

Introduction

- Obstructive sleep apnea (OSA) is a disease within a spectrum of respiratory disorders associated with upper airway collapse during sleep and is exceedingly common in the pediatric population, affecting 1% to 4% of children in the United States.
- Adenotonsillar hypertrophy has long been considered the primary pathogenesis of OSA in children with first-line treatment being adenotonsillectomy.¹
- Recently, with the increased utilization of drug induced sleep endoscopy (DISE), lingual tonsillar hypertrophy has been increasingly attributed as another cause of OSA in the pediatric population.^{2,3}
- Obesity, laryngopharyngeal reflux, and reactive hyperplasia due to previous adenotonsillectomy, Down syndrome have all been identified in contributing to lingual tonsil hypertrophy in the pediatric population.⁴⁻⁶
- Post-operative lingual tonsillectomy complications appear to be rare although the documented data is limited.⁷ The most common complications reported include postoperative hemorrhage and respiratory complaints requiring oxygen or corticosteroid treatment.⁸
- Due to these possible complications, the current practice is overnight hospital admission following lingual tonsillectomy for monitoring of clinical status, however, there has been limited data currently available to support this.

The objective of this study was to analyze the factors that may be associated with post-operative complications following lingual tonsillectomy and determine if overnight hospitalization is truly warranted

Methods and Materials

- Retrospective chart review of pediatric patients undergoing lingual tonsillectomy for OSA secondary to lingual tonsillar hypertrophy confirmed by PSG and DISE between 2016 and 2020 at a pediatric hospital
- Patients were excluded for incomplete medical records, the absence of preoperative DISE or pre-operative PSG
- Lingual tonsillectomy was performed by one of three Pediatric Otolaryngologists utilizing PROCISE[®] XP COBLATION[®] (Arthrocare ENT Coblator II, Austin, TX, USA)
- Following surgical intervention, all pediatric patients were admitted and observed overnight.
- Information collected and analyzed included age, sex, length of stay (LOS), body mass index (BMI), apnea-hypopnea index (AHI), Yellen grade, comorbidities and concomitant operations performed.
- Post-operative outcomes including minimum oxygen saturation, supplemental oxygen requirement, opiate pain medication requirement and number of doses, length of hospital stay, post-operative complications and readmission rates were analyzed.
- Statistical analysis was completed using t-tests, Wilcoxon rank sum tests, and Fisher's exact 2-tail tests

Results

65 patients were included in the study. 44 (67.7%) were male and 21 (32.3%) female. 8 patients (12.3%) had one or more post-operative complications, and 3 patients (4.6%) were readmitted to the hospital following discharge.

- **Table 1:** Continuous data and post-operative complication rate.
- **Table 2:** Categorical variables and post-operative complications.
- **Table 3:** Outline of post-operative complication, post-operative day, outcome, and concomitant surgeries.

Concomitant epiglottopexy had an increased risk of readmission compared to lingual tonsillectomy alone (p=0.048). There were no other factors that were analyzed that correlated with a higher rate of post-operative complications or readmission

	Total	Complication N=8	No Complication N=57	P-Value
Age (years)	8.94 (4.02)	7.75 (5.06)	9.11 (3.87)	0.376
BMI	19.8 (15.8-23.7)	20.4 (15.8-25.2)	19.8 (16-23.5)	0.808
AHI	5.09 (2.7-9.25)	5.41 (1.6-8.95)	5 (3-9)	0.814
Yellen Grade	2 (2-3)	2.5 (2-3)	2 (2-3)	0.452
CP/Trisomy 21/ADD	8	2	6	0.25
Any Comorbidity	40	5	35	1
Opiate Usage	22	2	20	0.71
Epiglottopexy	9	3	6	0.073
Any Additional Procedure	38	5	33	1

Table 1. Variables among Patients who Underwent Lingual Tonsillectomy With and Without Post-Operative Complications

	Total	Readmission N=3	No Readmission N=62	P-Value
Age (years)	8.94 (4.02)	5 (3.61)	9.13 (3.96)	0.082
BMI	19.8 (15.8-23.7)	19 (16.8-21.2)	19.8 (16-23.8)	0.510
AHI	5.09 (2.7-9.25)	33.2 (16.8-49.6)	5.09 (2.78-8.68)	1
Yellen Grade	2 (2-3)	2.5 (2-3)	2 (2-3)	0.338
CP/Trisomy 21/ADD	8	1	7	0.33
Any Comorbidity	40	2	38	1
Opiate Usage	22	2	20	1
Epiglottopexy	9	2	7	0.048***
Any Additional Procedure	38	2	36	1

Table 2. Variables among Patients who Underwent Lingual Tonsillectomy With and Without Post-Operative Readmission

Complication	POD#	Outcome, Intervention	Concomitant Operation
Nausea	3	Observed, Zofran	Adenoidectomy, SMRIT
Dysphagia, Odynophagia	4	Observed, Steroids & Viscous Lidocaine	N/A
Odynophagia	6	Observed, IVF	Adenoidectomy
Epistaxis, Odynophagia	8	Observed, Steroids	Epiglottopexy
Hemoptysis	8	Admitted, IVF	N/A
Odynophagia, Dehydration/ Epistaxis	9/12	Observed, Steroids/ Admitted, Nasal Floseal	Epiglottopexy, Nasal Cautery
Dehydration	11	Admitted, IVF	Epiglottopexy
Hemoptysis	12	Observed, IVF	N/A

Table 3: Post-Operative Complications

Discussion

- The overall post-operative complication rate for our study was 12.3% with 4.6% requiring readmission which is similar to previously reported complication rates in lingual tonsillectomy.¹⁰
- Our study indicated no increased risk of post-operative complications or readmission rates in syndromic patients undergoing lingual tonsillectomy similar to previous literature.¹¹
- Given the lack of serious complications, specifically within the observation period, it may not be of additional benefit to admit patients overnight post-operatively after lingual tonsillectomy.

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References

- Kang K, Koltai PJ, Lee C, Lin M, Hsu W. Lingual Tonsillectomy for Treatment of Pediatric Obstructive Sleep Apnea: A Meta-analysis. *JAMA Otolaryngol Head Neck Surg.* 2017;143(6):561-568.
- Chan DK, Jan TA, Koltai PJ. Effect of Obesity and Medical Comorbidities on Outcomes After Adjunct Surgery for Obstructive Sleep Apnea in Cases of Adenotonsillectomy Failure. *Arch Otolaryngol Head Neck Surg.* 2012;138(10):891-896.
- GO A, Cansz H, Duman C, Oz B, Cjgerciogullar E. Excessive reactive lymphoid hyperplasia in a child with persistent obstructive sleep apnea despite previous tonsillectomy and adenoidectomy. *The Journal of Craniofacial Surgery.* 2011; 1413-5.
- Hwang MS, Salapatias AM, Yalamanchali S, Joseph NJ, Friedman M. Factors associated with hypertrophy of the lingual tonsils. *Otolaryngology Head and Neck Surgery.* 2015; 851-5.
- Best J, Mutchnick S, Ida J, Billings K. Trends in management of obstructive sleep apnea in pediatric patients with Down syndrome. *International Journal of Pediatric Otorhinolaryngology.* Volume 110, 2018:1-5
- Dundar A, Ozunlu A, Sahar M, Ozgen F. Lingual tonsil hypertrophy producing obstructive sleep apnea. *Laryngoscope.* 106 (1996), pp. 1167-1169
- Conacher D, Meikle D, O'Brien C. Tracheostomy, lingual tonsillectomy and sleep-related breathing disorders. *Br J Anaesth.* 88 (5) (2002), pp. 724-726
- Lin A, Koltai P. Persistent pediatric sleep apnea and lingual tonsillectomy. *Otolaryngol. Head Neck Surg.* 141 (2009), pp. 81-85
- Abdel-Aziz M, Ibrahim N, Ahmed A, El-Hamamsy M, Abdel-Khalik M, El-Hoshy H. Lingual tonsils hypertrophy: a cause of obstructive sleep apnea in children after adenotonsillectomy: Operative problems and management. *International Journal of Pediatric Otorhinolaryngology.* Volume 75, Issue 9. 2011. Pages 1127-1131
- Yoskowitz A, Samaha M, Sweet R. Suction cautery use in lingual tonsillectomy. *J. Otolaryngol.* 29 (2000), pp. 117-118
- Mahant S, Keren R, Location R, Luan X, Song L, Shah S, et al. Variation in quality of tonsillectomy perioperative care and revisit rates in children's hospitals. *Pediatrics.* 133 (2014), pp. 280-288
- Krishna P, Lee D. Post-tonsillectomy bleeding: a meta-analysis. *Laryngoscope.* 111 (2001), pp. 1358-1361
- DeMarcantonio M, Sencer E, Meinen-Derr J, Roetting N, Shott S, Ishman S. The safety and efficacy of pediatric lingual tonsillectomy. *International Journal of Pediatric Otorhinolaryngology.* Volume 91. 2016. Pages 6-10
- Yumusakhuylu A, Binnetoglu A, Demir B, Baglam T, Sari M. Is it safe to perform adenotonsillectomy in children with Down syndrome? *Eur. Arch. Otorhinolaryngol.* 273 (9) (2016 Sep), pp. 2819-2823, 10.1007/s00405-016-4012-7. Epub 2016 Mar 28
- Goldstein N, Arnfield D, Kingsley L, Borland L, Allen G, Post J. Postoperative complications after tonsillectomy and adenoidectomy in children with Down syndrome. *Arch. Otolaryngol. Head. Neck Surg.* 124 (2) (1998 Feb), pp. 171-176
- Lumeng, J, Chervin, R. Epidemiology of pediatric obstructive sleep apnea. *Proc Am Thorac Soc.* 2008;5:242-252.
- Durr, ML, Meyer, AK, Kezirian, EJ, Rosbe, KW. Drug-induced sleep endoscopy in persistent pediatric sleep-disordered breathing after adenotonsillectomy. *Arch Otolaryngol Neck Surg.* 2012;138:638-643.
- Rivero A, Durr M. Lingual Tonsillectomy for Pediatric Persistent Obstructive Sleep Apnea: A Systematic Review and Meta-analysis. *Otolaryngology-Head and Neck Surgery.* 2017;157(6):940-94
- Dehlink E, Tan HL. Update on paediatric obstructive sleep apnoea. *J Thorac Dis.* 2016;8(2):224-235. doi:10.3978/j.issn.2072-1439.2015.12.04
- Friedman N, Prager J, Ruiz A, Kezirian E. A Pediatric Grading Scale for Lingual Tonsil Hypertrophy. *Otolaryngology Head and Neck Surgery.* 2015; 154