

Sarah D. Moral, MD
Ann Kathleen C. Barlin, MD
Jose M. Acuin, MD, MSc (Clin Epi)

Department of Otolaryngology Head & Neck Surgery
The Medical City Hospital
Pasig City, Philippines

Clinical Profile of Post-Tonsillectomy Bleeding: A 30-Month Institutional Review

ABSTRACT

Objective: To determine the prevalence of post-tonsillectomy bleeding in our institution and to describe the clinical characteristics, tonsillectomy techniques and post-tonsillectomy bleeding intervention in these patients.

Methods:

Design: Observational descriptive study

Setting: Tertiary private hospital

Population: All patients who were treated for post-tonsillectomy bleeding were retrospectively reviewed from medical records of all patients who had undergone tonsillectomy between January 1, 2007 and June 30, 2009. Age and sex, indication for surgery, tonsil grade, Body Mass Index (BMI), surgical technique, post-operative medications, length of hospital stay, interval between tonsillectomy and onset of bleeding and interventions to address post-operative bleeding were noted.

Results: Of the 662 patients who underwent tonsillectomy, 37 (5.6%) were managed for post-operative hemorrhage. Most had grade 2 or 3 tonsils (18 or 48.6% and 16 or 43.2% respectively) and were obese (25 or 67.5%). The highest proportion of post-operative bleeding was 9.2% for bipolar cauterization technique (18 of 196 patients) followed by 7.4% with cold knife, monopolar cauterization and suturing (11 of 148 patients); 6.9% with harmonic scalpel (2 of 29 patients); 6.5% with monopolar and bipolar cauterization (3 of 46 patients), and 2.8% for cold knife or Fischer knife (3 of 109 patients). Seven patients (18.9%) required blood transfusion. Onset of bleeding occurred between 4-12 days following surgery (mean: 8 days). Possible causes of bleeding included heavy physical activity and cough but most had no identifiable cause. Majority of the patients (29 out of 37) required surgical exploration under general anesthesia.

Conclusion: Post-tonsillectomy bleeding is still a clinically significant complication despite advances in surgical techniques. Surgeons must always consider trade-offs between benefits and risks of the procedure and be continually vigilant of this potentially serious complication.

Keywords: *Post-tonsillectomy bleeding, tonsillectomy techniques*

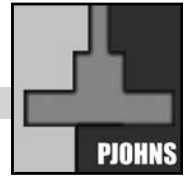
Tonsillectomy is still one of the most common surgical procedures performed by otolaryngologists. Different techniques have evolved through time but the indications and complications have not changed much.

The most common indications for tonsillectomy are recurrent or chronic tonsillitis, surgical augmentation of the airway, and malignancy.¹ Post-operative hemorrhage is still the most common complication which causes subsequent absence from school or work.² Occurrence of post-tonsillectomy hemorrhage is unpredictable and potentially-life threatening. It entails

Correspondence: Sarah D. Moral, MD
Department of Otolaryngology- Head & Neck Surgery
The Medical City
Ortigas Avenue, Pasig City 1600
Philippines
Telefax: (632) 687 3349
Email: sarahmoral_md@yahoo.com
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substantial consequences that can be detrimental for both patients and doctors. The cost of a second admission, longer hospital stay or a return to the operating room cannot be taken lightly. Most importantly, post-tonsillectomy bleeding is potentially life threatening and can degrade the patient's quality of life. For the surgeon, this complication can bring about emotional and professional trauma that can erode confidence.

The different surgical techniques have varying post-operative bleeding rates reported in the literature. A retrospective study of 494 patients by Ali *et al.* showed rates to be highest with bipolar cautery and lowest with cold knife and suturing.³ A retrospective study by Lowe and van der Meulen involving 13,554 patients showed that coblation tonsillectomy had a higher relative risk of post-operative bleeding compared with cold steel.⁴ Kristensen *et al.* also reported higher post-operative bleeding rates for coblation than for scalpel-snare-cautery techniques in a retrospective chart review of 632 patients.⁶ On the other hand, Collison² *et al.* found a 4% post-operative bleeding rate out of 430 tonsillectomies performed by 2 surgeons using cold dissection and snare for removal of tonsils and Valley Lab (Tyco Healthcare group LP, Boulder, Colorado, USA) suction cautery for hemostasis and Windfuhr *et al.* reported a 2.7% bleeding rate out of 602 patients who underwent tonsillectomy with scissors and snare, and hemostasis with suture ligation and gauze pressure.⁵

This paper aims to determine the prevalence of post-tonsillectomy bleeding in our institution and to describe the clinical characteristics, tonsillectomy techniques and post-tonsillectomy bleeding intervention in these patients.

METHODS

The medical records of all patients who had undergone tonsillectomy in our institution between January 1, 2007 and June 30, 2009 were retrospectively reviewed. All patients who were managed for post-tonsillectomy hemorrhage (defined as any bleeding that required medical attention) during the said time period were included in the present study. This included patients who developed bleeding during the same confinement for the tonsillectomy as well as those who were previously discharged but were readmitted due to post-tonsillectomy bleeding. Primary hemorrhage was defined as onset of bleeding less than 24 hours post tonsillectomy and secondary hemorrhage was defined as onset of bleeding more than 24 hours post tonsillectomy.

A standard data collecting form (*Appendix*) was used to extract the following data from each record: 1) age and sex, 2) tonsil grade and Body Mass Index (BMI), 3) indication for the procedure, 4) surgical technique including method of removal and hemostasis, 5) post-operative medications, 6) length of hospital stay, 7) number of hours from tonsillectomy to the report of post-operative bleeding, 8) possible

cause of bleeding identified, and 9) intervention or treatment for post-operative bleeding including blood transfusion. The post-tonsillectomy bleeding patients included those managed by re-operation or by conservative measures (defined as control outside the operating room by means of silver nitrate cautery stick and continuous ice water gargle).

RESULTS

Of the 662 patients who had undergone tonsillectomy at our institution during the 30-month study period, 37 patients (5.6%) were managed for post-operative hemorrhage and were included in this study.

Their ages ranged between 5 and 54 years old, with a mean age of 33 (+/- 11) and a male to female ratio of 5:1. Most patients had either grade 2 or grade 3 tonsils (18 or 48.6% and 16 or 43.2%, respectively). Most patients were obese (class I or BMI of 25-29.9, 18 or 48.6%; class II or BMI > 30, 7 or 18.9%). The most frequent indication for tonsillectomy was recurrent tonsillitis followed by obstructive sleep apnea (OSA), most of whom were severe by polysomnography (*Table 1*).

Five different tonsillectomy techniques were used (*Table 2*). Of the 37 patients who had post-tonsillectomy bleeding, 29 (78%) or roughly 4 out of 5 required re-operation. About half of the bleeds (18 or 48.7%) had undergone bipolar cautery, three quarters (14 or 77.8%) of whom had to be re-operated. About one-third of the bleeds (11 or 29.7%) had undergone cold knife with monopolar cautery, all of whom had to be re-operated. Seven of the 37 patients had also undergone blood transfusion.

Most of the post-tonsillectomy bleeding involved secondary hemorrhage (28 or 75.7%), with onset of bleeding occurring between 4-12 days after surgery (mean: 8 days).

DISCUSSION

Tonsillectomy techniques and instruments have evolved over the centuries, with aims that have included decreasing operating time and intraoperative blood loss.⁷

The different tonsillectomy techniques have been associated with varying intra and post operative bleeding rates. Pizzuto in 2000⁸ found that among the most commonly used techniques of cold dissection, hot knife dissection and bipolar diathermy dissection, intraoperative blood loss was far less with electrocautery than with cold dissection. He further concluded that the bipolar technique was a better choice on account of less bleeding, both intra and post-operatively, shorter recovery period and fewer days off from work and school.⁸

Reports comparing ligation with cautery attributed a higher rate of primary bleed to the use of suture ligation for hemostasis, and a more significant secondary bleed with the use of cautery. Although

the use of cautery was effective in preventing primary hemorrhage, there was a tendency to a deeper and more extensive zone of necrosis and subsequent exposure of larger vessels when sloughing of the eschar occurred.^{2,5} This may corroborate the results of this study where a majority of the patients experiencing secondary hemorrhage underwent cauterization.

The importance of strict adherence to indications for tonsillectomy

Table 1. Patient Characteristics & Indications for Tonsillectomy

| Patient characteristics | | n (%) |
|-------------------------------|----------------------------------|-------------|
| Age | 0-10 | 1 (2.7%) |
| | 11-21 | 2 (5.4%) |
| | 22-32 | 18 (48.6%) |
| | 33-43 | 10 (27%) |
| | 44-54 | 6 (16.2%) |
| Gender | Male | 32 (84%) |
| | Female | 5 (16%) |
| Tonsil Grade | Grade I | 2 (5.4%) |
| | Grade II | 18 (48.6%) |
| | Grade III | 16 (43.2%) |
| | Grade IV | 1 (10.8%) |
| Body Mass Index | Underweight (<18.5) | 1 (2.7%) |
| | Healthy (18.5-22.9) | 5 (13.5%) |
| | Overweight (23-24.9) | 6 (16.2%) |
| | Obese I (25-29.9) | 18 (48.6%) |
| | Obese II (>30) | 7 (18.9%) |
| Indications for tonsillectomy | Recurrent Tonsillitis ≥ 4/ yr | 19 (51.3%) |
| | Tonsillitis | 10 (52.6%) |
| | Obstructive Sleep Apnea | 9 (47.3%) |
| Polysomnography | moderate | 15 (40.54%) |
| | severe | 13 |
| | not mentioned | 3 (23%) |
| | CPAP yes | 8 (61.5%) |
| | no | 2 (15.4%) |
| | not mentioned | 1 (6.6%) |
| | Others (tonsillar mass) | 3 (20%) |

Table 2. Post-tonsillectomy bleeds and interventions by surgical technique

| Surgical Technique | Post-tonsil bleed n (% of total) (a) | Type of intervention to control post-operative bleed | |
|------------------------|--|--|-----------------------------------|
| | | Surgical n (% of a) (b) | Non-surgical n (% of a) (c) |
| Cold knife + Chromic | 3 (8.1%) | 2 (67%) | 1 (33%) |
| Cold knife + monopolar | 11 (29.7%) | 11 (100%) | 0 (0%) |
| Bipolar cautery | 18 (48.7%) | 14 (77.8%) | 4 (22.2%) |
| Bipolar + monopolar | 3 (8.1%) | 2 (67%) | 1 (33%) |
| Harmonic scalpel | 2 (5.4%) | 0 (0%) | 2 (100%) |
| Total | 37 | 29 (78.3%) | 8 (21.6%) |

cannot be understated considering its complications, particularly hemorrhage. Almost half (15/37 or 40.54%) of the patients with bleeding in our study had Obstructive Sleep Apnea (OSA) as an indication. Perhaps the relatively narrow oropharynx in patients with OSA made exposure difficult, resulting in a tendency to over-retract the tonsils medially. This could conceivably overstretch tonsillar bed vessels and cause immediate or delayed intraoperative bleeding necessitating hemostasis. Perhaps a first-line trial of CPAP in OSA patients should precede surgical options to minimize these complications of tonsillectomy.

Post-tonsillectomy hemorrhage was secondary in most of our patients. Secondary bleeding has not received as much attention as primary bleeding in the literature. This greater emphasis on primary bleeding may be attributable to the belief that it was more common and more serious⁹ but there are reports of delayed bleeding as long as 3 weeks following surgery that required surgical management under general anesthesia.⁵ There were no episodes of recurrent post-operative hemorrhage in our series.

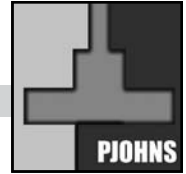
The loss of blood notwithstanding, minimizing the incidence of this complication was important because post-operative bleeding can lead to airway compromise. The need for additional intervention such as blood transfusion increased costs and overall inconvenience for doctors and patients alike.

As for possible inciting events for post-tonsillectomy bleeding, a majority of the patients did not have an identifiable cause while others reported early resumption of physical exertion or vigorous coughing. Giving thorough home care instructions should not be taken lightly because the activities of patients after discharge from hospital can contribute significantly to the occurrence of bleeding.

All the seven surgeons involved in this study were reasonably-experienced consultants with an average of 8 years and a range of 5-12 years of practice. The small sample size did not allow us to explore differences in the surgeons' clinical experience and their association with post-operative bleeding. However we can not discount the possibility that a clinically important association does exist and that surgical skill, rather than technique, could primarily influence complication rates.

Another potential limitation of this study lies in the method of identifying patients with post-tonsillectomy bleeding. It is possible that some patients with post-operative bleeding may have sought care at another facility without informing their original surgeon. This selection bias may further underestimate our post-tonsillectomy bleeding rate.

Post-tonsillectomy bleeding is still a clinically significant complication despite advances in surgical techniques. Surgeons must always consider trade-offs between benefits and risks of the procedure and be continually vigilant of this potentially serious complication.

**APPENDIX****Checklist for Post Tonsillectomy Bleed Patients (2007-2009)**

NAME: _____

AGE: _____

DATE OF OPERATION: _____

CONSULTANT: _____

FIRST ASSIST: _____

INDICATION FOR TONSILLECTOMY: (check one)

- Recurrent Tonsillitis (RT)
 - # of documented bouts per year: _____
 - # of years w/ RT: _____
 - Medicines taken: _____
- OSA (circle one)
 - Snoring? Y _____ N _____
 - Witnessed apnea? Y _____ N _____
 - PSG? Y _____ N _____
 - Results of PSG Mild _____ Moderate _____ Severe _____
 - Cephalometry? Y _____ N _____
 - Cephalometric values: _____
 - CPAP trial? Y _____ N _____
 - If yes, how long? _____
- Other indications (halitosis, biopsy etc). Pls. Indicate _____

PHYSICAL EXAMINATION

- Tonsil grade 1 _____ 2 _____ 3 _____ 4 _____
- Other pertinent oral cavity findings: _____
- BMI: _____

INTRA-OP DETAILS

Technique : (check one)

- Cold knife
- Cold knife + Monopolar cautery
- Bipolar cautery
- Monopolar + bipolar cautery
- Harmonic scalpel
- OTHERS

Hemostasis:

- Suturing
- Monopolar cautery
- Bipolar cautery
- Harmonic scalpel

Other surgeries performed with tonsillectomy: _____

Blood loss: _____

POST-OP MEDICATIONS: _____

LENGTH OF HOSPITAL STAY: _____ days

LENGTH OF TIME THAT HAD PASSED BETWEEN TONSILLECTOMY AND ONSET OF BLEEDING?

- <24 hours: _____ hrs post tonsillectomy
- >24 hrs: _____ days post tonsillectomy

INTERVENTION DONE:

- Brought back to OR: _____ suturing _____ cautery
- Controlled conservatively: _____ Ice gargle _____ cautery stick _____ packed with gauze

IDENTIFIED POSSIBLE CAUSE OF BLEEDING:

- Ate hard food. Indicate food _____
- Physical activity/exertion. Indicate activity _____
- Cough
- None

HEMOGLOBIN PRE-TONSILLECTOMY: _____

HEMOGLOBIN ON RE-ADMISSION (POST TONSIL BLEED): _____

BLOOD TRANSFUSION DONE? Y _____ N _____

If yes, indicate blood component and how many: _____

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