Postoperative Non-steroidal Anti-inflammatory Drugs and Risk of Bleeding in Pediatric Intracapsular Tonsillectomy

Jill N. D’Souza, MD
Thomas Jefferson University Hospital

Julie P. Adelman, BS
Temple University

Richard J. Schmidt, MD
Thomas Jefferson University Hospital

Heather C. Nardone, MD

Follow this and additional works at: https://jdc.jefferson.edu/otograndrounds

Recommended Citation
https://jdc.jefferson.edu/otograndrounds/29
ABSTRACT

Tonsillectomy with or without adenoidectomy is one of the most frequently performed surgeries in the United States, with over 500,000 performed annually. Post-tonsillectomy hemorrhage is one of the most feared complications; thus, medications that could increase the risk of postoperative bleeding traditionally have been avoided. With recent FDA guidelines encouraging a departure from codeine-based medications in pediatric patients undergoing tonsillectomy, we examined the use of ibuprofen for post-tonsillectomy pain control. The records of 449 children who underwent tonsillectomy and received ibuprofen for postoperative pain control were reviewed and compared to a cohort of 1731 children who received codeine for pain postoperatively. Outcomes measured included rates of secondary post-tonsillectomy hemorrhage (PTH), secondary PTH requiring control, and emergency room (ER) evaluation with or without emergency department (ED) evaluation in the ED for pain, oral pain, or poor oral intake; and need for reoperation due to secondary PTH. Children with known coagulopathies were excluded. The association between categorical variables was expressed as odds ratios (ORs) with 95% confidence intervals. Differences in the relative proportion between categorical variables were analyzed using Fisher exact test and chi-square analysis, as appropriate.

METHODS

A sample of children who underwent tonsillectomy or adenoidectomy for infections or sleep-disordered breathing at Nemours/Alfred I. duPont Hospital for Children (N/AIDHC) between 2011 and 2013 was reviewed. Post-tonsillectomy hemorrhage was performed on all children. Postoperatively, families received verbal and written instruction to use alternating acetaminophen and ibuprofen as needed for their child’s pain. This cohort of children was then compared to a cohort of children who underwent intracapsular tonsillectomy or adenotonsillectomy at N/AIDHC between 2002 and 2005 who used acetaminophen with codeine or hydrocodone as needed for pain. Data collected included patient age and gender; indication for surgery; use of postoperative ketorolac; occurrence of primary or secondary PTH; evaluation in the ED for PTH, pain, or poor oral intake; and need for reoperation due to secondary PTH. Children with known coagulopathies were excluded. The association between categorical variables was expressed as odds ratios (ORs) with 95% confidence intervals. Differences in the relative proportion between categorical variables were analyzed using Fisher exact test and chi-square analysis, as appropriate.

INTRODUCTION

Post-tonsillectomy pain traditionally has been controlled with acetaminophen in combination with a narcotic, such as codeine, hydrocodone, or oxycodone. Deaths due to respiratory depression have been reported in children given codeine post-tonsillectomy.1 Many of the deaths have been in children who possess forms of the liver microenzyme CYP2D6 that make them extensive or ultrarapid metabolizers of codeine.1

The current concerns regarding rapid metabolism of codeine products in children following tonsillectomy2 have led to widespread reconsideration of post-tonsillectomy pain management regimens for the pediatric population. Non-steroidal anti-inflammatory drugs (NSAID), specifically ibuprofen, have gained favor as an alternative to narcotics for postoperative pain control. While NSAIDs provide adequate pain control with decreased risk of respiratory depression associated with narcotic, and not conferring an increased risk for postoperative hemorrhage (PTH), the debate on the ideal pain control regimen for children post-tonsillectomy persists. Our review suggests that NSAIDs increase the likelihood of clinically significant secondary PTH; the rate of secondary PTH observed, however, still falls within national averages. Conversely, NSAIDs appear to provide adequate pain relief, resulting in an equivalent amount of ED evaluation for poor oral intake as compared to narcotic, and not conferring an increased risk for suppression of respiratory drive. Future studies aim to evaluate whether the number of doses and the amount of ibuprofen given per dose affects risk for PTH and to continue to examine the effects of ketorolac on primary and secondary PTH.

RESULTS

Several studies have been undertaken in recent years to evaluate the increased risk of PTH in children using NSAIDs, and suggest that there is evidence that NSAIDs increase the overall risk of hemorrhage requiring intervention by Marett, the preoperative use of NSAIDs was associated with increased risk of reoperation for hemostasis versus those who received placebo or narcotic. A study by Mauziche that same year found that postoperative NSAIDs use leads to increased likelihood of obtaining a PTH requiring reoperation. A more recent systematic review and meta-analysis by Riggs2 again found that patients receiving NSAIDs in the postoperative period have an increase in risk for PTH. Limitations of these studies include the use of several different NSAID agents and inclusion of both pediatric and adult patients.

INTRODUCTION

The current study examines differences in a pediatric population who underwent intracapsular tonsillectomy and for whom parents received standard written instruction regarding the recommended postoperative pain regimen. In our population, patients receiving postoperative ketorolac and ibuprofen had a statistically significant higher rate of secondary PTH with no increased bleeding attributed to use of ketorolac. Despite the observed increase in PTH, the overall rate of PTH and PTH requiring operative control remain within the national average. The relative increase in PTH must be weighed against the risks of respiratory depression associated with postoperative codeine use, especially in the pediatric sleep-disordered breathing population.

A limitation of our study involves variation in the dosage of ibuprofen administered; with some patients prescribing 5 mg/kg/dose and others 10 mg/kg/dose. As a retrospective study, the number of NSAID doses actually taken also remains unknown. Both limitations will be addressed in a future prospective study. Finally, it is noteworthy that in the narcotic group, children evaluated in the ED for hyperemesis thought to be due to codeine were not considered in the dataset. As such, the incidence observed in the narcotic group presenting to the ED for nausea and vomiting, noted to be not significantly different, is underestimated.

CONCLUSION

The debate on the ideal pain control regimen for children post-tonsillectomy persists. Our review suggests that NSAIDs increase the likelihood of clinically significant, secondary PTH; the rate of secondary PTH observed, however, still falls within national averages. Conversely, NSAIDs appear to provide adequate pain relief, resulting in an equivalent amount of ED evaluation for poor oral intake as compared to narcotic, and not conferring an increased risk for suppression of respiratory drive. Future studies aim to evaluate whether the number of doses and the amount of ibuprofen given per dose affects risk for PTH and to continue to examine the effects of ketorolac on primary and secondary PTH.

REFERENCES


Postoperative Non-steroidal Anti-inflammatory Drugs and Risk of Bleeding in Pediatric Intracapsular Tonsillectomy

Jill N. D’Souza, MD1; Julie P. Adelman, BS2; Richard J. Schmidt, MD1,3; Heather C. Nardone, MD1,3

1Thomas Jefferson University Hospital, Philadelphia, PA; 2Temple University, Philadelphia, PA; 3Nemours/Alfred I. duPont Hospital for Children, Wilmington, DE

Table 1. Comparison of Outcome Measures for Narcotic and NSAID Groups

<table>
<thead>
<tr>
<th></th>
<th>Narcotic (n = 1731)</th>
<th>NSAID (n = 449)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary PTH</td>
<td>19 (1.1%)</td>
<td>17 (3.8%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Secondary PTH requiring operative control</td>
<td>8 (0.5%)</td>
<td>7 (1.6%)</td>
<td>0.11</td>
</tr>
<tr>
<td>Dehydration</td>
<td>52 (3%)</td>
<td>19 (4.2%)</td>
<td>0.23</td>
</tr>
</tbody>
</table>

Table 2. Postoperative Ketorolac Use and Post-Tonsillectomy Hemorrhage

<table>
<thead>
<tr>
<th></th>
<th>Ketorolac Used (n = 161)</th>
<th>No Ketorolac Used (n = 288)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary PTH</td>
<td>4 (4.3%)</td>
<td>5 (1.7%)</td>
<td>0.73</td>
</tr>
<tr>
<td>Secondary PTH</td>
<td>5 (3.1%)</td>
<td>12 (4.2%)</td>
<td>0.80</td>
</tr>
</tbody>
</table>

The debate on the ideal pain control regimen for children post-tonsillectomy persists. Our review suggests that NSAIDs increase the likelihood of clinically significant, secondary PTH; the rate of secondary PTH observed, however, still falls within national averages. Conversely, NSAIDs appear to provide adequate pain relief, resulting in an equivalent amount of ED evaluation for poor oral intake as compared to narcotic, and not conferring an increased risk for suppression of respiratory drive. Future studies aim to evaluate whether the number of doses and the amount of ibuprofen given per dose affects risk for PTH and to continue to examine the effects of ketorolac on primary and secondary PTH.