Tonsillectomy Guidelines

Cecille G. Sulman
Best Evidence ENT 2017

Welcome!
Learner Objectives

After this presentation you should:
1) Understand the supportive evidence behind the Tonsillectomy Guidelines.
2) Understand the need for evaluation and intervention in special populations.
3) Understand the importance of counseling and education of families of children who are considering tonsillectomy for their child.
4) Reduce inappropriate or unnecessary variations in care.

Tonsillectomy By the Numbers

- Tonsillectomy is the third most common surgery performed on children in the US: 530,000 annual procedures.
- Habitual snoring is common during childhood: 10% of children aged 2-8 years.
- In non-obese and otherwise healthy children younger than 8 years, the prevalence of obstructive sleep apnea (OSA) is estimated to be 1-3%.
- Obesity confers 4-fold to 5-fold added risk for sleep-disordered breathing.
- Obstructive sleep apnea occurs more commonly among black and Hispanic individuals than among white adults and children. In patients younger than 18 years, blacks are 3.5 times more likely to develop obstructive sleep apnea than whites.

Tonsillectomy Guidelines

• Update pending Spring 2018
• Evidence-based recommendations on the preoperative, intraoperative, and postoperative care and management of children 1 to 18 years old who are under consideration for tonsillectomy.
• Intended for all clinicians in any setting who interact with children 1 to 18 years of age who may be candidates for tonsillectomy.
Tonsillectomy Guidelines

- Do NOT apply to:
  - Tonsillotomy, intracapsular surgery, or other partial removal techniques of the tonsil because of the relatively sparse high quality published evidence on these techniques and limited long-term follow-up.
  - Populations of children excluded from most tonsillectomy research studies, including those with diabetes mellitus, cardiopulmonary disease, craniofacial disorders, congenital anomalies of the head and neck region, sickle cell disease, and other coagulopathies or immunodeficiency disorders.
Intravenous dexamethasone

- **Strong recommendation** for a single, intraoperative dose of intravenous dexamethasone to children undergoing tonsillectomy.

Grade A

- Adherence: Cohort of 16,310 pts at 19 hospitals by 61 surgeons. The majority of hospitals and surgeons administered perioperative dexamethasone before and after the guidelines were published.

---

Intravenous dexamethasone

Cochrane 2011

- 19 randomized controlled trials in the review, with a total of 1756 patients.

- The review found that a dose of corticosteroid during tonsillectomy or adenotonsillectomy can prevent vomiting for one out of every five children who gets the drug.

- Children also return to a normal diet more quickly and they have less pain after surgery.

---

Effect of systemic steroids on post-tonsillectomy bleeding and reinterventions: systematic review and meta-analysis of randomised controlled trials

- 29 randomized controlled trials (n=2674).

- Seven studies presented a low risk of bias, none was specifically designed to systematically identify postoperative bleeding.

- Administration of systemic steroids did not significantly increase the incidence of post-tonsillectomy hemorrhage, odds ratio 0.96 (95%, CI 0.63 to 1.40).

- Significant increase in the incidence of operative reinterventions for bleeding episodes in patients who received systemic steroids (12, n=1178, 2.27 (1.03 to 4.96)).
Peri-operative Antibiotics

- **Strong recommendation against** routinely administering or prescribing perioperative antibiotics to children undergoing tonsillectomy.
  
  Grade A

- On the AAO-HNSF List of Common Tests and Treatments to Question as Part of the Choosing Wisely® Campaign.

- Adherence: Cohort of 16,310 pts at 19 hospitals by 61 surgeons. While the rate of antibiotic administration statistically decreased in 2012 compared to 2007-2011, only 2 of 17 surgeons who prescribed perioperative antibiotics appeared to have changed their practice.

  *Padia. Otolaryngology -- Head and Neck Surgery September 2014 151: P103*
Peri-operative antibiotics
Cochrane 2012

• Ten trials with total of 1035 participants.
• Most did not find a significant reduction in pain with antibiotics.
• Antibiotics were mostly *not shown* to be effective in reducing the need for analgesics.
• Antibiotics were *not* associated with a reduction in significant secondary hemorrhage rates (relative risk [RR] 0.49, 95% CI 0.08 to 2.91, P = 0.45) or total secondary hemorrhage rates (RR 0.90, 95% CI 0.56 to 1.44, P = 0.65).
• Antibiotics *reduced* the proportion of subjects with fever (RR 0.63, 95% CI 0.46 to 0.85, P = 0.002).

Tonsillectomy Guidelines
Recommendation

• *Watchful waiting* for recurrent throat infection if there have been fewer than 7 episodes in the past year or fewer than 5 episodes per year in the past 2 years or fewer than 3 episodes per year in the past 3 years.
• Modifying factors that may nonetheless favor tonsillectomy, which may include but are not limited to multiple antibiotic allergy/intolerance, periodic fever, aphthous stomatitis, pharyngitis and adenitis, or history of peritonsillar abscess.

Grade B

### Table 1: Positive Criteria for Tonsillectomy

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum frequency of sore throat episodes</td>
<td>Yearly frequency of sore throat per day or per month or per year</td>
</tr>
<tr>
<td>Clinical features (one or more features present)</td>
<td>Fever &gt; 38°C, swelling of the neck, or tonsillar edema</td>
</tr>
</tbody>
</table>

### Treatment

- *Watchful waiting* for recurrent throat infection if there have been fewer than 7 episodes in the past year or fewer than 5 episodes per year in the past 2 years or fewer than 3 episodes per year in the past 3 years.
- Modifying factors that may nonetheless favor tonsillectomy, which may include but are not limited to multiple antibiotic allergy/intolerance, periodic fever, aphthous stomatitis, pharyngitis and adenitis, or history of peritonsillar abscess.

Grade B
Tonsillectomy for tonsillitis
Cochrane 2014

- Five studies: four in children (n=719) and one in adults (n=70). Good information about the effects of tonsillectomy is only available for children and for effects in the first year following surgery.
- **Children:**
  - Reduction in the number of episodes of sore throat and days with sore throat in the first year after surgery compared to (initial) non-surgical treatment.
  - Those more severely affected were more likely to benefit as they had a small reduction in moderate/severe sore throat episodes.
- **Adults:**
  - Insufficient information is available on the effectiveness of adenotonsillectomy versus non-surgical treatment.

Tonsillectomy Guidelines
Recommendation

Asking caregivers of children with sleep-disordered breathing and tonsil hypertrophy about comorbid conditions that might improve after tonsillectomy, including growth retardation, poor school performance, enuresis, and behavioral problems.

Grade C

Adenotonsillectomy outcomes

- In 60-100% PSG OSA resolves after T&A.
- **Academic performance**
  - Cohort of 287 first graders with poor academic performance: 6- to 9-fold increase in the prevalence of OSA.
  - T&A in the children who had OSA resulted in a significant improvement in their academic performance in the following year.
  - There was no improvement in those with OSAS whose parents declined treatment.
- **Quality of Life:**
  - There is also a dramatic improvement in QoL in children after tonsillectomy for and this improvement is maintained for up to 2 years after surgery.
Adenotonsillectomy outcomes

• Behavioral and neurocognitive problems have been shown to improve significantly after tonsillectomy for SDB by both objective and subjective testing.
• Improvement in behavior has been shown to continue for at least 2 years after tonsillectomy. 

• Height, weight, and growth biomarkers increase significantly after tonsillectomy.
• SDB should be considered when screening, treating, and referring children with growth failure.

• Enuresis has been shown to resolve or improve in most children with SDB after tonsillectomy.
  Basha showed that 61% of children were free of enuresis and 23% had a decrease in enuresis after surgical therapy for SDB.

• Follow up studies beyond 1 year have reported similar results, with the resolution rate increasing proportionally as the time following surgery increases.

COUNTERPOINT:
• CHAT population older than typical age group undergoing tonsillectomy as younger children not able to participate in NEPSY.
• Demographics may not be representative: More than half of the children in each group were African American and just under half the children in each group were obese or overweight.
• Normalization of polysomnographic findings was less frequent in the African American and overweight/obese children in both study groups. Despite this, the effect of early adenotonsillectomy was still significant.
• CONCLUSION: With randomized evidence in a large number of 5-6 year olds with mild to moderate OSA undergoing early adenotonsillectomy showing benefit in symptomatic, behavioral, and quality of life parameters, surgery should remain the primary treatment modality. Watchful waiting should be reserved for particularly mild disease, with limited or no symptoms, particularly in older children.
Tonsillectomy Guidelines

Recommendation

Counseling caregivers about tonsillectomy as a means to improve health in children with abnormal polysomnography who also have tonsil hypertrophy and sleep-disordered breathing.

Counseling caregivers that sleep-disordered breathing may persist or recur after tonsillectomy and may require further management.

Grade C

Polysomnogram

- Most useful to confirm the diagnosis of OSA and document its severity in the following situations:
  - Children < 2 years
  - High risk patients for which surgery is contraindicated
  - Craniofacial anomalies, morbid obesity, cerebral palsy
  - When there is a discrepancy between history and physical exam
  - Children who are symptomatic after T&A
  - CPAP titration
  - Laryngomalacia with significant sleep symptoms

Other measures of sleep

- Sleep tape: Sensitivity of 88%, specificity of 52%, positive predictive value of 63%.

- Home video tape recording: Sensitivity of 94%, and a specificity of 68% in predicting a positive study.

- Overnight oximetry: Relatively simple to perform, widely available, and has sensitivity of 86.6% and a specificity of 98.9% for detecting OSA.

Source: Arch Argent Pediatr. 2013 Jul;111(3):196-201
Who is at risk for failure?

- Gain velocity in BMI
- Obesity BMI z score > 2
- African American
- Male gender
- PSG severity
- Craniofacial abnormalities
- Trisomy 21
- Cerebral palsy

Evaluation of OSA after T&A

- Telephone screening using pediatric sleep questionnaire
- Polysomnogram
- Drug induced sleep endoscopy
- Imaging
  - Lateral neck
  - Cine MRI
  - Airway fluoroscopy

Anti-inflammatory therapy

- Elevated levels of leukotriene receptors and increased expression of leukotriene biosynthetic enzymes in tonsillar tissue of children with OSA.
- Increased expression of glucocorticoid receptor α in tonsillar tissue of children with OSA.
- Intranasal budesonide and montelukast
  - 12 week regimen in children with residual OSA (AHI > 1, < 5).
  - Improvement in AHI, O2 nadir, and arousal index.
  - Unknown therapy duration.
Orthodontic treatment

- Candidates: OSA + retrusive chin, steep mandibular plane, vertical direction of growth and Class II malocclusion.
- Enlarging the UA, decreasing collapsibility and improving UA muscle tone.
- Studies are limited
  - Diminished snoring, AHI reduction reported.
  - Few studies include patients after adenotonsillectomy or address adenotonsillar size.

Villa. Sleep Med 2015;16:709-716

Rapid Maxillary Expansion
Constricted maxillary arches -> decrease nasal resistance and allow tongue repositioning.
May start at age > 4 years; duration ~ year.

Mandibular advancement -> increases oropharyngeal airway size over 6-9 months.
Monobloc or Herbst appliance.
Promotes mandibular growth.


Positive pressure ventilation

- CPAP: Continuous positive pressure most common.
- BIPAP/NPPV: Inspiratory and expiratory positive pressure.
- Improvement in attention deficits, daytime sleepiness, and school performance.
- Adherence is most important for favorable outcomes. Good usage is during the first week is a predictor for long term use.
- Side effects: Pressure skin sores, aerophagia, mucosal dryness, discomfort from mask leak.
Weight loss

- Prevalence of OSA in obese adolescents and teenagers ranges from 24% - 61%.
- Weight loss is associated with decreases in mean AHI, and improvement in oxygen parameters and arousal index.
- Kalra et al. studied morbidly obese adolescents who underwent bariatric surgery: 55% of subjects were diagnosed with OSA, after weight loss, AHI, arousal index and oxygen parameters improved.
- Challenges: limited access to treatment centers, lifestyle and cultural challenges.

Surgical approaches

Nasal surgery
- Inferior turbinate reduction
- Septoplasty

Oropharynx
- Midline glossectomy
- Lateral expansion pharyngoplasty
- Lingual tonsillectomy
- Genioglossus advancement
- Geniohyoid suspension

Craniofacial
- Mandibular distraction
- Midface distraction

Laryngeal
- Supraglottoplasty
- Epiglottopexy

Tonsillectomy Guidelines

Recommendation

Advocating for pain management after tonsillectomy and educating caregivers about the importance of managing and reassessing pain.

Grade B
Topical Pain Management

- Intraoperative injected local anesthesia
  - Review of randomized controlled trials of adults and children found no evidence that the use of intraoperative injection of local anesthetic improves postoperative pain control.

- Postoperative oral rinses, mouthwashes, and sprays
  - Review of 6 trials with nearly 400 children
  - Risk of bias was high in most studies, the reporting quality poor, and the data inadequate to permit comprehensive and reliable conclusions.

Oral Pain Management

- Review with nearly 1000 children from 13 randomized controlled trials found that NSAIDs did not significantly alter postoperative bleeding compared with placebo or other analgesics (odds ratio, 1.46; 95% CI, 0.49-4.40).

- In a subgroup analysis of 7 trials involving 567 children, the odds ratio for bleeding requiring reoperation was 0.91 (CI, 0.22-3.71) when ketorolac was excluded, suggesting no significant impact.

- Post-tonsillectomy hemorrhage rates with ketorolac range from 4.4% to 16%, and therefore ketorolac use should be avoided.

**Table 1. Postsurgical Pain Management Education for Carers**

1. Threaten pain is greatest the first few days following surgery and may last up to 2 weeks.
2. Encourage your child to communicate with you if he or she experiences significant throat pain, even if it is not always expressed and therefore not recognized promptly.
3. Discuss strategies for pain control with your health care provider before and after surgery relative to addition of analgesics. For example, ketorolac and other anti-inflammatory drugs are associated with fewer complications.
4. Pain medication should be given as directed by your health care provider. Failure to give analgesics on a regular schedule may lead to pain.
5. Pain medication should be taken on an as-needed basis.
6. Report any problems or concerns to your health care provider.
7. Do not give your child anything to eat or drink if your child refuses to take pain medication. Do not self-medicate your child’s pain.

**Tonsillectomy Guidelines**

**Recommendation**

Clinicians who perform tonsillectomy should determine their rate of primary and secondary post-tonsillectomy hemorrhage at least annually.

Grade C
Post-tonsillectomy bleed rates
Cochrane 2017

- In meta-analysis, the frequency of primary and secondary
  PTH associated with total and partial tonsillectomy was <4%
  for any technique.
- Fewer PTH episodes occurred with tonsillectomy for
  obstructive sleep-disordered breathing than for throat
  infection.
- Frequency of PTH-associated nonoperative
  revisits/readmission or reoperation ranged from 0.2% to
  5.7% for total tonsillectomy and from 0.1% to 3.7% for
  partial tonsillectomy.
- Frequency of PTH across techniques was similar.

Opportunities

- Evaluate reasons for readmission and
  opportunities to reduce.
- Leverage EHR for PMD education/accurate
  referral.
- Determine when pre- and postoperative
  polysomnogram should be performed.
Summary

Do
- Provide a single, intraoperative dose of IV dexamethasone.
- Counsel caregivers that sleep disordered breathing may recur.
- Ask caregivers about comorbid conditions that might improve after tonsillectomy.
- Educate caregivers about pain management.
- Monitor your bleed rate.

Summary

Do not:
- Routinely prescribe peri-operative antibiotics to children undergoing tonsillectomy.
- Perform tonsillectomy for tonsillitis if criteria and/or modifying factors are not met.
THANK YOU