Bleeding risk associated with resection of the middle turbinate during functional endoscopic sinus surgery

Anya Miller, MD1; Michael Bobian, BS2; Ed Peterson, PhD1; Robert Deeb, MD1
1Henry Ford Health System, 2Wayne State University
Detroit, MI

Abstract

Introduction: The decision to resect the middle turbinate (MT) during functional endoscopic sinus surgery (FESS) is controversial. While there have been a variety of studies examining the functional outcome related to this maneuver, very few studies, exist evaluating the potential for complications. We sought to determine if resection of the MT during FESS leads to an increased risk for post-operative bleeding.

Methods: Patients who underwent FESS between 2004 and 2014, at a single institution were analyzed for bleeding and other complications following resection of the MT.

Results: Between 2004 and 2014, 1185 sinus surgeries were performed by 15 surgeons. A propensity matched set of 228 patients who underwent turbine resection and 228 controls were selected based on predicted probabilities from a logistic regression predicting turbine resection, adjusted for age, sex, and procedure. There were 89 patients with bilateral turbinates removed and 139 with unilateral turbinates removed. There was no significant difference in major bleed or other complication rates between the two groups. Patients who underwent resection of at least one MT were 3.95 times more likely to have a minor bleed compared to those who did not; this risk increased with more turbinates resected (trend p=0.008). Patients with minor bleeds were significantly more likely to be on Coumadin (p=0.007).

Conclusion: There was no increased risk of major bleeding or other complications associated with resection of the MT. There was an increased minor bleed rate associated with MT resection, though these patients were more likely to be on Coumadin.

Introduction

Treatment of the middle turbinate in functional endoscopic sinus surgery (FESS) is variable among practitioners, particularly for the normal turbinate. Debate has centered mostly damage to olfactory epithelium, CSF leak, scarring of the frontal outflow tract, complications in revision cases, and airflow disturbances.

It is unclear if resection of the middle turbinate adds to the complication profile associated with endoscopic sinus surgery. Resection of the middle turbinate exposes the sphenopalatine artery and has the potential to result in significant disturbances. Debate has centered mostly damage to olfactory epithelium, CSF leak, scarring of the frontal outflow tract, complications in revision cases, and airflow disturbances.

Hypothesis: Resection of the middle turbinate during FESS results in increased risk of bleeding.

Methods and Materials

Retrospective chart review. All patients who underwent functional endoscopic sinus surgery (FESS) at Henry Ford Health System between 1/2004 and 8/2014. Inclusion: surgery for sinusitis or nasal polyposis

Exclusion: surgery for cancer

Variables analyzed:

1) Sinuses operated on: maxillary, sphenoid, ethmoid, and frontal
2) Whether or not resection of the middle turbinate(s) took place
3) Any adjunctive procedures, namely septoplasty
4) Medications that could increase bleeding risk grouped into one of three classes: aspirin, "anticoagulation", and anti-platelet therapy

Complications (within 30 days):

1) Minor bleeding not requiring OR
2) Major bleeding requiring OR
3) Other complications

Introduction

Methods and Materials

Results

2951 patients underwent FESS at Henry Ford Health System for sinusitis or nasal polyposis between 2004 and 2014

• 251 patients had 1 or 2 MTs resected (162 with 1 and 89 with 2)
• 228 patients matched to control group with matched covariates
• total sample size of 456 patients.

There were no differences between these two groups in terms of age, sex, sinuses operated on and adjunctive procedures

No significant finding:

• Major bleed rates
• Other complications

Significance found:

• Minor bleeding stratified for 1 v 2 MT resected – 3.53 and 4.57 fold increased risk
• Anticoagulation and minor bleeding (p=0.007)

Table 1. Comparison of complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>No MT resected</th>
<th>MT(s) resected</th>
<th>p-value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor bleed</td>
<td>1.75%(4/228)</td>
<td>6.58%(15/228)</td>
<td>0.016</td>
<td>3.95 (1.29, 12.09)</td>
</tr>
<tr>
<td>Major bleed</td>
<td>0.80%(2/228)</td>
<td>0.44%(1/228)</td>
<td>0.570</td>
<td>0.50 (0.05, 5.53)</td>
</tr>
<tr>
<td>Other complication</td>
<td>0.88%(2/228)</td>
<td>0.44%(1/228)</td>
<td>0.616</td>
<td>0.50 (0.05, 6.21)</td>
</tr>
<tr>
<td>1 turb resected</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 turb resected</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor bleed</td>
<td>1.75%(4/228)</td>
<td>5.8%(8/139)</td>
<td>0.048</td>
<td>3.53 (1.04, 16.96)</td>
</tr>
<tr>
<td>Minor bleed</td>
<td>1.75%(4/228)</td>
<td>7.9%(11/139)</td>
<td>0.018</td>
<td>4.57 (1.10, 17.12)</td>
</tr>
</tbody>
</table>

Table 2. Comparison of bleed rate with medication usage

<table>
<thead>
<tr>
<th>Medication</th>
<th>No bleed</th>
<th>Minor bleed</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>12.2%(26/213)</td>
<td>20.0%(3/15)</td>
<td>0.406</td>
</tr>
<tr>
<td>Anti-</td>
<td>0.9%(2/213)</td>
<td>13.3%(23/15)</td>
<td>0.007</td>
</tr>
<tr>
<td>coagulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-platelet therapy</td>
<td>0.5%(1/213)</td>
<td>6.7%(1/15)</td>
<td>0.030</td>
</tr>
</tbody>
</table>

Comparison of bleed rate with medication usage

<table>
<thead>
<tr>
<th>Medication</th>
<th>No bleed</th>
<th>Minor bleed</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>9.4%(21/224)</td>
<td>0.0%(0/4)</td>
<td>0.999</td>
</tr>
<tr>
<td>Anti-</td>
<td>2.7%(6/224)</td>
<td>0.0%(0/4)</td>
<td>0.999</td>
</tr>
<tr>
<td>coagulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anti-platelet therapy</td>
<td>0.5%(1/224)</td>
<td>0.0%(0/4)</td>
<td>0.999</td>
</tr>
</tbody>
</table>

Conclusions

There is an increased risk of minor bleeding following resection of the middle turbinate in FESS, but no significant increase in major bleeding or other complications.

Further risk of bleeding is associated with anticoagulation therapy if the middle turbinate has been resected.

References


Contact

Anya Miller
Henry Ford Health System
Detroit, MI
Email: Amille10@hfhs.org