmad, MD; Donald H. Solomon, MD; Nadeem Kolia, MD; Lucia D. Garcia, MD; Thomas C. Spalla, MD; John P. Gaughan, MS, PhD, MBA; Yekaterina Koshkareva, MD

Laryngoscope. 2022 Dec 13. PMID: 36511340

- Objectives
  - To define the rate of outpatient follow-up after in-hospital consultation.
  - To identify factors associated with establishing care
  - To evaluate an alternative scheduling process to improve outpatient adherence.
- Methods
  - Two-phase, prospective study at an academic, tertiary-care institution from March 2020 to August 2022.
  - First, all patients not previously known seen via inpatient consult who warranted outpatient follow-up were prospectively identified.
  - Logistic regression analysis was used to identify demographic, disease, and practice factors predictive of follow-up.
  - Second, a randomized control trial was performed to validate the effects of pre-assigning appointments prior to discharge.

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TABLE I.
Phase-One Follow-Up Outcomes.

Outcome	Incidence (%)
Sample size	500
Lost to follow-up	272 (54.4)
Followed up	228 (45.6)
Appointment scheduled	301 (60.2)
Cancelled*	48 (15.9)
No-show*	42 (14.0)
Rescheduled*	38 (12.6)
Days to appointment, median	21

*Frequencies adjusted for appointments scheduled.

TABLE II.
Phase-One Cohort Demographic Factors.

Variable	Incidence (%)	Follow-Up Rate (%)	*p* Value
Gender			0.078
Male	268 (53.6)	49.3	
Female	232 (46.4)	41.4	
Age, median	49	-	0.304
<17	76 (15.2)	55.3	0.310
18–40	127 (25.4)	43.3	
40–61	138 (27.6)	42.8	
>61	159 (31.8)	45.3	
English primary language	447 (89.4)	45.2	0.593
Race			0.386
Caucasian	256 (51.2)	45.3	
African American	136 (27.2)	41.9	
Hispanic	97 (19.4)	52.6	
Other	11 (2.2)	54.5	
Insurance			0.483
Government	294 (58.8)	45.6	
Commercial/private	180 (36.0)	47.2	
Uninsured	26 (5.2)	34.6	
Distance, miles			0.105
<25	311 (62.2)	42.4	
25–50	95 (19.0)	54.7	
>50	94 (18.8)	46.8	

The *p* value denotes level of significance for univariable comparison between patients who followed up and did not.

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TABLE III.
Phase-One Cohort Disease and Hospital Factors.

Variable	Incidence (%)	Follow-Up Rate (%)	*p* Value
Acute infection	116 (23.2)	47.4	0.671
Primary reason for hospitalization	280 (56.0)	57.9	<0.001
Transfer for ENT	122 (24.4)	53.3	0.050
Subspecialty			<0.001
General	162 (32.4)	45.1	
Head & Neck Oncology	86 (17.2)	67.4	
Rhinology	38 (7.6)	44.7	
Laryngology	66 (13.2)	36.4	
Pediatrics	32 (6.4)	62.5	
Otology	45 (9.0)	24.4	
Trauma/FPRS	71 (14.2)	35.2	
Intervention performed	139 (27.8)	62.6	<0.001
Type of intervention ($n = 139$)			0.447
Operating room	55 (39.6)	61.8	
Bedside	64 (46.0)	54.4	
Non-ENT	20 (14.4)	75.0	
Appointment made by staff	143 (28.6)	73.4	<0.001
Days to appointment, median	21.0	-	0.629

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TABLE IV.
Phase-One Multivariate Analysis of Factors Influencing Follow-Up.

Predictor	OR Estimate (95% CI)	*p* Value
Male	1.31 (0.87–1.95)	0.196
Distance, miles		
<25	Reference	
25–50	1.67 (0.97–2.86)	0.063
>50	1.08 (0.62–1.89)	0.777
Transfer for ENT	0.66 (0.31–1.42)	0.282
Primary reason for hospitalization	3.29 (1.92–5.64)	<0.001
Subspecialty		
General	Reference	
Head & Neck Oncology	1.93 (1.02–3.69)	0.045
Rhinology	1.29 (0.59–2.87)	0.522
Laryngology	1.49 (0.74–2.99)	0.266
Pediatrics	3.36 (1.41–7.98)	0.006
Otology	0.52 (0.23–1.20)	0.124
Trauma/FPRS	1.71 (0.83–3.53)	0.149
Intervention performed	1.49 (0.92–2.43)	0.103
Appointment made by staff	3.69 (2.29–5.96)	<0.001
Days to appointment	1.01 (0.94–1.01)	0.723

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TABLE VI.
Phase-Two Follow-Up Outcomes.

Outcome	Pre-Assigned Group $n = 50$ (%)	Control Group $n = 50$ (%)	p Value
Lost to follow-up	9 (18)	40 (80)	<0.001
Followed up	41 (82)	10 (20)	
Appointment scheduled	50 (100)	14 (28)	
Cancelled*	4 (8)	3 (21)	0.171
No-show*	5 (10)	1 (7)	0.608
Rescheduled*	3 (6)	1 (4)	0.470
Days to appointment, median	16	33	<0.001

Improving Outpatient Follow-Up Rates for New In-Hospital Consults

Luke Stanisce, MD; Nadir Ahmad, MD; Donald H. Solomon, MD; Nadeem Kolia, MD; Lucia D. Garcia, MD; Thomas C. Spalla, MD; John P. Gaughan, MS, PhD, MBA; Yekaterina Koshkareva, MD

Laryngoscope. 2022 Dec 13. PMID: 36511340

- Conclusions
  - Over 50% of new patients seen via in-hospital consultation without prior outpatient evaluation were lost to follow-up.
  - ENT-related illnesses necessitating hospitalization and those of Oncology and Pediatric subspecialties were independent predictors for establishing outpatient care.
  - Pre-assigning appointments prior to discharge were associated with increased outpatient adherence, as supported by randomized prospective evidence.

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Primary targeted medical therapy for management of bilateral head and neck lymphatic malformations in infants

Clare M. Richardson [a,b], Jonathan N. Perkins [a,b], Kaitlyn Zenner [b], Catherine Bull [a], Erika Lutsky [a], Dana M. Jensen [c], Victoria Dmyterko [c], James T. Bennett [c,d], Tara L. Wenger [d], John P. Dahl [a,b,c], Juliana Bonilla-Velez [a,b,c], Randall A. Bly [a,b], Amy E. Geddis [c,e], Jonathan A. Perkins [a,b,c,*]

Int J Pediatr Otorhinolaryngol. 2022 Nov 15, PMID: 36459725

- Objectives
  - Authors hypothesized that primary targeted medical therapy (pTMT) with diagnostic needle aspiration reduces the need for invasive therapy such as surgical resection and/or sclerotherapy.
- Methods
  - Retrospective case review was performed of infants with BHNLMs (Grade 2 or De Serres stage IV and V) treated from 2000 to 2021.
  - Patients were divided into two cohorts: those managed with pTMT and those managed with observation, sclerotherapy, or surgical intervention (non-pTMT).
  - pTMT patients had sirolimus initiated in the first month of life and underwent needle aspiration of malformation cyst fluid.

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Table 1
Demographic and diagnostic description of the study population.

	pTMT n = 3 (33%)	Non-pTMT n = 6 (66%)	Total n = 9
Gender			
Male	2 (66%)	6 (100%)	8 (89%)
Female	1 (33%)	0 (0%)	1 (11%)
Race or Ethnicity			
Caucasian	2 (66%)	5 (83%)	7 (78%)
Asian	1 (33%)	0 (0%)	1 (11%)
Native American	0 (0%)	1 (17%)	1 (11%)
Age at Diagnosis			
Prenatal	3 (100%)	6 (100%)	9 (100%)
EXIT Procedure			
Yes	2 (66%)	5 (83%)	7 (78%)
No	1 (33%)	1 (17%)	2 (22%)
Malformation Grade[31]			
2	3 (100%)	6 (100%)	9 (100%)
Composition			
Mixed	3 (100%)	6 (100%)	9 (100%)

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Table 4
Primary treatment details. *indicates a patient who died prior to initiation of definitive treatment. ** indicates patient who died after a combination of sildenafil, sclerotherapy and surgery.

Patient	Primary Treatment	Age at Treatment Initiation
pTMT Group		
1	Sirolimus + ASA	19 days
2	Sirolimus + ASA	9 days
3	Sirolimus + ASA	6 days
non-pTMT Group		
1	None*	n/a
2	Needle aspiration	5 days
3	Surgery	30 days
4	Surgery	17 days
5	Surgery + sclerotherapy**	6 days
6	Surgery + sclerotherapy	7 days

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Table 5

Primary treatment adjuncts and incidence both before and after initial discharge from the hospital. *indicates a patient within the cohort who died prior to discharge from the hospital, and may have received incomplete treatment.

	pTMT n = 3	Non-pTMT n = 6
Needle Aspiration	3 (100%)	1 (17%)
Tracheostomy	0 (0%)	4 (66%)
Number of Invasive Therapies Prior to Discharge		
0	0 (0%)	2* (33%)
1–2	0 (0%)	2* (33%)
3	0 (0%)	1 (17%)
>3	0 (0%)	1 (17%)
Deceased Prior to Discharge		
Yes	0 (0%)	2 (33%)
No	3 (100%)	4 (66%)
Total Number of Invasive Therapies (Lifetime)		
0	3 (100%)	1* (0%)
1–5	0 (0%)	2* (33%)
5–10	0 (0%)	0 (0%)
>10	0 (0%)	3 (50%)

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Table 6

Hospital stay data compared between cohorts.

	pTMT median days (IQR)	Non-pTMT median days (IQR)
Hospital Days After Birth	58 (26–89)	67 (19–97)
Days Intubated	22 (3–41)	25 (0–50)
Total Hospital Days (1st Year of Life)	68 (9–107)	68 (19–98)
Intensive Care Days (1st Year of Life)	35 (12–83)	42 (19–80)
Unplanned Hospital Days (1st Year of Life)	0	10 (5–43)

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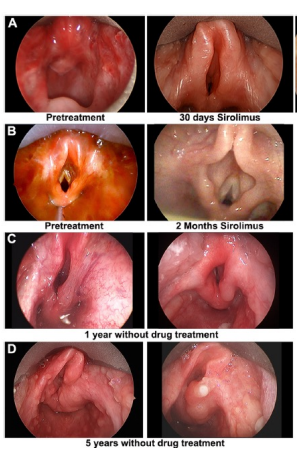

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- Conclusions
  - The results indicate that pTMT may be superior treatment for BHNLMs compared to traditional management by reducing the need for invasive therapies including tracheostomy.
  - Needle aspiration is a minimally invasive adjunct that can be successfully used for therapeutic and diagnostic purposes.
  - While the groups did not differ in intubation time, intensive care unit time, or initial hospital stay, the pTMT group did not have any unplanned hospital admissions within the first year of life and significantly decreased invasive procedures compared to the non-pTMT group.
  - More prospective work is needed to further determine how pTMT fits into the treatment algorithm of head and neck lymphatic malformation patients.

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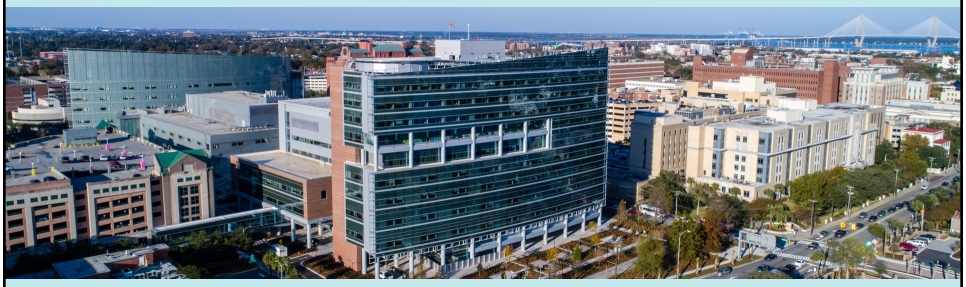

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