International Journal of Otorhinolaryngology and Head and Neck Surgery
Obalappa P et al. Int J Otorhinolaryngol Head Neck Surg. 2025 Dec;11(6):656-660
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20253749

Original Research Article

Incidence and predictors of post-tonsillectomy hemorrhage: a two-year retrospective analysis from a tertiary care center in Qatar

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Received: 11 October 2025
Accepted: 07 November 2025

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ABSTRACT

Background: Post-tonsillectomy bleeding (PTB) is one of the most concerning complications following tonsillectomy, with potential implications for patient morbidity and surgical outcomes. This retrospective study aimed to determine the incidence, pattern, and possible demographic risk factors associated with PTB in a tertiary care hospital setting.

Methods: A retrospective review was conducted at Al Ahli Hospital, Doha, Qatar, including 329 patients who underwent tonsillectomy between September 2023 and August 2025. Patients with recurrent chronic tonsillitis or obstructive sleep apnea were included, while those with unilateral tonsillectomy, tonsillar biopsy, or suspected neoplasms were excluded. Data on demographic characteristics, timing of bleeding, and return to the operating room (OR) were analyzed using Fisher's Exact Test, with $p<0.05$ considered statistically significant.

Results: The overall incidence of PTB was 4.25%, comprising 0.30% primary and 3.95% secondary hemorrhage. Bleeding was more frequent in males (3.34%) compared to females (0.91%), and a slight increase in bleeding incidence was noted with age (0.91% in <5 years, 1.51% in 5–15 years, and 1.82% in ≥16 years). However, these differences were not statistically significant. Only 1.21% of patients required surgical intervention, and no cases required blood transfusion. Bilateral and contralateral bleeding were rare (0.30% each).

Conclusion: PTB incidence in this cohort was low and predominantly secondary in nature. Although bleeding was more frequent among older and male patients, neither age nor gender significantly influenced the risk of reoperation. Consistent surgical technique and vigilant postoperative monitoring remain critical for minimizing bleeding-related complications.

Keywords: Tonsillectomy, Postoperative hemorrhage, Secondary bleeding, Risk factors, Retrospective study

INTRODUCTION

Tonsillectomy remains one of the most frequently performed surgical procedures in the field of otolaryngology, particularly among pediatric and adolescent populations.1 Despite being generally safe and effective, one of its most significant complications is post-tonsillectomy bleeding (PTB), which can lead to patient distress, emergency readmission, and in some cases, surgical re-intervention.[2] The reported incidence of PTB varies across studies, influenced by surgical technique, patient demographics, and postoperative care practices. Understanding the factors that contribute to bleeding risk is essential for improving surgical outcomes and patient safety. Age has been suggested to influence the likelihood of bleeding, with some studies indicating higher rates in older children or adults compared to younger patients.[3,4] Gender differences have also been explored, though findings remain inconsistent. Additionally, a subset of patients with post-tonsillectomy hemorrhage may require a return to the operating room (OR) for hemostasis, highlighting the need to identify predictors of more severe bleeding episodes.[5,6] This retrospective study aims to explore the pattern and risk factors of post-tonsillectomy bleeding in a tertiary care setting. The primary objectives are: to determine how

often bleeding occurs after tonsillectomy; to evaluate whether patient age affects the risk of bleeding; to compare bleeding rates between male and female patients; and to assess whether age and gender are associated with the likelihood of requiring a return to the operating room for bleeding control. By addressing these questions, the study seeks to provide clinically relevant insights that can guide preoperative risk assessment and postoperative management.

METHODS

Study design and setting

This retrospective observational study was conducted at Al Ahli Hospital, Doha, Qatar, a tertiary care center with a high annual surgical caseload for otolaryngology procedures. The study period spanned two years, from September 2023 to August 2025. Medical records of all patients who underwent tonsillectomy during this timeframe were reviewed. The primary objective was to evaluate the incidence, characteristics, and risk factors of post-tonsillectomy hemorrhage (PTH) and determine associations with demographic variables such as age and gender.

Study population

A total of 329 patients who underwent tonsillectomy were included in the analysis. Data were extracted from electronic health records and validated by cross-checking operative and postoperative nursing notes to ensure accuracy and completeness.

Inclusion criteria

Patients were included if they underwent bilateral tonsillectomy for standard indications such as recurrent or chronic tonsillitis, defined as ≥5 episodes per year for at least two consecutive years. Obstructive sleep apnea syndrome (OSAS) or pharyngeal obstruction confirmed by clinical and/or polysomnographic evaluation.

Exclusion criteria

Exclusion criteria comprised patients who underwent unilateral tonsillectomy, tonsillar biopsy, adenoidectomy alone, or procedures performed for suspected tonsillar neoplasms. Cases with incomplete documentation or coagulation disorders were also excluded to eliminate potential confounders.

Preoperative evaluation and surgical procedure

All patients underwent a comprehensive preoperative assessment, including a detailed history, physical examination, and routine hematological investigations such as hemoglobin estimation, platelet count, and coagulation profile to identify any pre-existing bleeding disorders. All surgeries were performed under general anesthesia by experienced otolaryngologists using the Sutter Coblation technique, which combines radiofrequency energy and saline irrigation for tissue dissection and hemostasis. The ablation power was standardized at 7 and the coagulation power at 2, following the hospital's otolaryngology protocol to ensure uniformity in surgical technique. Intraoperative bleeding was monitored and managed as per standard surgical hemostatic practices.

Postoperative monitoring and assessment

Postoperatively, all patients were monitored in the recovery area for immediate complications, followed by daily inpatient evaluation until discharge and subsequent follow-up visits in the outpatient clinic. The tonsillar fossae were inspected for signs of bleeding, clot formation, or sloughing. Bleeding events were classified as primary or secondary as shown in Figure 1.

Primary hemorrhage

Occurring within 24 hours post-surgery.

Secondary hemorrhage

Occurring after 24 hours, typically between postoperative days 5–10, often associated with eschar sloughing or infection.

The timing, severity, laterality (unilateral or bilateral), and need for return to the operating room (OR) for surgical intervention were documented. Conservative management included local compression, cold saline gargles, and topical hemostatic agents, whereas persistent or profuse bleeding warranted operative re-exploration.

Data collection

Data were compiled using a structured case record form capturing demographic variables (age, gender), intraoperative notes, postoperative bleeding characteristics, and management outcomes.

Statistical analysis

All data were analyzed using SPSS version 26.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized as mean ± standard deviation (SD).

Associations between categorical variables (such as age, gender, and bleeding incidence or return to OR) were assessed using Fisher's Exact Test due to the small sample size in some subgroups. A p value < 0.05 was considered statistically significant.

Ethical considerations

The study protocol was reviewed and approved by the Al Ahli Hospital Institutional Ethics Committee in

accordance with the Declaration of Helsinki (2013 revision). Since the study was retrospective in nature and utilized anonymized patient data, informed consent was waived. All patient confidentiality and data protection standards were strictly maintained throughout the study.

RESULTS

Section A: sociodemographic variables

The dataset comprises information from 329 individuals, categorized by age, gender, post-operative status, and bleeding-related variables. In terms of age distribution, the majority of individuals (47.41%) were between 5 and 15 years old, followed by 29.79% who were under 5 years, and 22.80% who were 16 years or older. Gender distribution shows a slightly higher number of males (54.40%) compared to females (45.60%). Regarding post-operative status, the vast majority of patients (95.75%) had a normal recovery, while 4.25% experienced haemorrhage. Notably, none of the individuals required a blood transfusion. Bleeding from both sides was reported in only 0.30% of cases, and the same percentage was observed for contralateral side bleeding, indicating that such complications were extremely rare within the sample (Table 1).

Section B: incidence of bleeding

Bleeding Rate (%)=Total number of patients who had bleeding/(Total number of patients)×100

=14/329×100= 4.25%

Bleeding occurred in 4.25% of patients after tonsillectomy.

Incidence of primary bleeding

Bleeding Rate (%)= (Total number of patients who had primary bleeding)/(Total number of patients)×100

= 1/329×100= 0.30%

Primary bleeding occurred in 0.30% of patients after tonsillectomy.

Incidence of secondary bleeding

Bleeding Rate (%)= (Total number of patients who had secondary bleeding)/(Total number of patients)×100

= 13/329×100= 3.95%

Secondary bleeding occurred in 3.95% of patients after tonsillectomy.

Section C: to see if age affects the chance of bleeding after tonsillectomy

Haemorrhage was rare across all age groups. It occurred in 0.91% of children under 5, 1.51% of those aged 5–15, and 1.82% of individuals 16 years or older, showing a slight increase with age (Table 2).

Section D: to compare the bleeding rates between males and females

Among those who experienced haemorrhage, the majority were male (11 cases, 3.34%) compared to only 3 cases (0.91%) in females. This indicates that haemorrhage was more frequently observed in males than in females (Table 3).

Section E: to find out the association between age, gender with return to the operating room

Fisher's Exact Test was used to examine the association between patient characteristics and the need for return to the operating room (OR) due to postoperative bleeding. Among the different age groups, return to OR was required in 1 of 3 patients under 5 years, 2 of 5 patients aged 5–15 years, and 1 of 6 patients aged 16 years or older. However, this association was not statistically significant (p=0.684).

Similarly, when analyzed by gender, 3 of 11 males and 1 of 3 females required surgical re-intervention, with no significant association observed (p=1.000). These findings suggest that neither age nor gender was significantly associated with the likelihood of requiring a return to the OR following tonsillectomy (Table 4).

Table 1: distribution of sociodemographic variables (n=329).

Variables	Frequency	Percentage
Age (in years)		
Under 5	98	29.79
5-15	156	47.41
16 or over	75	22.80
Gender		
Male	179	54.40
Female	150	45.60
Post op status		
Normal	315	95.75

Continued.

Variables	Frequency	Percentage
Haemorrhage	14	4.25
Blood transfusion		
Yes	0	0
No	329	100
Both sides bleeding		
Yes	1	0.30
No	328	99.70
Contra-lateral side bleeding		
Yes	1	0.30
No	328	99.70

Table 2: Distribution of post-tonsillectomy haemorrhage by age group (n=329).

Variables	Haemorrhage present		Haemorrhage absent	
	Frequency	Percentage	Frequency	Percentage
Age (in years)				
Under 5	3	0.91	326	99.1
5-15	5	1.51	324	98.5
16 or over	6	1.82	323	98.2

Table 3: Distribution of post-tonsillectomy haemorrhage by gender (n=329).

Variables	Haemorrhage present		Haemorrhage absent	
	Frequency	Percentage	Frequency	Percentage
Gender				
Male	11	3.34	318	96.66
Female	3	0.91	326	99.1

Table 4: Association between age, gender with return to operating room (n=14).

Variables	Frequency	Returned to OR (Yes)	Returned to OR (No)	P value (Fisher's Exact)	Result
Age (in years)					
Under 5	3	1	2	0.684	NS
5-15	5	2	3		
16 or over	6	1	5		
Gender					
Male	11	3	8	1	NS
Female	3	1	2		

DISCUSSION

This retrospective study evaluated the frequency and potential risk factors associated with PTB in a tertiary care setting, with a specific focus on age and gender as possible predictors. The findings are broadly consistent with existing literature while also contributing additional insights into the patterns of post-operative haemorrhage and the need for surgical intervention following tonsillectomy. The overall incidence of PTB in our cohort was 4.25%. Primary bleeding (within 24 hours postoperatively) was rare, occurring in only 0.30% of patients, whereas secondary bleeding (after 24 hours) was more common, observed in 3.95% of cases. These findings fall within the range reported in previous studies, where PTB rates vary from 1% to 20%, depending on surgical technique, patient population, and perioperative care protocols.[7,8]

A trend toward increased bleeding with age was observed, with haemorrhage rates of 0.91% in children under 5, 1.51% in those aged 5–15, and 1.82% in individuals aged 16 years or older. Although this trend was not statistically significant, it aligns with earlier studies suggesting that older children and adults may be at higher risk for postoperative bleeding.[9] Possible explanations include larger tonsillar fossae, increased vascularity, slower wound healing, and higher levels of postoperative physical activity. Previous large-scale reviews have similarly noted that PTB incidence tends to

rise with age, particularly during adolescence and adulthood, possibly due to anatomical and physiological differences as well as variations in surgical approach.[8] Gender differences in bleeding were also noted, with males accounting for 3.34% of haemorrhage cases compared to 0.91% in females. While the sample size was limited, this observation supports findings from earlier studies indicating a male predominance in post-tonsillectomy bleeding.[5,10] Importantly, when analyzing the need for return to the operating room (OR) for haemostasis, no statistically significant association was found with either age or gender. This suggests that although certain demographic groups may have a higher incidence of bleeding, the severity of bleeding requiring surgical intervention does not significantly differ across age or gender groups. This finding is consistent with the work of Mohammadpour-Maleki and Rasoulian, who reported higher bleeding rates in older patients but no significant variation in reoperation rates based on demographic factors.[11] In terms of clinical management, the majority of post-tonsillectomy bleeding episodes in our study were successfully managed conservatively. Initial approaches included observation, application of local pressure, and use of topical haemostatic agents or medications. Only a minority of cases (1.21%) required return to the operating room for surgical control of bleeding, indicating that most haemorrhages were mild to moderate in severity and could be effectively managed without invasive intervention.

An additional observation in our cohort was the very low incidence of bilateral or contralateral tonsillar bed bleeding, each occurring in only 0.30% of patients. This supports the commonly held understanding that post-tonsillectomy haemorrhage most often presents as focal, unilateral bleeding.

CONCLUSION

Post-tonsillectomy haemorrhage remains a relatively uncommon but clinically important complication. The observed trend of increased bleeding risk with age and male gender warrants further investigation, though neither factor was significantly associated with a need for surgical intervention. Continued efforts to standardize surgical techniques, optimize perioperative care, and identify high-risk patients will be key to minimizing complications and improving outcomes.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Obalappa P, Awa A, Mahafza T, Alrawashdeh H. Incidence and predictors of post-tonsillectomy hemorrhage: a two-year retrospective analysis from a tertiary care center in Qatar. Int J Otorhinolaryngol Head Neck Surg 2025;11:656-60.