

# Re-Evaluating the Safety and Efficacy of Universal Post-Operative Admission in Tonsillectomies in Children Under the Age of Three

Behm, Hayley, Cunningham, Andrew R, Andrew W. Ju, Matthew S. Peach, Albernaz, Marcus S. MD

Underlined authors are shared equal first authors.

Hayley Behm  
Brody School of Medicine  
East Carolina University  
Greenville, North Carolina 27858  
Hayleybehm@gmail.com  
407-712-4526

## PROBLEM/ BACKGROUND

- The American Academy of Otolaryngology-Head and Neck Surgery provides guidelines for pediatric tonsillectomy, emphasizing evidence-based patient selection, surgical techniques, and postoperative care.
- The 2019 guidelines recommend tonsillectomy for recurrent throat infections or obstructive sleep apnea confirmed by polysomnography<sup>1</sup>.
- Current recommendations suggest universal postoperative admission for patients under three<sup>1</sup>.
- We examined the safety of outpatient tonsillectomies in the largest cohort of 2- to 3-year-olds, comparing outcomes with existing literature. If deemed safe, avoiding unnecessary admissions could conserve hospital resources while challenging current guidelines.

## RESEARCH QUESTION/ METHODS

- Patients aged 2 to 3 years who underwent outpatient tonsillectomy and/or adenoidectomy (T&A) at the Surgicenter with planned home discharge were included in the analysis.
- From October 1, 2018 - May 31, 2023, 410 patients were identified using CPT codes (Appendix 1) from 3,772 procedures on patients under 18.
- A retrospective quality improvement review assessed complications and unscheduled readmissions, including admissions to the Recovery Care Center (RCC) or regional hospital and any required additional surgical interventions.
- Postoperative visits within 14 days were manually reviewed for acute or urgent visits within the healthcare network, categorized by chief complaint.

## RESULTS

### Demographics/Background

The cohort included 243 males (59.27%) and 167 females (40.73%), with an average age of 2.512 years (SD  $\pm$  0.28, range 2.01–2.95). Most (91.71%) were not Hispanic or Latino. The average height was 35.55 inches (SD  $\pm$  5.52), aligning with the 50th percentile at 2.5 years, and the average weight was 14.55 kg (SD  $\pm$  5.52), corresponding to the 75th percentile.

### Complications

Thirty patients (7.32%) presented with post-operative concerns within 14 days, some with multiple issues (e.g., fever with dehydration). The most common complications were poor oral intake/dehydration (3.41%) and fever or infections (3.17%). Nine patients required no intervention and were discharged, while 21 (5.21%) received medical care. The average time to presentation was 4.83 days post-op (SD  $\pm$  3.20).

### Re-Admissions

Only six patients (1.46%) required re-admission, with four needing medical intervention. Two were observed at the Surgicenter RCC and discharged the same day. Two were hospitalized post-surgery—one for poor oral intake (discharged after two days) and another for reactive airway disease requiring breathing treatments. One patient visited the emergency department for a medication error and was discharged the same day. One required surgical intervention for a tonsil bleed one-week post-op. A summary of these cases is in Table 1.

Table 1. Demographics and Characteristics of Study Population

Demographic	Count (N, %)
Sex:	
Male	243 (59.27%)
Female	167 (40.73%)
Age, Years (Mean, SD)	2.512 years (SD $\pm$ 0.28 yrs)
Race:	
White	243 (59.27%)
Black	124 (30.24%)
Other/Multiracial/Unknown	43 (10.49%)
Ethnicity	
Hispanic or Latino	33 (8.05%)
Non-Hispanic or Latino	376 (91.71%)
Unknown	1 (0.24%)
Body Morphology	
Height (in)	35.55 (SD $\pm$ 5.52)
Weight (kg)	14.55 (SD $\pm$ 5.52)



410 Tonsillectomies



Ages 2-3 years at time of operation



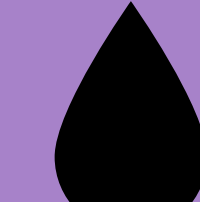
50th percentile - height  
75th percentile - weight



7.32% Overall  
Complication Rate



5.21% Requiring  
Medical Interventions



#1 Complication was poor  
intake/dehydration (3.41%)

Table 2. Post-Operative Visits by Complication and Types of Intervention Received

Complication and Intervention	Frequency (N, %)*	Time of Presentation Post-operatively, (M, SD)
<u>Fevers, Viral/ Bacterial Infections</u>	13 (3.17%)	5.15 $\pm$ 2.60 days
No Intervention Delivered	3 (0.73%)	
Hospitalized	2 (0.49%)	
Antibiotics	5 (1.22%)	
Intravenous Fluids (IVF)	5 (1.22%)	
Pain Medications/Steroids	7 (1.71%)	
Antiemetic	2 (0.49%)	
Inhaled Beta Agonist	1 (0.24%)	
<u>Dehydration/Poor Oral Intake</u>	14 (3.41%)	3.36 $\pm$ 1.95 days
No Intervention Delivered	4 (0.98%)	
Antibiotics	3 (0.73%)	
IVF	6 (1.46%)	
Pain Medications/Steroids	6 (1.46%)	
Antiemetic	2 (0.49%)	
Hospitalized	3 (0.73%)	
<u>Hemorrhage</u>	2 (0.49%)	4.5 $\pm$ 4.5 days
No Intervention Delivered	1 (0.24%)	
Cauterization/Return to O.R. w/ hospitalization	1 (0.24%)	
<u>Cough</u>	2 (0.49%)	11 $\pm$ 1 days
No Intervention Delivered	1 (0.24%)	
Leukotriene Receptor Antagonist	1 (0.24%)	
<u>Lower Airway Issues/Dyspnea</u>	2 (0.49%)	3.5 $\pm$ 3.5 days
Antiemetic	1 (0.24%)	
Antibiotics	1 (0.24%)	
Inhaled Beta Agonist	2 (0.49%)	
Corticosteroids	1 (0.24%)	
Hospitalization	1 (0.24%)	
<u>Pain</u>	4 (0.98%)	4.25 $\pm$ 1.09 days
No Intervention Delivered	3 (0.73%)	
IVF	1 (0.24%)	
Pain Medications/Steroids	1 (0.24%)	
Antiemetic	1 (0.24%)	
Hospitalization	1 (0.24%)	
<u>Surgical Site Infection</u>	1 (%)	2 days
Antibiotics	1 (0.24%)	
IVF	1 (0.24%)	
<u>Anesthesia Related Complications</u>	1 (%)	0 days
Hospital Observation	1 (0.24%)	

\* Patients can experience more than one complication and be in more than one category as well as receive more than one intervention within the complication category.

Table 3. Reasons for Readmission

Pt #	Readmission Type	Reason
1	Admit to RCC*	Observation due to multiple intubation attempts
2	Admit to RCC*	Observation due to sleep apnea
3	Admission to Hospital**	Poor oral intake (refusal to drink)
4	Admission to Hospital**	Medication error (admitted to the ED and discharged later in the day)
5	Admission to Hospital**	Reactive airway requiring a breathing treatment and overnight observation
6	Return to OR***	Bleed/Hemorrhage

\* any patients admitted to RCC at the SurgiCenter after their surgery

\*\* any patients admitted to the regional hospital after their surgery

\*\*\* any patients readmitted to the operating room

## DISCUSSION

- Of the 7.32% of complications observed, **only 5.21% required intervention**, primarily minor treatments like IV fluids, antiemetics, antibiotics, or pain medications.
  - These were typically managed in outpatient settings, reducing the burden on inpatient hospital resources.
  - Only 1.5% of patients required hospital readmission** for further observation or treatment, a rate consistent with existing studies on pediatric tonsillectomies >3 yrs old.
  - Only 2 (0.49%) of the hospital readmissions were for airway related concerns**
- Given this low rate, routine inpatient observation may not be necessary for appropriately selected and otherwise healthy patients with either no or mild sleep apnea.
- Most complications, including dehydration, infection, and hemorrhage, occur days after discharge, **beyond a 24-hour observation period**<sup>2,3</sup>.
  - Studies report post-op bleed rates between 0% and 0.78%<sup>4-8</sup>, aligning with our observed 0.49%, further supporting the safety of outpatient procedures in young children.
- Complications occurred at an average of 4.83 days post-op, with fever or infection at 5.15 days and poor oral intake at 3.36 days.
  - This aligns with prior research on older children, where complications averaged 5.96 days post-op<sup>9-11</sup>. Since these issues arise well after the immediate recovery period, inpatient monitoring beyond the post-anesthesia care unit is unlikely to prevent most complications.

## CONCLUSION

- In this retrospective study T&A patients between 2-3 years of age, we observed no significant increased risk of T&A performed outpatient with same day discharge compared to T&A in the literature.
- There were no upper airway complications in these appropriately selected, otherwise healthy patient with either no or mild sleep apnea.**
- Current guidelines of mandatory admission for young children may be reconsidered to alleviate excessive admissions, improve patient experience, limit patient costs, and relieve hospital resources.
  - Patients with severe sleep apnea or complex medical histories (such as craniofacial anomalies) should continue to be managed inpatient per guidelines.
- Future projects may look at prospective rate of upper airway compromise during inpatient admissions of this patient population, with analysis of sleep apnea.

## REFERENCES

- Mitchell RB, Archer SM, Ishman SL, Rosenfeld RM, Coles S, Finestone SA, Friedman NR, Giordano T, Hildrew DM, Kim TW, Lloyd RM, Parkin SR, Shulman ST, Walner DL, Walsh SA, Wincheta LC. Clinical Practice Guideline: Tonsillectomy in Children (Update). Otolaryngol Head Neck Surg. 2019 Feb;160(1, suppl):S1-S42. doi: 10.1177/014959818801757. PMID: 30798778.
- Vyskocil E, Baumgartner WD, Ch Grasl M, Grasl S, Arnoldner C, Steyrer J, Erovic BM. Post-tonsillectomy hemorrhage: cost-benefit analysis of prolonged hospitalization. Acta Otolaryngol. 2020 Jul;140(7):597-602. doi: 10.1080/00016489.2020.1746925. Epub 2020 Apr 11. PMID: 32281464.
- Granell J, Gete P, Villafraña M, Bolaños C, Vicent JJ. Safety of outpatient tonsillectomy in children: a review of 6 years in a tertiary hospital experience. Otolaryngol Head Neck Surg. 2004 Oct;131(4):383-7. doi: 10.1016/j.otohns.2004.03.027. PMID: 15467604.
- Liu JH, Anderson KE, Willging JP, Myer CM 3rd, Shott SR, Bratcher GO, Cotton RT. Posttonsillectomy hemorrhage: what is it and what should be recorded? Arch Otolaryngol Head Neck Surg. 2001 Oct;127(10):1271-5. doi: 10.1001/archotol.127.10.1271. PMID: 11587611.
- Rakover Y, Almog R, Rosen G. The risk of postoperative haemorrhage in tonsillectomy as an outpatient procedure in children. Int J Pediatr Otorhinolaryngol. 1997 Jul 18;41(1):29-36. doi: 10.1016/s0165-5876(97)00055-4. PMID: 9279633.
- Lee IN. Outpatient management of T and A procedure in children. J Otolaryngol. 1985 Jun;14(3):176-8. PMID: 4068114.
- Capper JW, Randall C. Post-operative haemorrhage in tonsillectomy and adenoidectomy in children. J Laryngol Otol. 1984 Apr;98(4):363-5. doi: 10.1017/s0022215100146742. PMID: 6715969.
- Kim DW, Koo JW, Ahn SH, Lee CH, Kim JW. Difference of delayed post-tonsillectomy bleeding between children and adults. Auris Nasus Larynx. 2010 Aug;37(4):456-60. doi: 10.1016/j.ani.2009.11.011. Epub 2010 Jan 19. PMID: 20034752.
- Granell J, Gete P, Villafraña M, Bolaños C, Vicent JJ. Safety of outpatient tonsillectomy in children: a review of 6 years in a tertiary hospital experience. Otolaryngol Head Neck Surg. 2004 Oct;131(4):383-7. doi: 10.1016/j.otohns.2004.03.027. PMID: 15467604.
- Vyskocil E, Baumgartner WD, Ch Grasl M, Grasl S, Arnoldner C, Steyrer J, Erovic BM. Post-tonsillectomy hemorrhage: cost-benefit analysis of prolonged hospitalization. Acta Otolaryngol. 2020 Jul;140(7):597-602. doi: 10.1080/00016489.2020.1746925. Epub 2020 Apr 11. PMID: 32281464.
- Karatas HA. Readmission after OSA surgery in pediatric patients. Eur Arch Otorhinolaryngol. 2023 Feb;280(2):879-884. doi: 10.1007/s00405-022-07657-4. Epub 2022 Sep 23. PMID: 36149489.