Post-Tonsillectomy Bleeding: Incidence and Risk Factors Running Title: PTB: Incidence and Risk Factors

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ABSTRACT

Background: The most serious complication of tonsillectomy is hemorrhage. Primary post-tonsillectomy bleeding (PTB) occurs during the first 24 hours following the procedure. Secondary PTB occurs most frequently between the 5th-8th postoperative days.

Aims: To evaluate the incidence of PTB and to elucidate any risk factors for such complication.

Materials and methods: This retrospective cohort study reviewed the medical records of all patients who underwent tonsillectomy with or without adenoidectomy between 1/1/2008 and 12/31/2009 at the AL-Ramadi Teaching Hospital in AL-Ramadi, Iraq. Data on patient age, gender, reason for tonsillectomy, occurrence and timing of PTB were recorded.

Results: Data were available for 2795 patients who underwent tonsillectomy or tonsillectomy and adenoidectomy during the study period. The incidence of PTB was1.2%. Seventy six point five percent was secondary bleeding while 23.5% was primary bleeding. The males were (61.8%), age group > 18 (64.7%) year and tonsillectomy for recurrent tonsillitis (44.1%) were more affected by bleeding. Seventy five percent of patients with primary and one patient (3.9%) with secondary bleeding have their bleeding controlled under general anesthesia (GA). Patients operated on by resident physicians were not more likely to have PTB than those operated on by attending surgeons. ($P < 0.05$)

Conclusion: The overall incidence of PTB was 1.2%. Secondary bleeding was more common than primary bleeding. Significant risk factors for PTB included male gender, age older than 18 years, and tonsillectomy indicated for recurrent infection.

Key Words: Post-tonsillectomy bleeding, Ramadi, Iraq.

Introduction

Tonsillectomy with or without adenoidectomy is one of the common world-wide surgical operations performed by otolaryngologists. Tonsillectomy techniques are currently undergoing something of a revolution. Until about ten years ago dissection tonsillectomy (first described by Edwin Pynchon in 1890), with hemostasis performed with ties or diathermy was the standard but more recently there has been an explosion of different dissection instruments described in an effort to try and reduce postoperative pain and haemorrhage associated with this procedure[1], Post-tonsillectomy bleeding (PTB) is a serious complication leading to morbidity and occasionally mortality.

According to the time of onset, PTB is divided into two categories:

- Primary (onset less than 24 hours following surgery).
- Secondary (onset more than 24 hours following surgery).

Technical errors are the most common cause of primary PTB, while infection is the most common cause for secondary bleeding.

The primary objective of this study was to evaluate the incidence of PTB in a cohort of patients undergoing tonsillectomy. The secondary objective of this study was to elucidate risk factors for PTB.

Patients and methods

A part from patients with bleeding tendency, the medical records of all other patients who had a tonsillectomy or tonsillectomy and adenoidectomy performed at AL-Ramadi Teaching Hospital from January 1, 2008 through December 31, 2009 were reviewed. During this time interval, tonsillectomy was performed by cold snare technique with Boyle Devis mouth gag under general anesthesia and is generally described as follows:

After removal of the left tonsil, an appropriate pack was left in the fossa for 5 minutes, then the right tonsil was removed and a pack left in its fossa for 5 minute. Secure of any bleeding points was performed after removal of the pack either by a ligature or electrocautery. Final assessment of the operative field was done after a relaxation period of the mouth gag for 3 minutes, Patients remained under observation for 24 hours and were then discharged on antibiotics (usually amoxicillin) and acetaminophen for 10 days.

If bleeding occurred, therapeutic interventions included observation, readmission to the hospital, removal of the clot, hydrogen peroxide and ice water gargles, pressure with gauze soaked with adrenaline on the bleeding point, blood transfusion [I wouldn't call a blood transfusion an intervention to address the bleeding—it's supporting the patient while the bleeding is addressed. However it is a good measure of how much bleeding the patient had]., and/or returning the patient to the operating room for hemostasis by ligature or electrocautery.

Data on PTB were collected, including the time/date of onset, severity, side and the site of bleeding (upper pole, middle pole, lower pole, or diffuse).

The method of control of bleeding—conservative (observation, removal of the clot, hydrogen peroxide and ice water gargles, pressure with gauze soaked with adrenaline on the bleeding point) vs return to OR for control—was recorded.

Comparisons of categorical variables were conducted using the $\chi 2$ test, crosstabs and t- test for

independent samples. The threshold for statistical significance was set at $p < 0.05$. All statistical analyses were conducted using SPSS statistical software, version 17.0. The study was approved by Surgical Department/ College of Medicine/ Anbar University.

Results

A total of 2795 patients underwent tonsillectomy with or without adenoidectomy during the study period. The age of them ranged from 1- 43 years with a mean of 9.13±6.55 years. Demographic characteristics are presented in Table 1. A total of 34 patients (1.2%) presented with PTB: 8 with primary and 26 with secondary bleeding. Table 1 shows the characteristics of the patients with PTB compared to those without PTB.

The patients with PTB were older than the patients without PTB (mean age 23.53 ± 9.89 vs 8.95 ± 6.26 ; $p < 0.001$). Males were more likely than females to have PTB ($p < 0.05$). Patients whose surgical indication was infection were more likely to bleed than those whose surgical indication was airway obstruction ($p < 0.001$). No statistical significance (P value =0.16) was found in the rate of PTB based on the level of training of the surgeon (attending vs resident).

There was no statistically significant difference between primary vs. secondary PTB regarding the age, sex, indication for surgery, side of bleeding, or the training level of the surgeon. Three quarters of primary PTB occurred within the first 8 hours postoperatively. Most of the secondary bleeding occurred within 3-5 postoperative days.

While there is a statistically significant difference between both types of bleeding with respect to the method of intervention (conservative versus control of bleeding under GA) and blood transfusion. No death was reported because of PTB (Table 2).

Table 1: Demographic characteristics of tonsillectomy patients with and without PTB.

Age group	Total N = 2795 n (%)	Without PTB N = 2761 n (%)	With PTB N = 34 n (%)	P- value
< 4 years	186 (6.6)	185 (6.7)	1 (2.9)	0.20
4-18 years	2193 (78.5)	2182 (79.0)	11 (32.4)	0.0001*
> 18 years	416 (14.9)	394 (14.3)	22 (64.7)	0.0001*
Sex				
Male	1167 (41.8)	1146 (41.5)	21 (61.8)	0.05*
Female	1628 (58.2)	1615 (58.5)	13 (38.2)	0.033*
Indication for tonsillectomy				
Airway obstruction	1801(64.4)	1789 (64.8)	12 (35.3)	0.003*
Recurrent infection	617 (22.1)	602 (21.8)	15 (44.1)	0.007*
Mixed	377 (13.5)	370 (13.4)	7 (20.6)	0.17
Surgeon				
Attending	1202 (43.0)	1186 (43.0)	16 (47.0)	0.65
Resident	1593 (57.0)	1575 (57.0)	18 (53.0)	0.70

* Significant difference

Table 2: Characteristics of patients with primary PTB versus secondary PTB

Age group	Primary PTB N = 8 n (%)	Secondary PTB N = 26 n (%)	p value
<4 years	1 (12.5)	0	
4-18 years	2 (25.0)	6 (23.1)	0.77
>18 years	5 (62.5)	20 (76.9)	0.23
Sex			
Male	5 (62.5)	16 (61.5)	0.92
Female	3 (37.5)	10 (38.5)	0.90
Indications			
Airway obstruction	2 (25.0)	10 (38.5)	0.08
Recurrent infection	4 (50.0)	11 (42.3)	0.40
Mixed	2 (25.0)	5 (19.2)	0.36
Level of surgeon			
Attending	4 (50)	12 (46.2)	0.68
Resident doctor	4 (50)	14 (53.8)	0.69
Time of bleeding			
First 8 hours	6 (75.0)	-	-
8-24 hours	2 (25.0)	-	-
3-5 days	-	17(65.4)	-
>5 days	-	9 (34.6)	-
Side of bleeding			
Right	4 (50.0)	14 (53.8)	0.69
Left	4 (50.0)	12 (46.2)	0.68
Blood transfusion			
Given	7 (87.5)	1 (3.9)	0.001*
Not given	1 (12.5)	25 (96.1)	0.001*
Control of bleeding			
Conservative#	3 (37.5)	25 (96.1)	0.001*
Return to the OR for hemostasis by ligature or electrocautery	5 (62.5)	1 (3.9)	0.001*
Death	0 (0.0)	0 (0.0)	-

conservative measures included (?) observation as an out-patient, readmission to the hospital, removal of the clot, hydrogen peroxide and ice water gargles, pressure with gauze soaked with adrenaline on the bleeding point
* Significant difference

Discussion

Although tonsillectomy is one of the old procedures in the field of otolaryngology and every effort was taken by otolaryngologists to minimize or prevent the complications of tonsillectomy particularly PTB, it remains unavoidable and its occurrence is terrible for both the surgeon and the patient with his or her family specially when one consider it as a relatively safe and simple procedure.

Many different techniques are used to perform tonsillectomy. However, due to the embargo and security conditions, the cold snare technique is the only method used to perform tonsillectomy in our hospital. The incidence of PTB in the present study is within the range of the incidences (0-12.7%) reported by studies using other methods[2-6]. The variability among these studies may be related to the following factors: age of the patient, definition of bleeding, methods of haemeostasis, indication for tonsillectomy, technique of tonsillectomy, whether relaxation of retraction before case termination was used or not and sample size, The present study showed that secondary bleeding is more common than primary PTB, consistent with other studies[2,6].

In our society, misuse of drugs is a common problem. In the present study, 4 year-male child presented with so severe secondary PTB on the 5th postoperative day after taking an aspirin to subside the postoperative fever on his own family responsibility, necessitating readmission of the child to the hospital, four pints fresh blood transfusion were given, and bleeding points were secured by 3 ligatures in the theater. It is well known that aspirin use inhibits platelet function irreversibly and lasts for the life of the platelet (8-11 days)[7]. Previous studies [7,8] showed that aspirin use increased hemorrhagic risk. It is our

hope to reactivate the strict law to prevent pharmacy owner from selling the drugs to any one unless they have a drug prescription order from the physician.

As a rule, both tonsillar fossae will bleed following tonsillectomy if there is a problem in the coagulation system. To our knowledge, no previous study describe whether bleeding was unilateral or bilateral. In this study, all patients with PTB had unilateral bleeding, equally distributed on both sides. One possible cause for this is that recurrent tonsillar infection usually occurs more on one side than the other. Unfortunately many causes remain obscure, so we need further studies to clarify why PTB is mostly unilateral, if it is not due to coagulation abnormalities.

In the present study, male sex, age group >18 years and tonsillectomy for recurrent infection are risk factors for PTB which is consistent with many other studies[3,5].

Awareness of these factors help in identifying patients who might have a greater tendency to bleed postoperatively. Consistent with the study by Kendrick, et al.[9].

Our study found that the level of training of the surgeon who did the operation did not influence the risk of bleeding. This suggests that tonsillectomy is relatively easy and quick to learn but its complications particularly PTB will occur even in the experienced surgeon.

The study showed low incidence (0.07) of primary (reactionary) hemorrhage after 8 hours from tonsillectomy which is nearly similar to a previous study (0.49)[10]. This finding confirms that tonsillectomy can safely be performed on day care clinic with 8 hours watchful period.

Apart from anaesthesia as a cause of death, PTB is the major cause of death following tonsillectomy[11]. Previous studies have reported mortality rates following PTB ranging from 0-1 in 5000[12,13]. Two recent studies [4,14] from Germany have reported a lethal outcome of one case due to PTB in each study. Fortunately, no death occurred in the present study.

The obvious limitation of the present study is the lack of comparison of PTB between cold snare dissection tonsillectomy (which is the only method of tonsillectomy used in our hospital) and other new methods of tonsillectomy. We suggest further studies to compare the results of PTB and other post-tonsillectomy complications among various methods of tonsillectomy.

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