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

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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. 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. 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. On the other hand, Collison 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.

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.

The different tonsillectomy techniques have been associated with varying intra and post operative bleeding rates. Pizzuto in 2000 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.

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.
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. This may corroborate the results of this study
where a majority of the patients experiencing secondary hemorrhage
underwent cauterezation.

The importance of strict adherence to indications for tonsillectomy
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 serious but there are reports of delayed bleeding as long as
3 weeks following surgery that required surgical management under
general anesthesia. 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.

Table 1. Patient Characteristics & Indications for Tonsillectomy

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>0-10</td>
<td>1 (2.7%)</td>
</tr>
<tr>
<td>11-21</td>
<td>2 (5.4%)</td>
</tr>
<tr>
<td>22-32</td>
<td>18 (48.6%)</td>
</tr>
<tr>
<td>33-43</td>
<td>10 (27%)</td>
</tr>
<tr>
<td>44-54</td>
<td>6 (16.2%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32 (84%)</td>
</tr>
<tr>
<td>Female</td>
<td>5 (16%)</td>
</tr>
<tr>
<td><strong>Tonsil Grade</strong></td>
<td></td>
</tr>
<tr>
<td>Grade I</td>
<td>2 (5.4%)</td>
</tr>
<tr>
<td>Grade II</td>
<td>18 (48.6%)</td>
</tr>
<tr>
<td>Grade III</td>
<td>16 (43.2%)</td>
</tr>
<tr>
<td>Grade IV</td>
<td>1 (0.8%)</td>
</tr>
<tr>
<td><strong>Body Mass Index</strong></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt;18.5)</td>
<td>1 (2.7%)</td>
</tr>
<tr>
<td>Healthy (18.5-22.9)</td>
<td>5 (13.5%)</td>
</tr>
<tr>
<td>Overweight (23-24.9)</td>
<td>6 (16.2%)</td>
</tr>
<tr>
<td>Obese I (25-29.9)</td>
<td>18 (48.6%)</td>
</tr>
<tr>
<td>Obese II (&gt;30)</td>
<td>7 (18.9%)</td>
</tr>
<tr>
<td><strong>Indications for</strong></td>
<td></td>
</tr>
<tr>
<td><strong>tonsillectomy</strong></td>
<td></td>
</tr>
<tr>
<td>Recurrent Tonsillitis</td>
<td>19 (51.3%)</td>
</tr>
<tr>
<td>≥ 4/yr</td>
<td>10 (26.3%)</td>
</tr>
<tr>
<td>Tonsillitis</td>
<td>9 (24.7%)</td>
</tr>
<tr>
<td><strong>Obstructive Sleep Apnea</strong></td>
<td>15 (40.54%)</td>
</tr>
<tr>
<td>Polysomnography</td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>severe</td>
<td>8 (61.5%)</td>
</tr>
<tr>
<td>not mentioned</td>
<td>2 (15.4%)</td>
</tr>
<tr>
<td>CPAP yes</td>
<td>1 (6.6%)</td>
</tr>
<tr>
<td>no</td>
<td>3 (20%)</td>
</tr>
<tr>
<td>not mentioned</td>
<td>11 (73.3%)</td>
</tr>
<tr>
<td>Others (tonsillar mass)</td>
<td>3 (8.1%)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Surgical Technique</th>
<th>Post-tonsil bleed</th>
<th>Type of intervention to control post-operative bleed</th>
<th>Surgical (n (% of a))</th>
<th>Non-surgical (n (% of a))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold knife + Chromic</td>
<td>3 (8.1%)</td>
<td>2 (67%)</td>
<td>1 (33%)</td>
<td></td>
</tr>
<tr>
<td>Cold knife + monopolar</td>
<td>11 (29.7%)</td>
<td>11 (100%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Bipolar cautery</td>
<td>18 (48.7%)</td>
<td>14 (77.8%)</td>
<td>4 (22.2%)</td>
<td></td>
</tr>
<tr>
<td>Bipolar + monopolar</td>
<td>3 (8.1%)</td>
<td>2 (67%)</td>
<td>1 (33%)</td>
<td></td>
</tr>
<tr>
<td>Harmonic scalpel</td>
<td>2 (5.4%)</td>
<td>0 (0%)</td>
<td>2 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>29 (78.3%)</td>
<td>8 (21.6%)</td>
<td></td>
</tr>
</tbody>
</table>
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): __________________________
If yes, indicate blood component and how many: __________________________

ACKNOWLEDGMENT
The authors would like to acknowledge the ENT surgeons who generously provided pertinent data for the completion of this study. This paper has supplemented the authors’ learning regarding post-operative bleeding after Tonsillectomy. It is the authors’ intention that this paper provides more understanding regarding the mechanisms and factors that contribute to this complication.

REFERENCES