Postoperative Complications in Children Under 3 Years of Age Undergoing Tonsillectomy and Adenoidectomy

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INTRODUCTION

- While tonsillectomy and adenoidectomy (T&A) is a common and generally safe pediatric procedure, children under 3 years of age are at higher risk of postoperative complications. The American Academy of Otolaryngology – Head and Neck Surgery guidelines recommend overnight inpatient monitoring in this age group due to increased risk (Mitchell et. al. 2019).
- Return to the emergency department for any reason within 30 days occurs in approximately 12.8% of pediatric patients (Lindquist, et al. 2019).
- **Purpose**: This study evaluates predictors of postoperative complications in children under 3 years old undergoing T&A at a single quaternary academic medical center.

METHODS

Study Participants

- Retrospective cohort study of patients who underwent T&A surgeries at a quaternary academic medical center between 2021 to 2023. This study received IRB approval.

Data Collection

- Electronic medical records were reviewed for demographics, birth history, medical comorbidities (asthma, autism, cardiovascular disease), polysomnogram (PSG) results, perioperative details (oxygen saturation, requirement, and duration in post-anesthesia care unit (PACU)), and postoperative outcomes.
- Postoperative complications were defined as unplanned admission to the intensive care unit (PICU) or emergency department (ED) visit within 7 and 30 days, respectively, following discharge.

Statistical Analysis

- Descriptive statistics were used to summarize variables; associations between perioperative factors and complications were tested with Pearson's χ^2 (categorical) and Wilcoxon rank-sum (continuous); significance set at $p<0.05$.

Table 1. Factors associated with floor vs PICU admission.

	Floor admission (N = 481)	PICU admission (N = 70)	F-distribution and Chi Square Analysis
Patient Comorbidities	n (%)	n (%)	
Cardiovascular Disease	26 (5%)	9 (13%)	χ^2 = 5.7 (p=0.017)
PSG Results	Mean (±SD)	Mean (±SD)	F (p)
Total AHI	11.1 ±12.3	18.5 ±20.4	4.5 (p=0.034)
Obstructive AHI	8.7 ±10.9	16.8 ±19.2	8.2 (p=0.004)
Nadir	82.3 ± 9.5	77.0 ±13.9	4.7 (p=0.003)
PACU Factors	Mean (±SD)	Mean (±SD)	F (p)
Lowest SaO2	91.6% ± 4.2	89.6% ± 7.6	4.41 (p=0.036)
Supplemental O2 Given	n (%)	n (%)	
No	426 (91%)	53 (77%)	χ^2 = 11.6 (p=0.002)
Yes	44 (9%)	16 (23%)	
Supplemental O2 Duration	15.4 min ±21.9	31.2 min ±28.9	10.9 (p=0.002)

PICU: pediatric intensive care unit, PSG: polysomnogram, AHI: apnea-hypopnea index,SaO2: oxygen saturation.

RESULTS

- A total of 551 patients were included in the study, 54% male (n=298) and 46% female (n=253). The mean age was 1.81 years. The average length of stay was 1.25 days.
- Thirty one patients were excluded due to leaving against medical advice and did not have overnight observation.
- Seventy patients required unplanned PICU admission. These patients had lower mean oxygen saturation nadirs on sleep study (77% vs 82%, p=0.03), higher oAHI (16.8 vs 8.7, p=0.004), greater supplemental oxygen requirements in PACU (23% vs 9%, p<0.001), and longer oxygen duration (31 min vs 15 min, p=0.002) **(Table 1)**.
- Patients were more likely to present with bleeding ≤7 days than >7 days (67% vs 34%, p=0.004) **(Figure 2)**. Of those presenting with bleeding, seven patients returned to the operating room for bleeding control. Four patients needed inpatient monitoring and seven patients were discharged.
- Nearly half of ED visits resulted in readmission, with no difference between early (≤7 days) and late (>7 days) presentations.

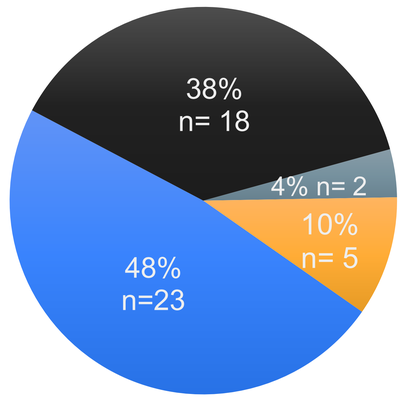

Figure 1. Primary reason for ED return within 30 days. n=48. Other: constipation, fever

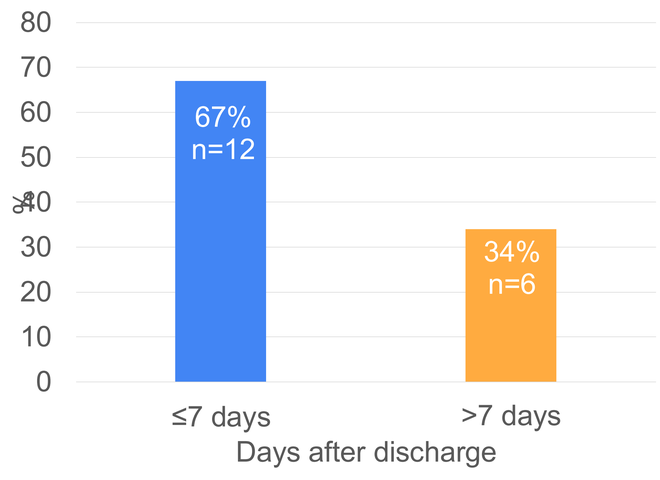

Figure 2. Return to ED for bleeding after discharge. N=18

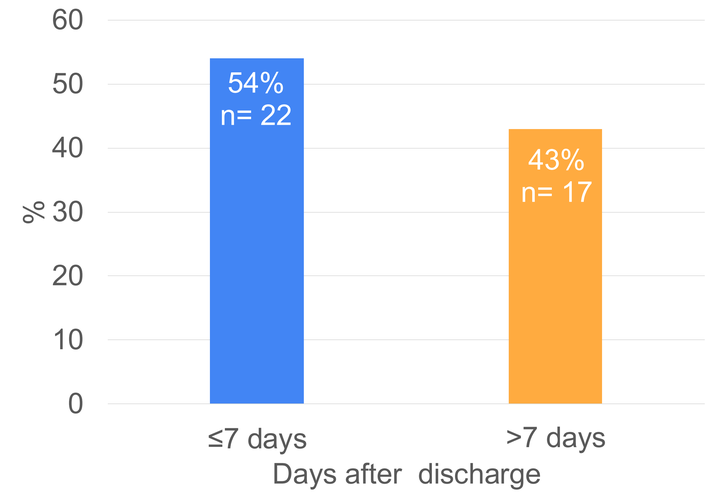

Figure 3. Readmission timing after discharge. N=39

CONCLUSIONS

- Lower oxygen nadir, higher AHI, and greater PACU oxygen needs were significantly associated with an increased rate of unplanned PICU admission in children under 3 years of age after T&A.
- PICU admissions correlated with very low preoperative oxygen nadirs, supporting low oxygen nadir and high AHI as predictors of respiratory events.
- PICU admissions also correlated with a history of cardiovascular comorbidities.
- Postoperative ED visits were most frequently due to pain/dehydration and bleeding, with pain/dehydration occurring earlier (within 7 days) and bleeding occurring later in recovery.
- Study limitations include lack of standardized PICU admission criteria, absence of long-term outcomes, reliance on electronic records, and limited power to assess rare risk factors.
- The findings highlight the value of a preoperative sleep study for risk stratification and the need for larger, multi-institutional studies integrating long-term and patient-reported outcomes.

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