

Original Article

## Prevalence of Post-Tonsillectomy Hemorrhage in Adults and Children

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### Abstract

**Background and objectives:** Hemorrhage is the most common complication of tonsillectomy. However, the incidence of post-tonsillectomy hemorrhage may be affected by various factors including weight, age, medications, surgical technique, etc. This study was carried out to determine prevalence of post-tonsillectomy hemorrhage in patients undergoing tonsillectomy in a teaching hospital in Gorgan, Iran.

**Methods:** This descriptive study was conducted on 1,043 cases of tonsillectomy who were admitted to a referral teaching hospital in Gorgan (Iran) between 2016 and 2017. Data were collected from medical records. Demographics characteristics, the applied surgical technique (e.g., tonsillectomy, adenoidectomy and adenotonsillectomy), the time of bleeding onset, the results of coagulation tests and the method of post-tonsillectomy hemorrhage management were recorded.

**Results:** The frequency of tonsillectomy was 19.2, 50.8, 18.6, 4, 2.1 and 5.3% in subjects aged 0-5, 5-10, 10-15, 15-20, 20-25 and more than 25 year old, respectively. The overall prevalence of post-tonsillectomy hemorrhage was 2.1%. The frequency of post-tonsillectomy hemorrhage was highest (13.6%) in patients aged 20-25 years. The incidence of post-tonsillectomy hemorrhage was zero in those aged  $\leq 5$  years. The rate of post-tonsillectomy hemorrhage was 54.5, 31.8 and 13.6% for those undergoing tonsillectomy, adenoidectomy and adenotonsillectomy, respectively. Secondary post-tonsillectomy hemorrhage (after 24 hours) was more common (81.8%). Moreover, the rate of re-admission for controlling the bleeding was 63.4% (14 cases).

**Conclusion:** The incidence of post-tonsillectomy hemorrhage, the methods for its management and the need for re-admission are quite different in different age groups.

**Keywords:** prevalence; tonsillectomy; hemorrhage; bleeding

## INTRODUCTION

Tonsillectomy is one of the most common surgical procedures performed by otolaryngologists (1). Infections and obstructive symptoms are the primary indications for tonsillectomy. However, the indications of tonsillectomy differ among different age groups. Pre-tonsillar abscess and malignancies are the main indications of surgical tonsillectomy in adults, while the higher prevalence of tonsillectomy in children is usually due to other reasons (25). The adenoid and the palatine tonsils are routine tonsillectomy targets. The lingual tonsils rarely require surgical removal but their dissection is associated with more complications. The most important aspect of tonsillectomy is complete hemostasis of the surgical site through suturing and electrocautery and to prevent posttonsillectomy hemorrhage. However, postoperative hemorrhage is still the most common and serious complication of tonsillectomy (1, 6). Pain and bleeding are two common complications of surgery. The pain may be related to the ear (7). Bleeding may occur early and within the first 24 hours of surgery (known as primary posttonsillectomy hemorrhage) or later (known as secondary post-tonsillectomy hemorrhage). The overall rate of postoperative hemorrhage is reported to be 1-5%. The incidence of primary and secondary hemorrhage is reported to be 0.22.2% and 0.1% - 3.5%, respectively (7-9). In primary post-tonsillectomy hemorrhage, the causes of inadequate homeostasis may include coagulation disorders, upper respiratory tract infection, residual tissue, and especially the inadequate or dysfunctional sutures. Delayed bleeding can be due to separation of crust from the surgical wound, noncompliance with dietary recommendations, wound dehiscence and any kind of strain maneuver (10). Age, gender, underlying disease, surgical procedure, homeostatic condition and

surgeon's expertise are important factors that affect incidence of post-tonsillectomy hemorrhage (11). If bleeding occurs, the patient should initially receive appropriate conservative management for bleeding control via wound cleansing with normal saline, removing clots, administration of sedatives, correction of water and electrolytes imbalance and blood transfusion if needed. If the bleeding is not controlled, the patient should be taken to the operating room for stopping the bleeding by electrocautery or suturing (1, 2). In this study, we aimed to determine the prevalence of postoperative hemorrhage and some of its influencing factors in patients undergoing tonsillectomy in a referral teaching hospital in Gorgan, Iran.

## MATERIALS AND METHODS

This cross-sectional study was performed on 1,043 patients who underwent surgical removal of palatine tonsils in a referral teaching hospital in Gorgan (Iran) between 2016 and 2017. The study received approval from the research council of Golestan University of Medical Sciences (ethics approval code: IR.GOUMS.REC.1396.239). Demographic and other information regarding the date of hospitalization, discharge date, type of tonsillar surgery, hemorrhage and other postoperative complications, hemoglobin and hematocrit values and coagulation tests were collected from medical reports. For cases of posttonsillectomy hemorrhage, the time and type of interventions were recorded. All tonsillectomy cases that had been readmitted after discharge were also included in the study. For these cases, the details of conservative and/or surgical treatments received for controlling bleeding were also recorded. The surgical procedures were adenoidectomy, adenotonsillectomy or tonsillectomy.

The patients were divided into six age groups: 0-5, 5-10, 10-15, 15-20, 20-25 and more than 25 years. All patients older than 25 years were considered in one group because the incidence of tonsillectomy was low after the age of 25. Post-tonsillectomy hemorrhage was categorized into primary and secondary post-tonsillectomy hemorrhage. Data were reported as mean  $\pm$  standard deviation and percentage. All statistical analyses were performed using SPSS 16 at significance level of 0.05.

## RESULTS

Of 1,043 patients, 545 (52.30%) were male and 498 (47.7%) were female. There was no significant difference in sex distribution ( $P=0.822$ ). The prevalence of tonsillectomy was highest in subjects aged 5-10 years (Table 1).

The overall frequency of post-tonsillectomy hemorrhage was 2.1%. The frequency of post-tonsillectomy hemorrhage was equal in both sexes. Bleeding occurred in 12 cases (54.5%) of tonsillectomy, 7 cases (31.8%) of adenoidectomy and 3 cases (13.6%) of adenotonsillectomy. The mean

time interval between the surgery and the onset of hemorrhage was  $5.9\pm 3.57$  days.

In addition, the frequency of primary and secondary post-tonsillectomy hemorrhage was 18.2% and 81.8%, respectively. As expected, the frequency of post-tonsillectomy hemorrhage was highest (45.5%) in subjects aged 5-10 years (Table 2). Although the frequency of tonsillectomy was lowest in patients aged 20-25 years, the frequency of post-tonsillectomy hemorrhage was 13.6% in this age group (Table 3).

In 8 cases, post-tonsillectomy hemorrhage was controlled by conservative measures and wound cleaning in an outpatient setting. However, 14 cases (63.4%) required hospitalization for controlling post-tonsillectomy hemorrhage. Of these, 6 cases (27.3%) needed transfusion and surgery under general anesthesia. The other 8 cases were re-admitted to the hospital for conservative management of bleeding. Table 4 presents results of the coagulation tests for 22 patients with post-tonsillectomy hemorrhage. The mean hemoglobin value improved significantly after receiving the treatment.

**Table 1. The frequency of tonsillectomy in different age groups**

Age group (years)	0-5	5-10	10-15	15-20	20-25	25 $\leq$	Total
Number	200	530	194	42	22	55	1043
Percent	19.3	50.8	18.6	4	2.1	5.3	100

**Table 2. Distribution of post-tonsillectomy hemorrhage in different age groups**

Age group (years)	0-5	5-10	10-15	15-20	20-25	25 $\leq$	Total
Number	0	10	2	4	3	3	22
Percent	0	45.5	9.1	18.2	13.6	13.6	100

**Table 3. Frequency distribution of post-tonsillectomy hemorrhage in different age groups**

Age group (years)	0-5	5-10	10-15	15-20	20-25	25 $\leq$	Total
Number of patients	200	530	194	42	22	55	1043
Number of bleeding cases	0	10	2	4	3	3	22
Percent	0	1.88	1.03	9.52	13.6	5.45	2.1

**Table 4. The mean  $\pm$  SD of some blood parameters in patients with post-tonsillectomy hemorrhage**

Parameter	Before treatment	After bleeding control	P-value
Prothrombin time (PT)	12.83 $\pm$ 0.45	12.76 $\pm$ 0.4	0.546
Partial thromboplastin time (PTT)	28.77 $\pm$ 4.79	29.74 $\pm$ 3.71	0.305
International normalized ratio (INR)	1.07 $\pm$ 0.1	1.03 $\pm$ 0.04	0.171
Hemoglobin	10.58 $\pm$ 1.77	11.57 $\pm$ 1.63	0.0001

## DISCUSSION

Various factors including gender (male), old age, peritonsillar abscess, season, temperature, obesity, steroids use, surgeon expertise and even the time of admission/discharge have been reported to influence the incidence of posttonsillectomy hemorrhage (11-15). In our study, as expected, the incidence of posttonsillectomy hemorrhage increased with age, which may be related to recurrent infections and adhesion of the tonsils to the underlying tissues.

The prevalence of post-tonsillectomy hemorrhage varies widely between different studies. In one study on 36,210 adult patients, the rate of post-tonsillectomy complications was 20%, while 6% of the study population required specific treatment for bleeding control. The mentioned study reported underlying diseases, peritonsillar abscess and antibiotic administration as possible risk factors of post-tonsillectomy complications (12). In another study on 1,418 patients under 15 years of age, the overall prevalence of post-tonsillectomy hemorrhage was 2.2%. This study reported that the incidence of post-tonsillectomy hemorrhage had a significant association with dexamethasone administration but not with weight, gender, surgical procedure and nonsteroidal anti-inflammatory drugs/antibiotics use (16). In our study, only 22 patients had posttonsillectomy hemorrhage. In 8 cases (36.4%), the bleeding was managed in an outpatient setting. The reminding 14 cases (63.4%)

required re-admission and hospitalization. Of these cases, only 6 patients (27.3%) required surgery. Overall, only 0.58% of all patients undergoing tonsillectomy required a second surgical procedure for control of post-surgical bleeding. This rate is similar to the rates reported in two previous studies (17, 18). The frequency of post-tonsillectomy hemorrhage was highest (13.6%) in subjects aged 20-25 years and nil in those aged  $\leq 5$  years. These findings are similar to the results of a previous study by Torres (19). In a study by Mueller et al., the risk of posttonsillectomy hemorrhage was higher in individuals aged  $\geq 24.78$  years (20). In a study by Bhattacharyya et al. on 7,748 adults, the rate of the re-admission due to post-tonsillectomy hemorrhage was 4.8%, and 2.2% of the cases needed a procedure to control their bleeding at first revisit (21). In our study, the rate of re-admission for posttonsillectomy hemorrhage was 1.34%, which is lower than the rate reported by Bhattacharyya et al. This may be due to the fact that the incidence of post-tonsillectomy hemorrhage was zero in subjects less than 5 years of age. Similar to previous studies, the rate of post-tonsillectomy hemorrhage was 1.73% in subjects aged  $\leq 15$  years (22).

We found no abnormality in results of coagulation tests, and all patients with posttonsillectomy hemorrhage had normal hemostasis. However, we did not perform any specific laboratory assay for Von Willebrand's disease (23).

Our study had some limitations including the inequality of sample size in different age groups and data collection from only one referral center. However, these data are comparable with other reports and provide a comparison for post-tonsillectomy hemorrhage rate between adult and children. Despite the limitations, our study reports data about adult and children from one referral center, which can eliminate some confounding variables that may affect the rate of post-tonsillectomy hemorrhage in patients who underwent tonsillar surgery in different setting e.g., outpatient, ambulatory surgery center, emergency department and inpatient admission.

## CONCLUSION

In summary, our findings show that posttonsillectomy hemorrhage is associated with older age and gender, and emphasize that the incidence of post-tonsillectomy haemorrhage, its management and the need for re-admission are quite different in different age groups.

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## DECLARATIONS

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Ethics approvals and consent to participate  
The study received approval from the research council of Golestan University of Medical Sciences (ethics approval code: IR.GOUMS.REC.1396.239). Written

consent was obtained from all participants.

### Conflict of interest

The author declares that there is no conflict of interest regarding publication of this article.

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