Pain Control in Tonsillectomy

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Pain control: requires preoperative, intraoperative, and postoperative management

Steroids: 2011 guideline on tonsillectomy in children recommends single intraoperative dose of intravenous (IV) dexamethasone; steroids decrease postoperative nausea and vomiting, throat pain, and time to oral intake; dose not established, but 0.5 to 1 mg/kg commonly used

Local anesthetic: findings of studies mixed; although better-designed studies and Cochrane review have shown no benefit, use of local anesthetics widespread

Codeine: pharmacology — weak opioid; inactive prodrug must be converted to morphine; effectiveness — unblinded study randomized 110 children to ibuprofen vs acetaminophen with codeine; ibuprofen group had less nausea; no differences in pain control or bleeding; randomized, double-blinded study of acetaminophen vs acetaminophen with codeine found no difference between groups in pain scores; patients taking acetaminophen significantly more likely to consume normal diet postoperatively; studies from other specialties — randomized, double-blinded study in 240 children with arm fractures found that ibuprofen associated with less pain and fewer adverse effects than acetaminophen with codeine; in adults having facelifts, ibuprofen associated with similar pain relief and fewer adverse effects than acetaminophen with codeine; risks — significant proportion of population does not metabolize codeine and derives no benefit it; combination of codeine and acetaminophen does not include adequate dose of acetaminophen; however, recommending extra dose of acetaminophen for child already taking combination creates risk of overdosing acetaminophen; small percentage of individuals ultrarapid metabolizers of codeine and may develop respiratory depression or die; risk for this complication higher in North Africans than Europeans; Food and Drug Administration — declared that codeine should not be prescribed for postoperative pain relief in children undergoing tonsillectomy or adenoidectomy

Nonsteroidal antiinflammatory drugs: ibuprofen safe after tonsillectomy; Cochrane review of 1000 children in 13 randomized, controlled trials (RCTs) found no significant difference in postoperative bleeding compared with placebo; aspirin and ketorolac should not be given

Protocols: many institutions developing pain management protocols using ibuprofen and acetaminophen; acetaminophen suppositories useful for young children

Narcotics: unclear whether narcotics needed for select patients; those with sleep apnea more sensitive to narcotics; acetaminophen/hydrocodone (Hycet, Lortab, Vicodin) — may be prescribed by telephone; available as liquid; oxycodone — effective for moderate to severe pain; available as liquid; may require triplicate prescription; may be used with acetaminophen or ibuprofen

Topical medications: include oral rinses, mouthwashes, and sprays; Cochrane review of 7 studies and =600 patients concluded that lidocaine could be more effective than placebo for pain, but also noted that data could be biased

Communication with families: 2011 tonsillectomy guideline offers points for discussion; throat pain greatest during first few postoperative days; children should be encouraged to communicate their pain; parents should discuss strategies for pain control with provider; antibiotics do not reduce pain and should not be given routinely; child should drink plenty of fluid; ibuprofen safe; medications should be given often; children often have greater pain in morning

Policies for practices: all staff members should agree on management; to institute policy, physician should hold meeting to educate staff members, check formulary at hospital, and include key individuals when developing management protocols (eg, nurses from postanesthesia care unit, individuals who field telephone calls for practice, and pediatric pain specialist); important to change perception that narcotics provide superior pain relief

Example of pain management protocol: for children <5 yr of age, acetaminophen and ibuprofen alternated every 3 hr; no narcotics used; after 1st 2 days, medications given as needed; oxycodone may be added for older children; narcotics for rescue, not routine use

Special cases: 2 yr old who refuses to consume fluids may receive rectal acetaminophen; if only adenoids removed, pain medications given as needed; large children may receive adult dose of acetaminophen (650 mg) or ibuprofen (400 mg), but dose of narcotic should be based on ideal (lean) weight; children allergic to dye in liquid formulations may use chewable acetaminophen; if acetaminophen cannot be given, ibuprofen used every 6 hr; kidney specialist should be consulted for children with renal transplant; such children need inpatient management for hydration; special restrictions also required for children with liver transplants; children with Down syndrome who do not drink adequate fluids should be kept in hospital and treated with IV or rectal medication

Partial vs Total Tonsillectomy

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Benefits of microdebrider: for partial intracapsular tonsillectomy and adenoidectomy (PITA), microdebrider can debulk regrowth after tonsillectomy and adenoidectomy.

5. Discuss recent clinical trials evaluating use of the coblator for tonsillectomy.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and is not a proprietary business or commercial interest. For this program, members of the faculty and planning committee reported nothing to disclose.
without entering capsule or mucosa; creates no thermal injury, leaves “biologic dressing” of lateral capsule of tonsil to protect muscle, removes 95% to 99% of tonsil in controlled fashion, preserves pillars, and reduces postoperative morbidity

**Comparison with electrocautery:** study compared microdebrider with electrocautery in 243 patients with obstructive symptoms; methods — for PITA, microdebrider used at 1500 rpm; suction electrocautery at 10 to 15 W used to achieve hemostasis after microdebridement; blood loss — intraoperative blood loss not clinically significant; postoperative bleeding observed in 1.7% of children undergoing PITA and 4.7% of those having total tonsillectomy (TT); cost — in 2002, microdebrider cost $80 to $100 and electrocautery cost $5 to $10; complications — decrease in operative time modest (3 min); delayed complications similar in both groups, including dehydration, torticollis, velopharyngeal insufficiency, changes in voice, and depression; for patients undergoing PITA, microdebrider group had shorter time to resumption of normal activity (4 days, vs 8 days for electrocautery group), time for normal diet (3 vs 7 days), and duration of analgesic requirement (2 vs 5 days)

**Risks from PITA:** outcomes — study used parental questionnaires to evaluate 6–y results after PITA with carbon dioxide (CO₂) laser vs TT and adenoidectomy; study found no differences in health, recurrent snoring, apnea, or frequency of respiratory illnesses; sleep apnea — study of PITA in children found reduction in mean apnea hypopnea index from 7.9 to 0.1 and improved quality of life as measured by Obstructive Sleep Apnea-18 questionnaire; however, study followed patients only for 1 to 2 mo; tonsillar regrowth — occurs in ≥1% of children after PITA; among 188 patients undergoing adenoidectomy by coblation, 13% had regrowth at 1 y, but only 1% of regrowth associated with symptoms; younger children and those with large adenoids before surgery most likely to have regrowth; TT vs partial tonsillectomy — retrospective comparison conducted in 30 patients followed for 1 to 6 y; minimal clinical differences found in long-term sleep studies

**Costs:** cost of dexmedetomidine ($480) exceeds that of microdebrider; although microdebrider costly, procedure and recovery are faster, and patients have fewer postoperative admissions, admissions to pediatric intensive care unit, readmissions, and visits to emergency department; overall cost of care for patients treated for infection; 2011 survey of 314 pediatric and 321 general otolaryngologists found that 80% used total techniques, 9% used intracapsular techniques, and 7% used both; coblator most common single instrument used (reported by 27.5%); monopolar electrocautery most common instrument used in combination with other instruments; coblator commonly used for total and intracapsular techniques

**Contraindications to PITA:** include recurrent or chronic tonsillitis, PANDAS (pediatric autoimmune neuropsychiatric disorders associated with Streptococcus), and PFAPA (periodic fever, aphthous stomatitis, pharyngitis, adenitis, and history of peritonsillar abscess); children with tonsillar asymmetry need biopsy to rule out lymphoma

**Technique:** CO₂ laser, bipolar scissors, and suction Bovie

**Instruments:** microdebrider most common instrument used for PITA; other methods include harmonic scalpel, radiofrequency, CO₂ laser, bipolar scissors, and suction Bovie

**Technique:** PROcise MAX coblator wand useful; irrigation through inferior port does not interfere with function of instrument; compared with other instruments, PROcise MAX has broader field of contact; instrument hotter than Evac 70 wand; allows surgeon to use single instrument for tonsils, adenoids, and coagulation; produces less thermal injury than electrocautery, offers precise tissue dissection, and preserves tonsillar pillars; outcomes — perioperative and postoperative blood loss low; recovery similar to that observed in patients having PITA with microdebrider; procedure should be stopped before muscle reached; coblator also used for adenoids, which bleed more than tonsils; instrument easy to use and associated with rapid recovery and good postoperative pain control; management — many children require little pain medicine; parents should not awaken children to give medication; based on sleep studies, long-term benefits of PITA similar to those of TT

**Outcomes:** retrospective study of coblation in 415 patients compared TT with PITA; odds ratio for postoperative bleeding (TT vs PITA) 4.8; mean time to resumption of normal diet longer in TT group (8 vs 5 days); patients with PITA appear less likely to have increased postoperative pain 5 to 9 days after tonsillectomy

**Drawbacks to coblator:** learning curve for surgeon may lengthen case; theoretical contraindications include recurrent tonsillitis, history of abscess, and medical comorbidities; regrowth of tonsils may occur in younger children; although data favorable so far, currently unknown how many children need second operation; older children may have lower risk for regrowth

**Coblation Techniques**

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**Current practices:** survey of 120 members of American Society of Pediatric Otolaryngology found that three-fourths performed TT for obstructive sleep apnea (OSA) and one-fourth did intracapsular procedures; larger percentage of respondents did TT for tonsillitis; TT, 53% used monopolar electrocautery; for intracapsular procedures, most respondents used debrider in patients treated for obstruction, and most used coblator in those treated for infection; 2011 survey of 314 pediatric and 321 general otolaryngologists found that 80% used total techniques, 9% used intracapsular techniques, and 7% used both; coblator most common single instrument used (reported by 27.5%); monopolar electrocautery most common instrument used in combination with other instruments; coblator commonly used for total and intracapsular techniques

**Coblation:** uses bipolar radiofrequency energy to produce plasma field within conducting medium of saline; dissociates molecules but releases minimal thermal energy; electrocautery heats tissue to 450°C to 600°C; coblation (cold ablation) heats tissue to 40°C to 70°C; settings — settings from 1 to 5 denote thermal mode; settings ≥6 associated with creation of plasma field; many surgeons use PROcise XP wand (miniature version of Evac 70) for TT

**Evidence for coblation:** 2007 Cochrane review concluded that evidence inadequate to compare coblation with other techniques for TT; however, 12 RCTs performed since then, and most studies showed some benefit for coblation

**Postoperative hemorrhage:** large audit of tonsillectomies done in United Kingdom (UK); level of experience with coblation among participating hospitals unknown; rates of bleeding 4.6% after coblation and 1.4% after cold tonsillectomy; individual series — large institutions report bleeding rates of 0.95% to 1.5%; rates of bleeding higher in series that included inexperienced surgeons; large recent studies report acceptable rates; study of ablation learning curve — evaluated 1700 cases performed by 19 surgeons; rate of primary hemorrhage 1.3% among first 10 cases by each surgeon, but fell to 0% after 40 cases performed; rate of secondary hemorrhage 3.2% among first 10 cases, but fell to 1%; study suggests institutions in UK audit inexperienced

**Technique:** coblator not designed for fine dissection, so surgeon must modify technique; critical to find and dissect within subcapsular plane; nonactive back surface of coblator may be used as spreading device to locate plane; surgeon must maintain 1- to 2-mm distance from capsule in order to visualize bubbling of coblation plasma field between tip of coblator and capsule and avoid penetration of capsule; active electrode should face away from fossa and toward tonsil; keeping tip in motion maximizes its cutting activity; small pressing motions increase cutting activity, but could result in cutting more deeply into muscle and exposing vessels; when these precepts followed, learning curve less steep than that reported in literature

**Intracapsular coblation:** RCT of intracapsular coblation vs subcapsular total coblation showed that intracapsular techniques associated with significantly less pain and increased oral intake; in another RCT, intracapsular techniques using coblation or microdebrider both associated with improved recovery compared with TT using electrocautery
Coblation for lingual tonsillectomy: motivation — systematic review reported resolution of OSA in 82.9% of nonobese children having tonsillectomy; larger review reported 66.3% rate of success; success rate lower in complicated patients with morbid obesity and severe preoperative OSA; although tonsillectomy and adenoidectomy effective for many children, significant proportion still have OSA after surgery; sleep endoscopy in children with persistent OSA sometimes reveals large lingual tonsils; history — older techniques for lingual tonsillectomy associated with excessive swelling of tongue and need for postoperative intensive care; technique — coblation technique includes use of nasotracheal intubation, Jennings mouth retractor, 2 red rubber catheters to retract soft palate, and Freeman retractor to extend tongue; operation performed using monitor, 30° or 45° telescope, and coblation handpiece; PROCise MAX tip preferred because it allows faster ablation than PROCise XP; after lingual tonsillectomy, median glossotomy performed to create trough in tongue; outcomes — procedure improves apnea hypopnea index and respiratory disturbance index.

Acknowledgments

Drs. Messner, Shapiro, and Chang were recorded at SENTAC Annual Meeting, presented by Society for Ear, Nose, and Throat Advances in Children, and held December 5-8, 2013, in Long Beach, CA. For information and updates from the Society for Ear, Nose, and Throat Advances in Children, please visit our website, audio-digest.org, and click on the “upcoming meetings” tab at the bottom of the page. The Audio Digest Foundation thanks the speakers and the Society for Ear, Nose, and Throat Advances in Children for their cooperation in the production of this issue.

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Tonsillectomy Tips

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To submit a test form by mail or fax, complete Pretest section before listening and Posttest section after listening.

1. For patients undergoing tonsillectomy, clinical practice guidelines from the American Academy of Otolaryngology recommend a single intraoperative dose of:
   (A) Corticosteroids  (B) A narcotic agent  (C) Acetaminophen  (D) A nonsteroidal antiinflammatory drug

2. Which of the following medications is considered safe for children after tonsillectomy?
   (A) Aspirin  (B) Ketorolac  (C) Codeine  (D) Ibuprofen

3. An obese child may be treated with the adult dosage of:
   1. Acetaminophen
   2. Oxycodone
   3. Ibuprofen
   4. Hydrocodone
   (A) 1,3  (B) 2,4  (C) 3,4  (D) 1,2,3,4

4. A study comparing the microdebrider for PITA with electrocautery for tonsillectomy in 243 patients with obstructive symptoms found that the microdebrider was associated with:
   (A) Lower cost  (B) Less postoperative blood loss  (C) Fewer changes in the voice  (D) Less dehydration

5. Regrowth of the tonsils is expected in approximately _______ of children who undergo partial intracapsular tonsillectomy.
   (A) 1%  (B) 4.7%  (C) 7%  (D) 13%

6. Partial tonsillectomy may be performed in a child with:
   (A) Pediatric autoimmune neuropsychiatric disorders associated with Streptococcus
   (B) Periodic fever, aphthous stomatitis, pharyngitis, adenitis, and history of peritonsillar abscess
   (C) Tonsillar lymphoma
   (D) Obstructive sleep apnea

7. In a survey of 314 pediatric and 321 general otolaryngologists, the most common single instrument used for tonsillectomy was:
   (A) Cold knife  (B) Coblator  (C) Microdebrider  (D) Electrocautery

8. The coblator heats tissue to a maximum temperature of:
   (A) 40°C  (B) 70°C  (C) 450°C  (D) 600°C

9. What was the primary concern raised about the coblator based on an audit of tonsillectomies in the United Kingdom?
   (A) Cost  (B) Regrowth  (C) Hemorrhage  (D) Lack of surgeon experience

10. In a randomized trial that compared intracapsular coblation, intracapsular microdebridement, and total tonsillectomy, improved recovery was observed in patients treated with:
    (A) Coblation  (B) Microdebrider  (C) Both A and B  (D) Neither A nor B

Answers to Audio Digest Otolaryngology Volume 47, Issue 22: 1-B, 2-C, 3-C, 4-A, 5-A, 6-D, 7-C, 8-D, 9-A, 10-B

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