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Post Tonsillectomy Bleeding among Children in a Tertiary Hospital in the Kingdom of Bahrain: Two Years Experience

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Abstract

Background: Palatine tonsils are part of the immune system located within the Waldeyer's ring, they are prone to infections, hypertrophy or both. These conditions are known as tonsil diseases that usually require surgical removal through tonsillectomy. Tonsillectomy is one of the most common procedures done for children but it is challenged by the occurrence of complications, especially post tonsillectomy bleeding (PTB). In the current study, the incidence of post tonsillectomy bleeding in children younger than 14 years undergoing tonsillectomy in Salmaniya Medical Complex is evaluated and their demographic data and risk factors are assessed. **Method:** Pediatric patients who are younger than 14 years with postoperative tonsillectomy bleeding that were treated in Salmaniya Medical Complex between the period of January 2018 and December 2019 were retrospectively studied for risk factors. **Results:** A total of 1161 patients within the age range of 2 - 13 years old underwent tonsillectomy in Salmaniya Medical Complex from the period of January 2018 to December 2019. Twenty-eight pediatric patients had post-tonsillectomy bleeding (PTB) during the study period with an incidence of 2.4% of the total number of pediatric tonsillectomies done in our institute. The majority were male patients and the mean age was 6.2 years. The main indication of tonsillectomy for those with bleeding was recurrent tonsillitis. A second surgery was needed in 64.5% to control the bleeding. The size of the tonsil, the level of the surgeon and the season at which the tonsillectomy was done did not seem to have any effect on the incidence of post-tonsillectomy bleeding (PTB). **Conclusion:** The incidence of post tonsillectomy bleeding (PTB) in Salmaniya Medical Complex is 2.4%, which makes it a common complication for a common surgery irrelevant to any patient, surgeon or climate related factors.

Keywords

Pediatric Tonsillectomy, Post Tonsillectomy Bleeding (PTB), Primary Post Tonsillectomy Bleeding, Secondary Post-Tonsillectomy Bleeding, Tonsillectomy

1. Introduction

Palatine Tonsils are aggregates of lymphoid tissues that provide barriers to the spread of pathogens into the human body. They are prone to infections, hypertrophy or both. These conditions are common in children and known as tonsillar diseases usually requiring surgical excision through tonsillectomy [1] [2] [3] [4].

Tonsillectomy is one of the most common surgical procedures performed on children [1] [2] [3] [5] [6] [7] [8]. Indications for surgery are variable, like repeated attacks of acute tonsillitis, tonsil hypertrophy with obstructive sleep apnoea [1] [2] [3] [5] [8] [9], haemorrhagic tonsillitis, dysphagia, halitosis and sampling the tonsils in case of suspected malignancy [1] [2] [4] [10].

The benefits of the procedure are challenged by occurrence of complications such as dehydration, reduced oral intake, post-operative pain that does not respond to analgesia, infection and post tonsillectomy bleeding (PTB) [1]-[7] [10] [11].

Post tonsillectomy bleeding (PTB) is a serious complication [2] [3] [4] [8] [9] [10] [11] and considered a real ENT emergency especially in children [1] [4] [5] [6] [7] [10]. It occurs in around 2% - 4% of both adults and children undergoing tonsillectomy [1] [2] [4] [5] [8] [10]. Its incidence ranges from 0% - 12.7% [9]. It is linked to one-third of the mortality cases in relation to tonsillectomy [2]. Post tonsillectomy bleeding (PTB) is divided into primary and secondary bleeding [1]-[6] [8] [9] [10] [11] [12]. Bleeding that occurs within the first 24 hours of the surgery is considered primary bleeding, whereas secondary bleeding is referred to bleeding occurring after 24 hours of surgery [2] [3] [4] [5] [6] [8] [9] [10]. Many patients require a second surgery to control the bleeding [1] [4] [6] [8] [9] [10]. Recognizing PTB as a complication as early as possible is of paramount importance along with the possible associated factors leading to this serious complication [1] [2] [5] [8] [9] [10]. In this paper we are evaluating potential factors that might predispose some patients into this unfortunate event.

2. Aim of the Study

To estimate the local incidence of post tonsillectomy bleeding in children younger than 14 years undergoing tonsillectomy during the period of January 2018 to December 2019 at Salmaniya Medical Complex and to assess their risk factors.

3. Materials and Methods

The study is a retrospective case series, conducted by Otorhinolaryngology head

and neck surgery department at Salmaniya Medical Complex (SMC) in Manama, which is the main governmental hospital in the Kingdom of Bahrain, where around 700 tonsillectomy cases are done per year. Paediatric constitutes the majority of cases. All paediatric patients aged 1 to 13 years who presented to us with post-tonsillectomy bleeding (PTB) from the period of January 2018 till December 2019, were included in the study. Patient who had their primary surgery in another hospital and presented to us at a later date with post-tonsillectomy bleeding (PTB), were excluded from the study. The analysed data included; biographical data of the patients, and reported risk factors in literature such as the reason for tonsillectomy, size of the removed tonsils, time of bleeding from surgery, level of the required intervention and the level of the operating surgeon.

All patients had tonsillectomy with or without adenoidectomy, under general anaesthesia using either cold dissection or hot dissection with bipolar diathermy. Haemostasis was achieved by packing the tonsillar fossae with saline soaked packs and cauterizing the bleeders with bipolar diathermy.

All of these patients were observed for at least twenty-four hours post-operatively and kept on systemic pain killers, antibiotics and dexamethasone. On discharge, they were prescribed paracetamol, NSAIDS and antibiotics. They were followed for at least two weeks after the surgery. All patients were advised to present immediately to us in case of bleeding.

Every child with secondary post-tonsillectomy bleeding (PTB) was readmitted and managed either conservatively or surgically. Conservative treatment included observation for bleeding, vital signs monitoring, hydration, pain management and systemic antibiotics. Surgical management was achieved with bipolar electro-cautery which was used in most of the cases or with ligation of bleeders.

None of the patients required any extensive interventions like angioplasty or neck exploration for bleeding control.

Data collection methods:

All patients with postoperative tonsillectomy bleeding were identified from the morbidity and incidents reports which are available in our centre. Patient's data were collected using their electronic medical records, in addition to operation theatre logbook.

Data management and analysis plan:

The data were analysed using SPSS 19 and PSPPIRE data editor. P value <0.05 was considered statistically significant.

4. Results

A total of 1161 patients within the age range of 2- 13 years old underwent tonsillectomy in Salmaniya Medical Complex from the period of January 2018 to December 2019. Tonsillectomy was done with adenoidectomy in 1033 patients. Out of 1161 patients, 402 (34.6%) were females and 759 (65.3%) were males (Table 1).

During this period of time, 35 patients were treated in our centre with posttonsillectomy bleeding (PTB). However, seven patients had their tonsillectomy in another hospital and hence were excluded from the study. Only 28 children with PTB were included, with an incidence of (2.4%) among all the paediatric tonsillectomies (Table 1).

The age of the children that were involved in the study ranges from 2 - 13 years old. The mean age of children with PTB in this case-series was 6.2 years (SD = ±2.8). Seventeen patients were males (61%) and 11 (39%) were females (p = 0.59) (Figure 1).

Recurrent tonsillitis was the main indication in 25/28 cases (89.3%) and tonsil hypertrophy was the indication in 3/28 patients (10.7%) (P = 0.75).

Two patients (7.1%) had primary PTB and 26 (92.9%) had secondary PTB. The two cases of primary PTB occurred after two and four hours of the surgery with an average of three hours. Both returned back to the operation theatre for surgical control (Table 2).

The average time interval between the tonsillectomy and the incidence of secondary bleeding was 7.7 days (SD = ±3.4) (Figure 2). However, the range of days was 2 - 16 days post tonsillectomy. No patient came with PTB beyond the 16th day. Nonetheless, 72.2% of the patients who required general anaesthesia for bleeding control (13/18) had their PTB within the first 7 days after tonsillectomy (p = 0.05).

Only 35.7% (10/28) were managed conservatively, while 64.5% (18/28) required a second surgery to control the bleeding under general anaesthesia. All patients with primary PTB required a control under general anaesthesia (100%), while those presenting with secondary PTB needed bleeding control under general anaesthesia in 61.5% of cases (16/26). Majority of paediatric patients who needed to visit the operating theatre for control were males as they constitute

Table 1. Comparison of tonsillectomy cases by gender.

Variables	males	females	Total
TY With PTB	17 (2.2%)	11 (2.7%)	28 (2.4%)
TY Without PTB	742 (97.8%)	391 (97.3%)	1133 (97.6%)
Total number of tonsillectomies	759 (100%)	402 (100%)	1161 (100%)

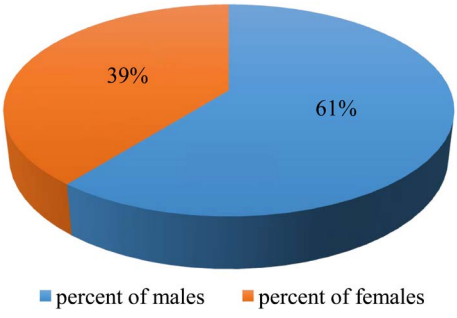

Figure 1. Stratification of post tonsillectomy patients in relation to gender.

Table 2. Factors frequency in relation to type of PTB management.

Variable	Frequency and percentage	Control under GA N = 18	Conservative N = 10	P value
Gender				
Male	17 (60.7%)	12	5	0.38
Female	11 (39.3%)	6	5	
Indication for TY				
Frequent tonsillitis	25 (89.3%)	16	9	0.75
Tonsil hypertrophy	3 (10.7%)	2	1	
Size of the tonsils				
Grade 2	5 (17.9%)	2	3	0.38
Grade 3	11 (39.3)	7	4	
Grade 4	12 (42.9)	9	3	
Surgeon level				
Specialist	17 (60.7%)	10	7	0.93
trainee	11 (39.3%)	8	3	
Season				
Hot season	11 (39.3%)	7	4	0.43
Cold season	17 (60.7%)	11	6	
Side of bleeding				
Left fossae	9 (25%)	7	2	0.41
Right fossae	7 (32.1%)	1	6	
Bilateral fossae	12 (42.8%)	10	2	
Time of PTB				
Before 7 days	16 (57.2)	13	3	0.05*
After 7 days	12 (42.8)	5	7	

*Significant.

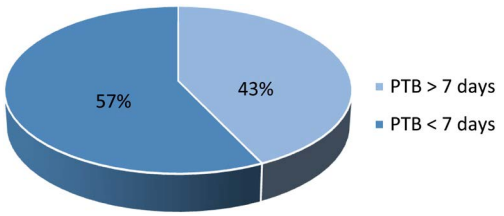

Figure 2. Percentage of post tonsillectomy bleeding in relation to time of presentation.

66.6% (12/18), while females constitute 33.3% (6/18). (p = 0.38). The ratio of male to female requiring control of PTB under GA was 2:1 (**Figure 3**).

Eighteen out of the total tonsillectomy patients (1161) needed to be taken back to the operating room for control of PTB (1.5%). None of the patients required any extensive interventions like angioplasty or neck exploration for bleeding control.

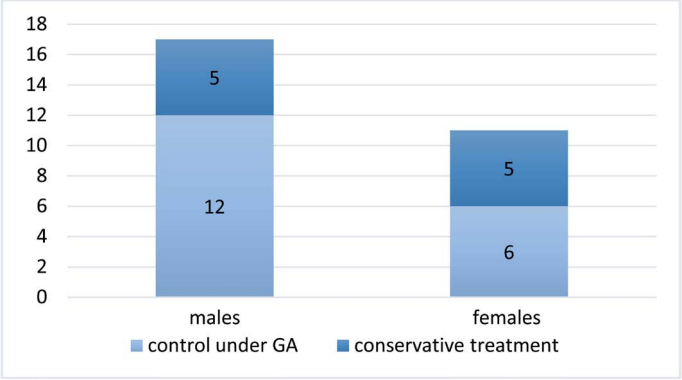

Figure 3. Management of post tonsillectomy bleeding by gender.

Seventeen out of the 28 children with PTB (70.8%) were originally operated by qualified specialist and 11/28 were operated by trainees (29.2%).p value 0.40.

The size of the removed tonsils was documented in all the PTB cases and graded on Friedman grading scale [6]. Grade II was found in 17.6% (5/28), grade III was found in 39.2% (11/28) and grade IV was found in 42.8% (12/28). Grade III and IV (23/28) were deemed as large tonsils. Tonsils with a grade of less than III (5/28) were deemed as small tonsils ($p = 0.41$).

Bilateral tonsillar fossa bleeding was accounted for 57.1% (16/28) and unilateral fossa bleeding was accounted for 49.1% (12/28). ($p = 0.41$). Unilateral bleeding was divided into right sided fossa bleeding in 25% (7/28) and left sided fossa bleeding in 32.1% (9/28). The exact location of the bleeding within the fossae was not reported in the majority of cases.

PTB occurred in 17/28 children during the hot season that extends across the period of April to October and occurred in 11/28 patients during the cold season that lasts from November till March ($p = 0.23$).

Two patients had more than one episode of secondary PTB, they constitute 7.1% of the children who had PTB (2/28). One patient had two episodes of PTB on day seven and on day twelve and was conservatively treated in both episodes. The second patient had three episodes of bleeding on days five, twelve and sixteen that required bleeding control under general anaesthesia in each incident, they were readmitted, kept on IV tranexamic acid in their recurrent bleeding episodes and did not require blood transfusion. However, these children were referred to a paediatric haematologist for evaluation and none of them was found to have an underlying bleeding disorder.

Four patients of the total PTB children (14.3%) needed blood transfusion due to significant blood loss. Moreover, there were no reported deaths in this study.

5. Discussion

Tonsillectomy is one of the most common surgical procedures performed on children [1] [2] [3] [5] [6] [7] [8]. Unfortunately, it is not without complications [1]-[7] [10] [11]. Post tonsillectomy bleeding (PTB) remains the most common and feared complication particularly in paediatrics [2] [3] [4] [8] [9] [10] [11]. It

is associated with one third of the mortality cases related to tonsillectomy [2]. Despite the efforts to reduce its incidence, it occurs in around 2% - 4% of both adults and children undergoing tonsillectomy [1] [2] [4] [5] [8] [10]. However, many studies showed that the incidence was varied and ranging from 0% - 12.7% [9]. This variability is thought to be affected by several factors [1]-[12].

In our study the incidence of PTB was 2.4% in children. Many studies reported a similar incidence of less than 4% in paediatrics [1] [5] [8].

Although there is a global shift of tonsillectomy prime indication from infectious causes to obstructive causes related to tonsillar hypertrophy [2] [5]. In our study we found that recurrent tonsillitis was the indication in 89.3% of those who had PTB and tonsillar hypertrophy was the indication in 10.7%. These figures are seen in many other studies [8] [9] [12]. However, Alvo *et al.* reported in their cohort study that sleep-disordered breathing was the main indication for surgery in patients presenting with PTB. Conversely, he reported that smaller tonsils had a higher chance of PTB [5]. In our study, the size of the tonsil did not play a major role in the incidence of PTB. Kim *et al.* had a similar finding to ours [6].

In a study conducted by Al-Ani, males had a higher risk of sustaining PTB and that risk was statically significant between males and females [9]. Nevertheless, in the present study males constitute 60.7% of those presenting with PTB, and had a higher need for control under general anaesthesia compared to females with a ratio of 2:1 but these differences were statically insignificant.

The average age of children with PTB was 6.2 years and the majority aged between six and nine years. The same was observed in AlOtaibi *et al.* study, stating that the range of age for the majority of children with PTB to be between seven and ten [7]. Kim *et al.* reported a mean age of 6.8 years [6], while Alvo *et al.* reported a mean age of 7.3 [5].

Post tonsillectomy bleeding is divided according to the time of bleeding onset into a primary PTB which occurs within the first 24 hours of the operation and a secondary PTB that occurs after 24 hours within the first 28 days of tonsillectomy [2] [3] [4] [5] [6] [8] [9] [10].

In the current study, primary PTB occurred in 7.1% of children and secondary PTB occurred in 92.9%, this higher incidence of secondary bleeding compared to the primary bleeding was also seen in other studies [2] [4] [5] [6] [8] [9] [11] [12]. Although we had only few cases of primary PTB, they took place in the first few hours post-surgery with an average of three hours. Other studies showed a low incidence of primary PTB after eight hours of tonsillectomy [9] which could change the current practice in our institute from admitting paediatric tonsillectomies to observing them in a day case setting for several hours. This was suggested by some authors [5] [9].

Alvo *et al.*, found that only 40% of paediatrics with primary PTB needed a second surgery to control the bleeding [5] but in our study all paediatrics with primary PTB needed a second general anaesthesia for bleeding control.

In regard to secondary PTB, the average number of days from tonsillectomy

to the incidence of bleeding was 7.7 days (SD = ±3.3) with no bleeding beyond day 16. These findings were close to the data published by Alvo *et al.* who reported no bleeding beyond day 16 and Hussain *et al.*, who reported no bleeding beyond day 18 [5] [7]. A published meta-analysis reported that 27.4% of patients needed a second visit to the operating theatre to control their secondary PTB while 61.5% of our secondary PTB cases required so [5]. Hussein eta al, stated that 90% of patients presenting with a single episode of bleeding had to go for a second surgery to control their bleeding. Moreover, he noticed that children with PTB that were controlled under general anaesthesia were less likely to have recurrence [10]. This finding was difficult to test in the present study as we had only two patients with recurrent PTB.

The findings emerged from the present study showed that the experience of the operating surgeon did not contribute to the occurrence of PTB, suggesting that such a complication is unavoidable and can occur despite appropriate training [9] [11].

Bilateral tonsillar fossa bleeding was accounted for 57.1% and unilateral fossa bleeding was accounted for 49.1%. This difference was not statically significant. Al-Ani achieved the same result in his study [9].

In our series, it has been found that climate does not have an important effect on the incidence of PTB. Although, more patients had PTB during the hot season from April to October and less during the colder months, this difference does not have any statistical significance.

We found that 14.3% of paediatrics with PTB needed blood transfusion, despite the fact that the need for blood transfusion in PTB patients is known to be around 0.04% [10], which makes the rate of blood transfusion in our centre higher than the usual. Systemic tranexamic acid is usually added in our centre to those with recurrent bleeding. In our study the role of tranexamic acid on the rate of bleeding recurrence or the need for blood transfusion is not significant but its role to reduce the rate of re-visiting the operating theatre for control was significant according to Smith *et al.* [13].

All the patients in this study were kept on antibiotics after their surgery and yet presented at a later date with PTB. Hence it seems that antibiotics do not have a protective effect against post-operative bleeding. This has been described before in literature [4] [7]. Despite that, giving antibiotics post-tonsillectomy is the routine practice in our institute. Conducting a randomized controlled study in our hospital, maybe recommended to change this practice.

Our study was limited due to small size sample and under reported data like the incidence of PTB in relation to the operative technique during tonsillectomy and the exact location of bleeding within the fossae. Moreover, more studies are needed to evaluate our current practice, as we suggested earlier.

6. Conclusion

PTB is a common complication of tonsillectomy in paediatrics, its incidence in

Salmaniya Medical Complex is similar to the expected incidence worldwide. It is an unavoidable complication with no obvious patient, surgeon or climate related risk factors. Further studies are needed to set recommendations in the management of paediatric tonsillectomies in the future.

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Ethical Considerations

Ethical approval letter submitted to the research committee and approval received.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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