

Abstract

Objectives: There is little research on the rate and risk factors for revision tonsillectomy after primary intracapsular tonsillectomy. Our study aimed to determine the revision rate following intracapsular tonsillectomy, identify patient characteristics that may increase the probability of revision surgery, and report the tonsillar hemorrhage rate after revision.

Study Design: Retrospective case-control study.

Methods: A case-control study of pediatric patients who underwent intracapsular tonsillectomy between January 1, 2004, and December 31, 2018, was performed. Patients aged 2-20 years were analyzed and compared with matched controls who underwent intracapsular tonsillectomy within seven days of the same surgeon's case. One hundred sixty-nine revision procedures were included with 169 matched controls.

Results: A 1.39% revision rate was observed among a total of 12,145 intracapsular tonsillectomies. Among the 169 patients who underwent a revision procedure, the mean time between cases was 3.5 years. Tonsillitis was the most common diagnosis prompting revision tonsillectomy. Four (2.4%) patients underwent operative control of a postoperative tonsillar hemorrhage after revision surgery. Younger patients ($P < 0.001$) and patients with a history of gastroesophageal reflux disease ($P = 0.006$) were more likely to undergo revision tonsillectomy.

Conclusion: Patients below age four years and patients with gastroesophageal reflux disease may be at increased risk of undergoing revision tonsillectomy after primary intracapsular tonsillectomy. These factors should be considered when selecting an intracapsular technique for primary tonsillectomy in pediatric patients.

Introduction

- Tonsillectomy is a standard surgical procedure performed in the United States, commonly used for tonsillar hypertrophy, sleep-disordered breathing (SDB), obstructive sleep apnea (OSA), and recurrent or chronic tonsillitis¹
- Tonsillectomies are either performed through intracapsular tonsillectomy (IT) or total tonsillectomy (TT)
- Total tonsillectomies have well-documented risks of bleeding, postoperative pain, dehydration, and delays in return to regular activity²⁻⁴
- Intracapsular tonsillectomy reduces these complications but is associated with recurrent tonsillitis and regrowth
- We aimed to identify factors that may increase the likelihood of revision surgery, such as age, medical comorbidities, body mass index (BMI), initial indication for surgery, tonsil size, and surgical technique

Methods

- Electronic medical records were queried to identify patients who underwent a tonsillectomy with or without adenoidectomy between January 1, 2004, and December 31, 2018, within the Nemours enterprise
- Operative notes were reviewed for surgical technique and to confirm revision procedure
- A retrospective case-control study was performed by coupling all patients in the revision cohort to controls who did not undergo revision after IT

Results

	Revision Cohort N = 169	Control N = 169	P
Age, mean [SD]	5.0 [3.6]	7.5 [4.0]	< 0.001
Sex			
Male	77 (45.6%)	73 (43.2%)	0.661
Female	92 (54.4%)	96 (56.8%)	
Race			
White	118 (70.7%)	119 (71.3%)	0.205
Black	36 (21.6%)	27 (16.2%)	
Other	13 (7.8%)	21 (12.6%)	
Ethnicity			
Hispanic	12 (7.2%)	25 (15.0%)	0.023
Non-Hispanic	155 (92.8%)	142 (85.0%)	
Diagnosis			
OSA/SDB	124 (73.4%)	125 (74.4%)	0.360
Tonsillitis	36 (21.3%)	39 (23.2%)	
OSA/SDB + Tonsillitis	9 (5.3%)	4 (2.4%)	
Tonsil size			
1/2+	25 (16.1%)	24 (15.5%)	0.122
3+	76 (49.0%)	60 (38.7%)	
4+	54 (34.8%)	71 (45.8%)	
BMI class			
Underweight (<5 th %)	10 (6.3%)	5 (3.2%)	0.368
Normal weight (5 th %-85 th %)	92 (58.2%)	89 (56.3%)	
Overweight (85 th %-95 th %)	24 (15.2%)	22 (13.9%)	
Obese (>95 th %)	32 (20.3%)	42 (26.6%)	
Trisomy 21			
Yes	2 (1.2%)	1 (0.6%)	0.562
No	167 (98.8%)	168 (99.4%)	
History of GERD			
Yes	54 (32.0%)	32 (18.9%)	0.006
No	115 (68.0%)	137 (81.1%)	

Table 1. Bivariate Statistics: Comparison of Case & Control Group Characteristics.

		OR (95% CI)	P
Age, years	>12	1.0 (ref)	-
	8-12	1.5 (0.6 - 4.1)	0.424
	5-7	1.4 (0.5 - 4.4)	0.549
	2-4	6.5 (2.1 - 19.6)	0.001
	<2	18.4 (5.3 - 63.3)	<0.001
Sex	Male	1.0 (ref)	-
	Female	1.4 (0.8 - 2.4)	0.295
Race	White	1.0 (ref)	-
	Black	1.4 (0.7 - 2.9)	0.378
	Other	1.0 (0.3 - 4.1)	0.974
Ethnicity	Hispanic	1.0 (ref)	-
	Non-Hispanic	2.3 (0.6 - 9.6)	0.240
Diagnosis	OSA/SDB	1.0 (ref)	-
	Tonsillitis	2.7 (1.2 - 5.9)	0.014
	OSA/SDB + Tonsillitis	8.4 (1.9 - 37.6)	0.006
Tonsil Size	1/2+	1.0 (ref)	-
	3+	1.4 (0.6 - 3.2)	0.476
	4+	0.9 (0.4 - 2.1)	0.788
BMI	Normal Weight	1.0 (ref)	-
	Underweight	4.0 (0.9 - 17.7)	0.066
	Overweight	2.1 (0.9 - 4.7)	0.075
	Obese	1.5 (0.7 - 3.3)	0.263
Trisomy 21	No	1.0 (ref)	-
	Yes	n/a	~1.000
History of GERD	No	1.0 (ref)	-
	Yes	2.0 (1.1 - 3.8)	0.028

Table 2. Binary Logistic Regression: Patient Characteristics Predictive of Revision Tonsillectomy and Associated Odds Ratios

Discussion

- Examination of this case-control matched population identified several patient characteristics independently associated with an increased risk for revision tonsillectomy: younger age, history of GERD, and a surgical indication of tonsillitis relative to OSA/SDB
- Younger age at the time of initial IT appears to be a risk factor for revision surgery
- Little is known about ethnic and racial differences when performing tonsillectomy in pediatric patients
- History of GERD was demonstrated as a significant risk factor for revision surgery
- Patients with GERD undergoing tonsillectomy have been known to have higher rates of complications, such as desaturations requiring supplemental oxygen or re-intubation, pulmonary edema, post-tonsillectomy bleed, and dehydration⁵
- The bleed rate following revision surgery was found to be 2.4%, which is most likely attributable to the tonsillectomy technique
- The present study has several limitations, some inherent to a retrospective chart review, including confounding errors and resident surgeon involvement

Conclusion

- Positive predictors of revision tonsillectomy after IT in the pediatric population include younger age, GERD, and a surgical indication of tonsillitis relative to OSA/SDB
- Clinicians should consider these factors when counseling in the shared decision-making process between selecting intracapsular versus extracapsular techniques.

References

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