Effects of Synchronous Nasal Surgery on Posttonsillectomy Hemorrhage

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Objective: To evaluate the effects of synchronous nasal surgery on the rate of posttonsillectomy hemorrhage.

Design: Retrospective medical record review.

Setting: Military tertiary referral center.

Patients: Adult patients identified in our surgical database from June 1, 2000, through September 31, 2005, who had undergone tonsillectomy or uvulopalatopharyngoplasty with tonsillectomy (UPPPT) either alone or with synchronous nasal surgery.

Main Outcome Measures: The rate of posttonsillectomy hemorrhage was reviewed in all patients who underwent tonsillectomy or UPPPT at our medical center, and an investigation was conducted to determine whether synchronous nasal surgery altered this rate.

Results: A total of 1010 patients were included in this study, with a rate of posttonsillectomy hemorrhage of 5.5%. A total of 204 patients underwent synchronous nasal surgery. No significant difference was found between the hemorrhage rate in patients who underwent tonsillectomy or UPPPT alone and those who underwent synchronous nasal surgery (6.0% and 3.9%, respectively; P=.30). When these patients were further divided into those undergoing UPPPT and those undergoing synchronous nasal surgery, no significant difference in hemorrhage rate was found (6.2% and 2.0%, respectively; P=.06).

Conclusions: Synchronous nasal surgery does not appear to increase the rate of postoperative hemorrhage in patients who undergo tonsillectomy alone or in those who undergo UPPPT. This information may help persuade physicians to perform synchronous surgical procedures instead of(stage) surgical procedures. In this regard, the patient requires only 1 anesthetic and 1 postoperative course without the risk of increased postoperative hemorrhage.


General otolaryngologists commonly evaluate patients with concomitant oropharyngeal and nasal complaints. Sometimes the chief concerns are distinct in the case of recurrent tonsillitis and nasal obstruction, whereas other times they are related, as in cases of obstructive sleep apnea. Obstructive sleep apnea, which is present in 1% to 2% of the general population, has undeniably been in the foreground of medicine in not only the specialties of otolaryngology, pulmonology, and neurology but also the primary care arena. The main focus has been on the long-term effects of obstructive sleep apnea, and recent literature has demonstrated a 2-fold increase in stroke and death in patients with obstructive sleep apnea, even when adjusted for weight, blood pressure, and smoking. Surgical management for obstructive sleep apnea has been debated in the past. One of the hotly debated topics is whether oropharyngeal and nasal surgery should be staged or performed in a synchronous manner. Supporters of synchronous surgery cite a decreased number of procedures under general anesthesia, shorter hospital stays, lower cost, and shorter postoperative recovery time, whereas their adversaries cite increased morbidity, specifically pain, posttonsillectomy hemorrhage, and oxygen desaturation. The increased morbidity, presumably secondary to nasal packing, often mandates admission to the critical care unit or a monitored ward with continuous pulse oximetry.

In 2003, a retrospective review compared 71 patients who underwent synchronous tonsil and nasal surgery with 398 patients who underwent tonsillectomy alone. This study demonstrated a significant increase in posttonsillectomy hemorrhage with synchronous surgery (12.7%...
and 4.0%, respectively; \( P = .007 \). To our knowledge, this is the only study that has looked at the rate of posttonsillectomy hemorrhage with synchronous nasal surgery. Because this sample size is small, the results may have shown a statistical difference when in fact there was none.

It has been the practice at our institution to perform synchronous oropharyngeal and nasal surgery if our patients so desire. It has been our anecdotal experience that there is no difference in postoperative hemorrhage when combining tonsillectomy or uvulopalatopharyngoplasty with tonsillectomy (UPPPT) with synchronous nasal surgery. To formally address this variable with a larger sample size, we performed a retrospective review of all patients who underwent tonsillectomy or UPPPT and synchronous nasal surgery at Madigan Army Medical Center during a 3-year period.

### METHODS

After approval was obtained from the institutional review board, the surgical database of our tertiary care training hospital was searched from June 1, 2000, through September 31, 2005, for adult patients, 18 years or older, with the Current Procedural Terminology codes corresponding to tonsillectomy, adenotonsillectomy, and uvulopalatopharyngoplasty. A separate database was created that included patients with Current Procedural Terminology codes that corresponded to septoplasty, turbinoplasty, septorhinoplasty, functional endoscopic sinus surgery, and control of oropharyngeal hemorrhage and patients with visits to either the emergency department or otorhinolaryngology clinic within 15 days of surgery. The 2 databases were merged, and the medical records of the patients were reviewed. We excluded from the combined database all patients who underwent tonsillectomy as part of a known carcinoma of the head and neck and all patients with prior tonsillectomy who underwent uvulopalatopharyngoplasty, which yielded a sample size of 1036. An additional 25 patients with incomplete medical records and 1 patient diagnosed as having lupus anticoagulant were also removed, for a final sample size of 1010 patients.

The following information was collected on the cohort: age, sex, preoperative diagnosis, surgical procedure(s) performed, number of visits within 15 days of the surgery, and reason for visit(s). The patients were then grouped according to whether synchronous nasal surgery was performed and whether they underwent tonsillectomy alone or UPPPT. Posttonsillectomy or UPPPT hemorrhage was considered significant only if it required intervention for control of the hemorrhage. Intervention was defined as either removal of the clot and electrocautery under local anesthesia or a return to the operating room for control of the hemorrhage. Patients in whom no clot or hemorrhage was visualized were not included in the total number of hemorrhages. Patients who hemorrhaged multiple times were counted as having 1 hemorrhage event. The \( \chi^2 \) method was used to determine statistical significance except in cases where the sample size was less than 10, in which case the Fisher exact test was then used.

### RESULTS

The final sample size was 1010 patients. Patient ages ranged from 18 to 60 years, with a mean of 25 years. The study group consisted of more men than women (622 and 388, respectively). A total of 56 patients (5.5%) presented with postoperative hemorrhage that necessitated intervention. Patients who had multiple hemorrhage events were counted once; none of these patients had undergone synchronous nasal surgery. Seventeen patients required returns to the operating room to control the hemorrhage. Posttonsillectomy hemorrhages occurred between days 1 and 15 postoperatively, with a median of 7 days.

Tonsillectomies were performed for the following diagnoses: recurrent tonsillitis (45.8%), obstructive sleep apnea (22.5%), snoring (21.8%), tonsil hypertrophy or asymmetry (5.2%), or a history of peritonsillar abscess (4.7%) (Table 1). Nasal surgical procedures performed in this study included the following: septoplasty, turbinateplasty, septorhinoplasty, functional endoscopic sinus surgery, and septal button placement (Table 2). In looking at the study groups, we noted no additional adverse effects of synchronous nasal surgery.

A total of 806 patients underwent tonsillectomy or UPPPT alone, and 204 patients underwent tonsillectomy or UPPPT with synchronous nasal surgery (Table 3). No significant difference was found in posttonsillectomy hemorrhage in patients who underwent tonsillectomy or UPPPT alone when compared with those patients who underwent synchronous nasal surgery (6.0% and 3.9%, respectively; \( P = .30 \)). A total of 290 patients underwent UPPPT and 151 patients underwent UPPPT with synchronous nasal surgery. No significant difference was found in postoperative hemorrhage between patients who underwent UPPPT and patients who underwent UPPPT with synchronous nasal surgery (6.2% and 2.0%, respectively; \( P = .06 \)). There were 516 patients who underwent tonsillectomy alone and 53 patients who underwent synchronous nasal surgery with tonsillectomy.

### Table 1. Preoperative Diagnosis for Tonsillectomy or Uvulopalatopharyngoplasty With Tonsillectomy

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Patients, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent or chronic tonsillitis</td>
<td>463 (45.8)</td>
</tr>
<tr>
<td>Obstructive sleep apnea</td>
<td>227 (22.5)</td>
</tr>
<tr>
<td>Snoring</td>
<td>220 (21.8)</td>
</tr>
<tr>
<td>Tonsil hypertrophy or asymmetry</td>
<td>53 (5.2)</td>
</tr>
<tr>
<td>Peritonsillar abscess</td>
<td>47 (4.7)</td>
</tr>
</tbody>
</table>

### Table 2. Nasal Surgical Procedures Performed

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No. of Procedures Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septoplasty or turbinateplasty</td>
<td>116</td>
</tr>
<tr>
<td>Turbinoplasty</td>
<td>46</td>
</tr>
<tr>
<td>Septoplasty</td>
<td>18</td>
</tr>
<tr>
<td>Septorhinoplasty</td>
<td>8</td>
</tr>
<tr>
<td>FESS</td>
<td>7</td>
</tr>
<tr>
<td>Septorhinoplasty or turbinateplasty</td>
<td>4</td>
</tr>
<tr>
<td>FESS or septoplasty</td>
<td>3</td>
</tr>
<tr>
<td>FESS or turbinateplasty</td>
<td>1</td>
</tr>
<tr>
<td>Septal button</td>
<td>1</td>
</tr>
</tbody>
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Abbreviation: FESS, functional endoscopic sinus surgery.
No significant difference was found in posttonsillectomy hemorrhage between patients who underwent tonsillectomy alone and those who underwent tonsillectomy with synchronous nasal surgery (5.8% and 9.8%, respectively; P = .40).

**Table 3. Postoperative Hemorrhage Rates in Synchronous Nasal Surgery and UPPPT or Tonsillectomy**

<table>
<thead>
<tr>
<th>Group</th>
<th>Synchronous Surgery</th>
<th>No Synchronous Surgery</th>
<th>Total</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPPT</td>
<td>3/151 (2.0)</td>
<td>18/290 (6.2)</td>
<td>21/441 (4.8)</td>
<td>.06</td>
</tr>
<tr>
<td>Tonsillectomy</td>
<td>5/53 (9.4)</td>
<td>30/516 (5.8)</td>
<td>35/569 (6.2)</td>
<td>.40</td>
</tr>
<tr>
<td>Both groups</td>
<td>8/204 (3.9)</td>
<td>48/806 (6.0)</td>
<td>56/1010 (5.5)</td>
<td>.30</td>
</tr>
</tbody>
</table>

Abbreviation: UPPPT, uvulopalatopharyngoplasty with tonsillectomy.

Tonsillectomy is 1 of the surgical procedures most commonly performed by otolaryngologists, and thus multiple studies have been dedicated to the identification of preoperative risk factors, the modification of surgical technique, and the alteration of postoperative care in an attempt to decrease posttonsillectomy hemorrhage. Despite these efforts, posttonsillectomy hemorrhage remains 1 of the most common complications. Posttonsillectomy hemorrhage is defined as primary if it occurs less than 24 hours postoperatively or secondary if it occurs greater than 24 hours postoperatively. Most commonly this occurs 5 to 10 days after surgery. The adult posttonsillectomy hemorrhage rate in the literature ranges from 1.5% to 18%, with most in agreement on a rate between 3% and 6%. Less than half these cases require returns to the operating room, and death secondary to postoperative hemorrhage is rare at 0.007%. Although the percentage of posttonsillectomy hemorrhage is low, it can be traumatic for the patient who undergoes cauteryization under local anesthesia or the patient who receives a subsequent general anesthetic.

At our institution, patients with posttonsillectomy hemorrhage undergo attempted suctioning of a blood clot and cauteryization under local anesthetic before being transferred to the operating room. We believe this algorithm is appropriate in adult patients because it saves the need for the patient to receive another general anesthetic. In this study, we counted a patient having postoperative hemorrhage as any patient who required electrocautery under local anesthesia or control of hemorrhage in the operating room; patients who bled multiple times were counted once. This approach gave us an overall hemorrhage rate of 5.5% for tonsillectomy or UPPPT alone, which is within the expected range and comparable to the rate of 4% achieved by the previous synchronous nasal surgery study. Our data failed to demonstrate any significant difference in the postoperative hemorrhage rate of patients who underwent synchronous nasal surgery. In fact, our hemorrhage rate was lower with synchronous nasal surgery. Our posttonsillectomy hemorrhage rate in patients who underwent synchronous nasal surgery was 3.9%. This finding is in stark contrast to the hemorrhage rate of 12.7% reported by the previous study. We believe our nasal surgical procedures are comparable because 78% of their nasal surgical procedures were composed of septoplasty or some form of turbinoplasty, whereas our study was mainly composed of these 2 nasal surgical procedures.

Questions then remain as to why our hemorrhage rate was lower than that in the above-mentioned study by Murray et al and why our patients who underwent synchronous surgery had a lower rate of hemorrhage compared with patients who did not undergo synchronous surgery. By convention, a patient who undergoes synchronous nasal surgery should have a higher posttonsillectomy hemorrhage rate. Nasal packing increases mouth breathing, which further exposes the mucosa and vessels, which may lead to increased hemorrhage. Also, increased pain from synchronous surgery may decrease the oral intake of the patient, which would further desiccate the mucosa. Despite these principles, our patients who underwent synchronous surgery had less postoperative hemorrhage. We believe this result may be because we use Doyle splints instead of packing, which thus enables the patient to breathe through his/her nose. We also promote copious nasal irrigation that starts the night immediately after surgery. This technique not only maintains the patency of the nasal splint but also coats the exposed pharyngeal mucosa. However, we believe that the main difference in our posttonsillectomy hemorrhage rate compared with that in the study by Murray et al is most likely owing to sample size. Our sample size of 204 more than doubled the sample size of the original study, of 71 patients undergoing synchronous nasal surgery. Because of this fact, we believe our data better approximate the true risk of the performance of synchronous nasal surgery.

This information is important clinically in patients with 2 separate chief concerns but may be more relevant in the patient with obstructive sleep apnea. Although continuous positive airway pressure is an efficacious treatment for patients with obstructive sleep apnea, long-term compliance rates are shown to be 60% to 70%, which makes surgery a viable option in patients with anatomic obstructions amenable to surgical intervention. Obstruction can occur at any of the following locations: nasal passage, oropharynx or soft palate, and hypopharynx or tongue base. Surgical intervention often begins with tonsillectomy or UPPPT; however, use of each of these procedures has been shown to improve or eliminate obstructive sleep apnea in only 41% to 66% of patients. Failures of UPPPT are mostly secondary to poor patient selection as demonstrated by Friedman et al but can also be owing to scarring and poor surgical technique. Patients who Friedman et al classified as having stage 1 or 2 conditions have failure rates of 19.4% and...
It has been the practice at our institution to perform synchronous nasal surgical procedures if clinically indicated. Our anecdotal experience has not shown an increase in postoperative pain or postoperative recovery time for synchronous nasal surgery; however, our study is limited in that it does not objectively assess these morbidities. Further studies need to be conducted to assess morbidity and patient satisfaction after concomitant nasal and pharyngeal surgery vs pharyngeal surgery alone. On the basis of these findings, we believe that a concern for post-tonsillectomy hemorrhage should not be a deterrent to the performance of synchronous procedures.

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Author Contributions: Dr Adams had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Wilhelm and Demars. Acquisition of data: Adams and Demars. Analysis and interpretation of data: Adams, Demars, and Harsha. Drafting of the manuscript: Adams and Harsha. Critical revision of the manuscript for important intellectual content: Adams, Wilhelm, Demars, and Harsha. Statistical analysis: Adams. Administrative, technical, and material support: Adams, Wilhelm, and Demars. Study supervision: Wilhelm, Demars, and Harsha.

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REFERENCES