



Post-Tonsillectomy Bleeding: Assessing the Merit of Some Risk Factors in a Series of Saudi Patients

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ABSTRACT

Background: Post-tonsillectomy bleeding is a commonly encountered problem due to several risk factors. This study aimed to assess the burden of post-tonsillectomy bleeding and its possible hematological risk factors in Saudi Arabia. **Methodology:** This is a retrospective study involved a series of 311 patients who attended with evidence-based indications of tonsillectomy and subsequently underwent surgical removal of the tonsils, with or without adenoidectomy (adeno/tonsillectomy). All of the patients underwent bipolar diathermy surgical techniques. **Results:** Out of the 311 patients, 67.5% underwent tonsillectomy and 32.5% underwent adenotonsillectomy. Post-tonsillectomy bleeding was experienced in 5.8% patients, 6.9% were males and 4% were females. The males' risk (relative risk (RR)) of Post-tonsillectomy bleeding and the 95% confidence interval 95% CI): RR (95% CI)=1.7011 (0.6220 to 4.6521), $p=0.3007$. **Conclusion:** The prevalence of post-tonsillectomy bleeding is relatively higher in Saudi Arabia than the reported values in most studies. Factors such as post-operative infection, use of bipolar diathermy technique, and pain might be incriminated in the reported cases of postoperative bleeding in the current study.

Keywords: Post-tonsillectomy bleeding, Tonsillectomy, Adenoidectomy, Saudi Arabia, Posttonsillectomy hemorrhage

INTRODUCTION

Surgery of the tonsils remains one of the most common treatments during childhood [1]. Tonsillectomy is defined as a surgical procedure performed with or without adenoidectomy that completely removes the tonsil, including its capsule, by dissecting the peritonsillar space between the tonsil capsule and the muscular wall [2].

Tonsillectomy is a low-risk surgical method, which is widely accepted for surgical treatment of tonsils [3]. For many years, researchers and ENT surgeons have developed new procedures for tonsillectomy in order to reduce intraoperative complications and postoperative morbidity.

It is well accepted that the ideal tonsillectomy technique should lessen the operative time, bleeding, postoperative hemorrhage and morbidity [4]. The post-tonsillectomy hemorrhage occurs rarely but is a life-threatening complication [5]. Complications of adult outpatient tonsillectomies are common and may be associated with significant morbidity, health care utilization, and expenditures [6]. It was found that the surgical technique used for tonsillectomy and adenotonsillectomy with the lowest post-tonsillectomy hemorrhage rate is the hot technique; these results are statistically significant. This technique should be used whenever possible, in order to lower the risk of post-tonsillectomy hemorrhage [5].

Three to ten percent of tonsillectomy patients experience post-tonsillectomy hemorrhage [7]. Post-operative bleeding

is one of the most common complications that can result in increased patient distress and hospitalization. It was suggested that suturing the tonsil pillars immediately post-tonsillectomy may reduce the risk of severe postoperative bleeding necessitating a return to the operating room for some patients [8]. However, there is a lack of literature from Saudi Arabia regarding tonsillectomy, consequently, this study aimed to assess the burden of post-tonsillectomy bleeding and its possible hematological risk factors in Saudi Arabia.

MATERIALS AND METHODS

This is a prospective study involved a series of 311 patients who attended with evidence-based indications of tonsillectomy and subsequently underwent surgical removal of the tonsils, with or without adenoidectomy (adeno/tonsillectomy). All of the patients underwent bipolar diathermy surgical techniques. Records related to all patients selected for adeno/tonsillectomy including the results of laboratory tests were retrieved from Ear, Nose, Throat (ENT) department, King Khalid hospital in Hail, Northern Saudi Arabia. Demographical characteristics including; age and gender were also recorded.

Ethical Consent

Our study protocol was confirmed according to the 2013 Declaration of Helsinki and this study was approved by the ethics committee of the College of Medicine, University of Hail, Saudi Arabia.

Statistical Analysis

Statistical analysis was performed using SPSS software for Windows (version 16.0, SPSS Inc., Chicago, IL, USA). Categorical variables are given as frequencies and percentages, and continuous variables. For all statistical comparisons, a p-value below 0.05 was considered statistically significant.

RESULTS

This study investigated 311 patients underwent tonsillectomy, aged 2-49 years old with a mean \pm std. deviation age was 11.18 ± 6.67 years, including 188 (60.5%) males and 123 (39.5%) females. Out of the 311 patients, 210 (67.5%) underwent tonsillectomy and 101 (32.5%) underwent adenotonsillectomy. Out of the 188 males, 121 (64.4%) underwent tonsillectomy and the remaining 67 (35.6%) underwent adenotonsillectomy, hence, out of the 123 females, 89 (72.4%) underwent tonsillectomy and 34 (27.6%) underwent adenotonsillectomy.

Post-tonsillectomy bleeding was experienced in 18/311 (5.8%) patients, 13/188 (6.9%) were males and 5/123 (4%) were females. The males' risk (relative risk (RR)) of Post-tonsillectomy bleeding and the 95% confidence interval (95% CI): RR (95% CI)=1.7011 (0.6220 to 4.6521), $p=0.3007$. The highest bleeding frequencies were observed in days 2 and 5, both representing 4/18 (22.2%). Among males, bleeding was frequent in days 1 and 5, representing 3/13 (23%), hence, among females, day 2 witnessed the highest rate constituted 3/5 (60%), as indicated in Table 1 and Figure 1.

All of the patients underwent bipolar diathermy surgical technique (100%). None of the patients experienced a recurrent attack of tonsillitis (100%). All of the patients submitted to conservative management.

Table 1 Tonsillectomy by sex

Variable	Males	Females	Total
Surgery Type			
Tonsillectomy	121	89	210
Adenotonsillectomy	67	34	101
Total	188	123	311
Post-tonsillectomy Bleeding			
Yes	13	5	18
No	175	118	293
Bleeding Days			
Day 1	3	0	3
Day 2	1	3	4
Day 3	2	0	2

Day 4	2	0	2
Day 5	3	1	4
Day 6	1	0	1
Day 7	0	0	0
Day 8	0	0	0
Day 9	0	0	0
Day 10	1	0	1
Day 11	0	1	1
Total	13	5	18

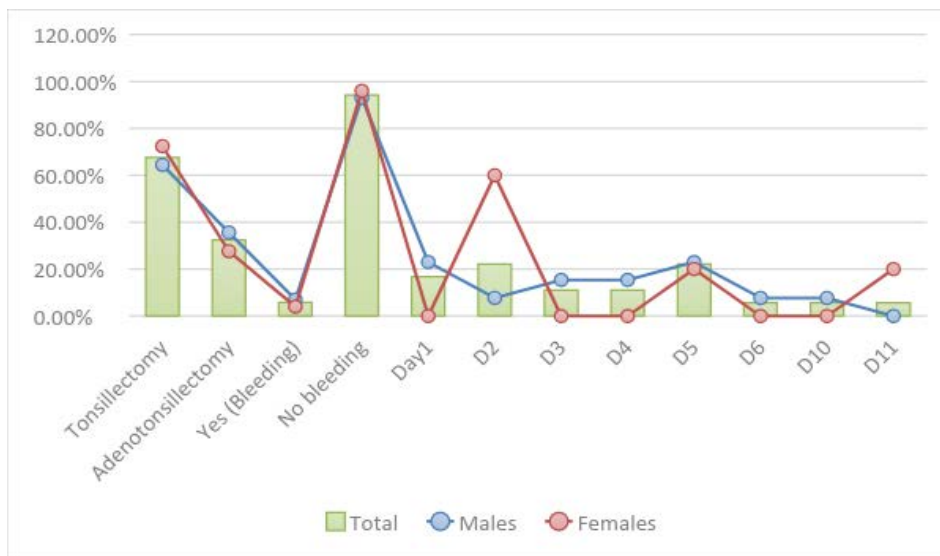


Figure 1 Tonsillectomy by sex

With regard to the age, the majority of the patients were at the age range 7-10 years followed by <7 years, constituting 108/311 (34.7%) and 80/300 (25.7%), this order. Patients with age <7 years, 49/80 (61.3%) have performed tonsillectomy compared to 31/80 (38.7%) in adenotonsillectomy. In the age group 7-10 years, 69/108 (63.9%) patients underwent tonsillectomy compared to 39/108 (36.1%) of adenotonsillectomy cases, as described in Table 2 and Figure 2. With regard to the tonsillectomy and age, most cases were seen at the age group 7-10 years followed by <7 years, and 12.1-18 years, representing 69/210 (32.9%), 49/210 (23.3%), and 37/210 (17.6%), respectively, as shown in Figure 2. Elevated cases of adenotonsillectomy were observed in the age group 7-10 years followed by <7 years, and 12.1-18 years, representing 39/101 (38.6%), 31/101 (30.7%), and 15/101 (14.9%), correspondingly, as shown in Figure 2. Most cases of post-tonsillectomy bleeding were seen at the age group 7-10 years followed by <7 years constituting 9/18 (50%) and 6/18 (33.3%), in this order, as described in Table 2. For the age group, 10-12 years most cases of bleeding were seen as day 5 followed by days 4 and 3. For the age group <7 years, frequent bleeding experienced in day 2, as indicated in Table 2 and Figure 3.

Table 2 Tonsillectomy by age

Variable	<7 years	7-10yrs	10.1-12yrs	12.1-18yrs	18+yrs	Total
Surgery Type						
Tonsillectomy	49	69	30	37	25	210
Adenotonsillectomy	31	39	14	15	2	101
Total	80	108	44	52	27	311
Post-tonsillectomy Bleeding						
Yes	6	9	0	1	2	18
No	74	99	44	51	25	293
Bleeding Days						
Day 1	1	1	0	1	0	3

Day 2	2	1	0	0	1	4
Day 3	0	2	0	0	0	2
Day 4	0	2	0	0	0	2
Day 5	0	3	0	0	1	4
Day 6	1	0	0	0	0	1
Day 10	1	0	0	0	0	1
Day 11	1	0	0	0	0	1
Total	6	9	0	1	2	18

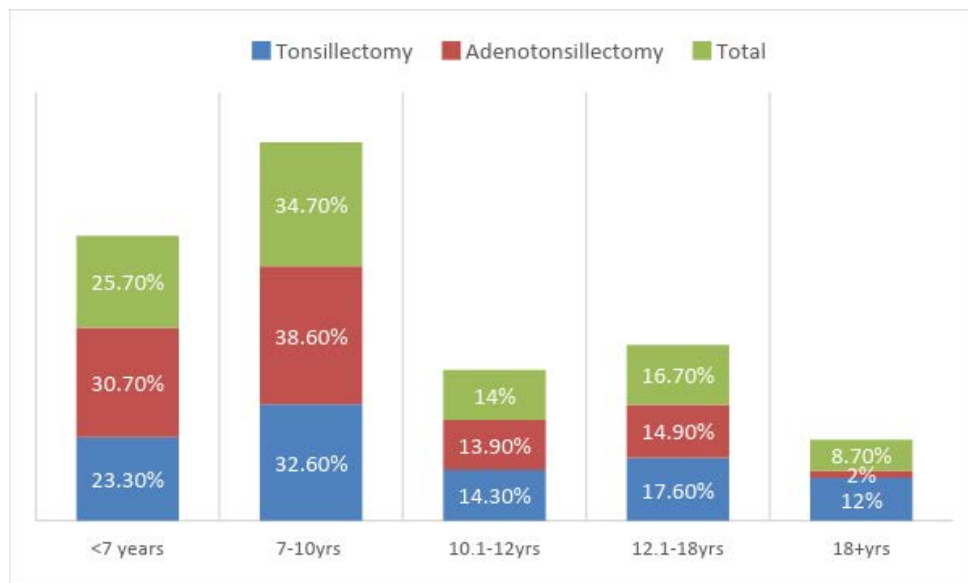


Figure 2 Tonsillectomy proportions within each age group

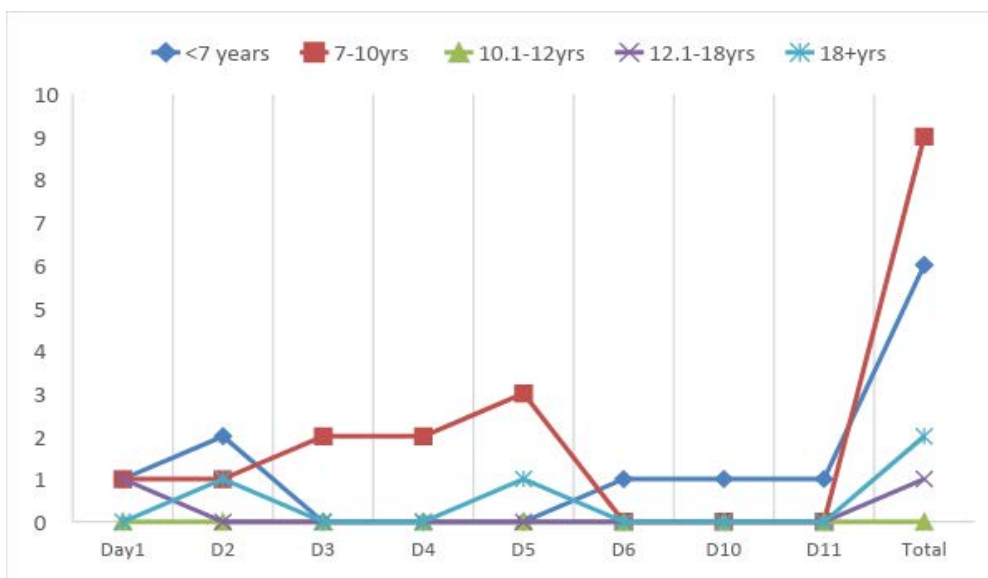


Figure 3 Post-tonsillectomy bleeding by bleeding days

The associations between post-tonsillectomy bleeding by Surgery type, white blood cells (WBC) count and hemoglobin (Hb) concentration were summarized in Table 3 and Figure 4. Post-tonsillectomy bleeding was relatively significantly associated with tonsillectomy surgical procedure; the RR (95% CI)=3.8476 (0.9019 to 16.4146), p=0.0687, z statistic=1.820.

Before tonsillectomy only 2/18 (11%) of the patients with subsequent bleeding attended with high WBCs total count, hence, 30/293 (10%) of the patient without subsequent bleeding attended with high total WBC count. After surgery, 8/18 (44.4%) of the patients with bleeding showed a high WBC count. High WBC total count is a risk for post-tonsillectomy bleeding, and this was found to be statistically significant; the RR (95% CI)=4.00 (0.9814 to 16.3029), p=0.0531, z statistic=1.934. Lower Hb concentrations were experienced in 5/18 (27.8%) after the surgery compared to 3/18 (16.7%) before the surgery among the bleeding patients. The RR (95% CI)=1.6667 (0.4664 to 5.9560), p=0.4318, z statistic=0.786.

Table 3 Post-tonsillectomy bleeding by Surgery type, WBC count and Hb concentration

Variable	Post-tonsillectomy Bleeding		
	Yes	No	Total
Surgery Type			
Tonsillectomy	16	194	210
Adenotonsillectomy	2	99	101
Total	18	293	311
WBC Before			
Low	1	11	12
Normal	15	250	265
High	2	30	32
Total	18	291	309
WBC After			
Low	0	0	0
Normal	10	0	10
High	8	0	8
Total	18	0	18
Hemoglobin (Hb) Before in mg/dl			
<12	3	40	43
12-13.5	9	138	147
13.6-15.5	5	105	110
15.6-17.5	1	8	9
17.6+	0	2	2
Total	18	293	311
Hemoglobin (Hb) After in mg/dl			
<12	5	0	5
12-13.5	5	0	5
13.6-15.5	5	0	5
15.6-17.5	5	0	5
17.6+	2	0	0
Total	18	0	18

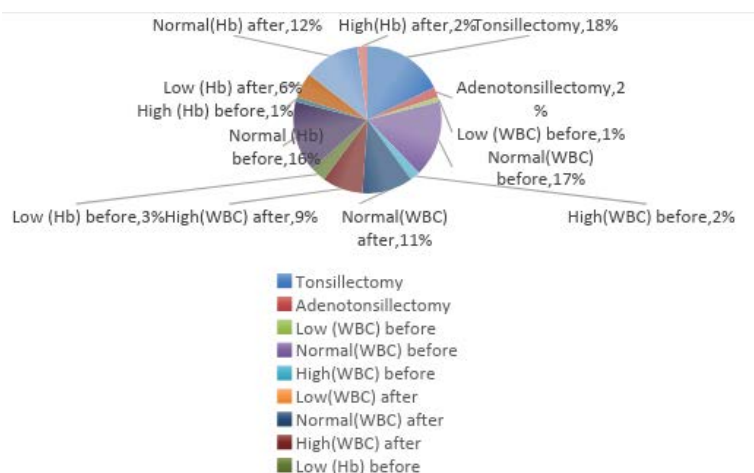


Figure 4 Post-tonsillectomy bleeding by Surgery type, WBC count and Hb concentration

Table 4, summarized the post-tonsillectomy bleeding by bleeding parameters. High platelets' counts were found in 5/18 (27.8%) of the patients after the surgery compared to only 2/18 (11%) before the surgery. The RR (95% CI)=2.6389 (0.5842 to 11.9195), $p=0.2072$, z statistic=1.261. Prothrombin time (PT) and partial thromboplastin time (PTT) didn't any considered differences before and after the surgery among bleeding patients. Low international normalized ratio (INR) was detected in 6/7 (85.7%) of the patients after the surgery and in none of the patients with subsequent bleeding before the surgery. The RR (95% CI)=13.00 (0.8698 to 194.2908), $p=0.0630$, z statistic=1.859.

Table 4 Post-tonsillectomy bleeding by bleeding parameters

Variable	Post-tonsillectomy Bleeding		
	Yes	No	Total
Platelets Before			
Low	1	3	4
Normal	15	255	270
High	2	35	37
Total	18	293	311
Platelets After			
Low	1	0	1
Normal	12	0	12
High	5	0	5
Total	18	0	18
PT Before			
<11 seconds	4	66	70
11-13.5	13	201	214
13.6+	1	11	12
Total	18	278	296
PT After			
<11 seconds	2	0	2
11-13.5	5	0	5
13.6+	0	0	0
Total	7	0	7
INR Before			
Low	0	1	1
Normal	16	262	278
High	2	19	21
Total	18	282	300
INR After			
Low	6	0	6
Normal	1	0	1
High	0	0	0
Total	7	0	7
PTT Before			
Low	1	15	16
Normal	14	204	218
High	2	49	51
Total	17	268	285
PTT After			
Low	0	0	0
Normal	7	0	7
High	0	0	0
Total	7	0	7

DISCUSSION

Since there is an overall paucity of literature regarding tonsillectomy in general and post-tonsillectomy bleeding and its possible risk factors from Saudi Arabia, this study is reporting post-tonsillectomy bleeding in a series of patients from Northern Saudi Arabia. The overall prevalence of post-tonsillectomy bleeding in the present study was 5.8%, and the prevalence rate was high among males (6.9%) compared to females (4%). A prevalence of 6.1% of post-tonsillectomy bleeding was previously reported from Southern Saudi Arabia [9]. Another study from Saudi Arabia has reported a prevalence of 27% [10], which is very high compared to the findings of the present study. This variability might be attributed to the low sample size (n=60) and the variability in the techniques used which included the bipolar, monopolar and cold techniques, whereas, the present study applied only bipolar diathermy technique. However, another study from Saudi Arabia has reported that post-tonsillectomy bleeding according to the surgical procedure was considerably higher among patients who undertook bipolar diathermy than cold dissection procedure ($p<0.05$) [11]. It was reported that all hot techniques increase the risk of post-tonsillectomy bleeding and the risk for a return to the theatre was higher for all hot techniques except for coblation [12]. Microdebrider intracapsular tonsillectomy is associated with lower mortality and morbidity as compared to cold steel, coblation, electrodissection, laser and radiofrequency [13]. However, the prevalence rates reported nationwide and in meta-analysis studies were below 5% [5,14], which is lower than the reported incidence in this study.

In the present study, the highest bleeding percentages were observed in days 2 and 5, both representing 22.2%. Among males, bleeding was frequent in days 1 and 5, demonstrating 23%, hence, among females, day 2 witnessed the highest rate constituted 60%. With the absence of established criteria for categorizing on what day the post-operative bleeding can occur, the earlier bleeding may be attributed to hematological factors disorders, whereas, the later bleeding may be caused by infections or other factors. Moreover, patients who have severe or increasing pain in the first few days after tonsillectomy have a significantly higher risk of hemorrhage [15].

In this study, the highest frequencies of post-tonsillectomy cases were found in patients under the age of 10 years. Several studies indicated that post-tonsillectomy is more common among younger children [16]. In the present study, 44.4% of the patients with post-tonsillectomy were found with significantly ($p<0.05$) higher total WBC count. Such findings may raise the possibility of infectious risk factors. On the other hand, the use of an antibiotic may reduce the probability of infections. In a systematic review, including meta-analyses for select outcomes, suggests that although individual studies vary in their findings, there is no evidence to support a consistent, clinically important impact of antibiotics in reducing the main morbid outcomes following tonsillectomy [17]. Moreover, a recent study failed to support clear evidence to use routinely post-operative antibiotics to reduce post-tonsillectomy morbidities [18].

Relatively lower hemoglobin and higher platelet counts were observed in 27.8% of the patients. PT and PTT showed no apparent differences before and after the operation. Such findings were previously reported as coagulation test results are irrelevant for the course of tonsillectomy and postoperative bleeding events [19]. Low INR was detected in 85.7% of the patients after the surgery and in none of the patients with subsequent bleeding before the surgery. This reduced value may be due to the influence of the treatment.

Although the present study provided some important clues about the encumbrance of tonsillectomy and its associated risk of bleeding in Saudi Arabia, it has some limitations including its retrospective setting and the relatively small number of patients with post-tonsillectomy hemorrhage.

CONCLUSION

The prevalence of post-tonsillectomy bleeding is relatively higher in Saudi Arabia than the reported values in most studies. Factors such as post-operative infection, use of bipolar diathermy technique, and pain might be incriminated in the reported cases of postoperative bleeding in the current study.

DECLARATIONS

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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