Tonsillectomy and Adenoidectomy

Objectives  After completing this article, readers should be able to:

1. Describe the indications for a tonsillectomy and adenoidectomy.
2. Know the complications of a tonsillectomy and adenoidectomy.
3. Recognize the serious outcomes that may be associated with tonsillar or adenoidal hypertrophy or both.
4. Discuss the importance of proper evaluation of velopharyngeal insufficiency in a child being considered for tonsillectomy, adenoidectomy, or both.

Introduction

Although the number of tonsillectomy and adenoidectomy procedures has declined over the past 50 to 60 years, these operations continue to be among the procedures performed most commonly in the United States, second only to myringotomy with tube insertion. According to the most recent compilation of national health statistics (1996), more than 287,000 children younger than age 15 years underwent tonsillectomies with and without adenoidectomy; approximately 129,000 children underwent adenoidectomy without tonsillectomy.

Despite being common procedures, the indications for tonsillectomy and adenoidectomy remain controversial. There have been few randomized, controlled clinical trials to help the primary care practitioner recommend which children to refer for tonsillectomy or adenoidectomy. Clinicians often feel pressured by parents and families to recommend such procedures. Tonsillectomies are performed most commonly on children who have obstructive sleep apnea syndrome (OSAS) and recurrent throat infections. The primary indication for adenoidectomy is adenoid hypertrophy, with resultant upper airway obstruction.

Anatomy

Waldenyer ring is a ring of lymphatic tissue in the oral cavity and nasopharynx. Tonsils and adenoids are part of this lymphatic ring. The term tonsil usually refers to the palatine tonsil, which is bounded anteriorly by the palatoglossus muscle (anterior tonsillar pillar) and posteriorly by the palatopharyngeus muscle (posterior tonsillar pillar). The palatine tonsils form the lateral aspects of the ring. The adenoids, or pharyngeal tonsils, located in the nasopharynx, form the superior aspect of the ring. The lingual tonsil, which resides at the base of the tongue, forms the inferior aspect of the ring.

Clinical Presentation

Children who have abnormalities of the tonsils or adenoids usually have problems related to malignancy, obstruction, or infection.

Malignancy

Although most tonsillar asymmetry is benign, pharyngeal cancer, usually lymphoma, may present with asymmetric tonsillar hypertrophy. Children who have a malignancy often have other symptoms that distinguish their disease from benign tonsillar asymmetry, such as fevers, night sweats, weight loss, dysphagia, and adenopathy greater than 3 cm.

Obstruction

Children who have adenotonsillar hypertrophy often have airway obstruction that causes problems with sleep. Such problems range from primary snoring to OSAS. Accordingly,
when obtaining a history during a routine health supervision visit, the clinician should include a sleep history screening for snoring. Adenotonsillar hypertrophy also may cause other problems, such as hyponasal speech, nasal obstruction, adenoidal facies, and mouth breathing. Those patients who have narrow upper airways may have orofacial and dental abnormalities as a result of adenotonsillar hypertrophy. Tonsillar hypertrophy may be present on physical examination or findings may be normal.

Infection
Children who have adenotonsillar infections may present with fever, sore throat, tender cervical nodes, headache, abdominal pain, halitosis, and dysphagia. The physical examination may reveal enlarged, tender cervical nodes; erythematous, enlarged tonsils that may be covered with exudates; and petechiae of the soft palate and tonsillar pillars. An infection with group A beta-hemolytic Streptococcus is confirmed with either a rapid test or throat culture.

Indications For Tonsillectomy (Table 1)

Malignancy
Children who have asymmetric tonsillar hypertrophy and whose history and physical examination findings are suspicious for a malignancy, such as lymphoma, should undergo a tonsillectomy.

Recurrent Tonsillitis
Tonsillectomy to prevent subsequent throat infections in children who have recurrent infections has been a common reason to perform this procedure in the past. The number of throat infections that a child should have before undergoing tonsillectomy to reduce the recurrence of subsequent episodes remains controversial. The American Academy of Otolaryngology-Head and Neck Surgery guidelines list “3 or more infections of tonsils and/or adenoids per year despite adequate medical therapy.” The Scottish Intercollegiate Guidelines Network (SIGN) lists the following as reasonable indications for tonsillectomy in children: Five or more sore throats per year caused by tonsillitis, symptoms having lasted for at least 1 year, and episodes of sore throat that are “disabling and prevent normal function.” Studies by Paradise and associates at the University of Pittsburgh have established that tonsillectomy, when combined with adenoidectomy, is efficacious in reducing the occurrence of throat infections in children who are severely infected. To meet the definition of “severely infected,” children were required to have seven or more well-documented, clinically important, adequately treated episodes of throat infection in the preceding year; five or more infections in each of 2 successive years; or three or more episodes in each of 3 successive years.

The benefits of tonsillectomy have been marginal when less stringent criteria are employed. The result of a later study from the University of Pittsburgh that used less stringent criteria for affected children than those from the previous study but that had indications for tonsillectomy comparable to those in general use suggests that the moderate benefit conferred by tonsillectomy or adenotonsillectomy in children moderately affected with recurrent throat infections seems not to justify the morbidity, risks, or costs of the procedures.

Hemorrhagic Tonsillitis
Children occasionally experience hemorrhage from recurrent tonsillitis or tonsillar hyperplasia. If bleeding is recurrent or causes anemia, tonsillectomy is indicated.

Recurrent Peritonsillar Abscess
An episode of peritonsillar abscess usually is treated with needle aspiration and incision and drainage. Prospective trials studying the efficacy of tonsillectomy in preventing recurrent peritonsillar abscess have not been performed. The results of retrospective studies suggest that tonsillectomy may help prevent peritonsillar abscess if the patient has had two or more episodes.

Indications for Adenotonsillectomy

OSAS
Although the number of tonsillectomies and adenoidectomies has been decreasing, the proportion of these procedures performed for OSAS is increasing. The prevalence of OSAS in children is approximately 1% to 3%. Although it can occur in a child of any age, it is believed to occur most frequently in preschool-age children, at
which time the adenoids and tonsils are largest in size compared with the child’s airway. OSA is defined as a disorder of breathing during sleep characterized by prolonged partial upper airway obstruction or intermittent complete obstruction (obstructive apnea) that disrupts normal ventilation during sleep and normal sleep patterns. It is associated with signs and symptoms that include habitual (nightly) snoring (often with intermittent pauses, gasps, or snorts), sleep difficulties, or daytime neurobehavioral problems. Risk factors include adenotonsillar hypertrophy, neuromuscular disorders, obesity, and craniofacial abnormalities.

Primary snoring occurs in 6% to 12% of children. Unlike OSAS, primary snoring is defined as snoring without frequent arousals from sleep, obstructive apnea, or gas exchange abnormalities.

Sequelaes of OSAS may include cognitive and behavioral abnormalities, failure to thrive, and in severe cases, cor pulmonale. Several studies suggest an increase in behavior and neurocognitive abnormalities (eg, excessive daytime sleepiness, hyperactivity, decreased school performance) in children who have sleep-disordered breathing. Because OSAS now is being diagnosed and treated earlier, failure to thrive is not seen commonly, although children who have OSAS, even those who are obese, tend to gain weight and exhibit a growth spurt after adenotonsillectomy. It now is rare to see a child who has OSAS present with cor pulmonale and heart failure. Some degree of pulmonary hypertension may be present in affected patients, along with systemic hypertension. These symptoms appear to be reversible after adenotonsillectomy.

Recent studies have suggested several benefits of treating children who have OSAS with adenotonsillectomy, including improved school performance; reduction of health care utilization; marked improvement in domains of sleep disturbance, physical symptoms, emotional distress, and daytime problems; and a perceived long-term improvement in quality of life.

The gold standard for diagnosing OSAS is overnight polysomnography (PSG) performed in a sleep laboratory. However, PSG is expensive, and clinicians may not have a sleep laboratory in the geographic area that performs the test. Alternatives to overnight PSG are overnight oximetry and nap PSG, which have high specificity but low sensitivity, and home PSG, videotaping, and audiotoaping, which require more study. Under selected circumstances, these procedures may help in the diagnosis of OSAS. Adenotonsillectomy is the first-line treatment for most children; its rate of cure ranges from 75% to 100%.

Table 2. Indications for Adenoidectomy

- Obstructive sleep apnea due to adenotonsillar hypertrophy
- Chronic adenoiditis
- Chronic sinusitis
- Repeat surgery for otitis media with effusion

Indications For Adenoidectomy (Table 2)

OSAS
As noted previously, adenotonsillectomy is indicated in children diagnosed with OSAS.

Chronic Adenoiditis, Chronic Sinusitis
When a child presents with chronic rhinorrhea, it often is difficult to differentiate clinically between chronic sinusitis and chronic adenoiditis. An inability to visualize and examine the adenoids compounds the problem. Some studies suggest that adenoidectomy may be beneficial for children who have recurrent or chronic sinonasal problems.

Otitis Media
Otitis media alone is not an indication for adenoidectomy or tonsillectomy. Although adenoidectomy and adenotonsillectomy commonly are performed to reduce the occurrence of recurrent acute otitis media, evidence supporting this practice is limited. A study from the University of Pittsburgh suggests limited efficacy of these procedures for children who have recurrent acute otitis media. In the updated clinical practice guideline on otitis media with effusion (OME), developed jointly by the American Academy of Pediatrics, the American Academy of Family Physicians, and the American Academy of Otolaryngology-Head and Neck Surgery, the following was recommended regarding adenoidectomy and OME: In the absence of a condition such as chronic sinusitis, adenoiditis, or postnasal obstruction, adenoidectomy is not recommended for initial surgery in children who have OME. However, because there is a 50% reduction in the need for future operations when it is performed, adenoidectomy is recommended when a child requires repeat surgery for OME. This benefit is greatest for children 5 years of age and older and is apparent in children as young as 2 years of age.

Postoperative Care
Many children who undergo tonsillectomies and adenoidectomies are discharged the same day of the proce-
ture. For most children, this is safe. Situations where this practice is not recommended include age younger than 3 years, severe OSAS, and other major medical problems (eg, craniofacial abnormalities, neuromuscular disorders). In addition to medical issues, social issues, such as a family living more than 1 hour from the hospital, questionable ability of caretaker, or parental anxiety, also must be considered when deciding which children may benefit from an overnight admission postoperatively.

Acetaminophen, sometimes combined with codeine, may be used for pain relief. Ibuprofen and other analgesics that interfere with coagulation should not be used. Antibiotics (usually amoxicillin) may be given for 7 to 10 days postoperatively. Light activity can be undertaken after a few days, with return to full activity in 2 weeks. Otalgia, due to referred pain, is common. Children have sore throats and halitosis after surgery. After a tonsillectomy, a white, shaggy eschar forms in the tonsillar fossae and may persist for 3 to 4 weeks. This may be mistaken as infection by parents, but infection in this region is uncommon postoperatively. Children who have severe, persistent pain; fever; bleeding; or signs of dehydration should be evaluated by a physician.

Complications
The anesthetic risk for ambulatory surgery is low, reported to be 1 in 50,000, but the current rate may be even lower. Mortality from tonsillectomy and adenoidectomy is rare. Most deaths are related to bleeding and anesthetic complications. The complications of both tonsillectomy and adenoidectomy are similar. The most common immediate complications from these procedures are bleeding and respiratory distress. Bleeding usually occurs within the first 24 hours after surgery but may develop as late as 2 weeks postoperatively. It occurs less commonly with adenoidectomy. Any bleeding requires immediate evaluation. Respiratory distress can occur because of obstruction due to tongue or palate edema or from risk factors related to airway obstruction, such as severe OSAS, right ventricular hypertrophy, obesity, failure to thrive, craniofacial abnormalities, or neuromuscular disorders. Pulmonary edema rarely occurs postoperatively. Other complications include dehydration due to poor oral intake, torticollis, and OME.

Velopharyngeal insufficiency (VPI) can be seen following adenoidectomy and, rarely, following tonsillectomy. It is caused by inadequate closure of the posterior aspect of the palate against the pharyngeal wall after removal of posterior nasopharyngeal tissue. Patients who have VPI have hypernasal voices and nasal air emissions (air escape through the nasal passage with speech) that cause problems with speech. This usually is transient, lasting a few weeks, although on rare occasions it may persist and require speech therapy or surgical repair.

A child’s voice and palate should be evaluated before performing an adenoidectomy or tonsillectomy. Children who have cleft palates or submucous cleft palates are at risk for postoperative VPI. Submucous cleft palate can be difficult to diagnose. A bifid uvula or notched hard palate may be associated with the condition. Patients who have craniofacial abnormalities, neuromuscular disorders, and Down syndrome also are at risk for VPI.

Summary
Tonsillectomy and adenoidectomy continue to be performed commonly. Although these procedures are beneficial for children who have OSAS and are severely affected with throat infections, other indications for surgery are not as clear. Randomized, controlled clinical trials are needed to provide evidence-based decision-making for clinicians regarding the efficacy of tonsillectomy and adenoidectomy.

Suggested Reading
Darrow DH, Siemens C. Indications for tonsillectomy and adenoidectomy. Laryngoscope. 2002;112:6–10
5. A 17-year-old male presents to your office with a history of difficulty swallowing and severe night sweats. Inspection of his throat reveals that his right tonsil is much larger than the left. You are concerned that the boy may have a tonsillar malignancy. Of the following, the other finding that makes tonsillar malignancy most likely is:

A. Cervical adenopathy greater than 3 cm.
B. Epistaxis.
C. Severe drooling.
D. Snoring with apnea.
E. Splenomegaly.

6. The mother of a 2-year-old boy expresses concern during a health supervision visit that her child has had increased problems with snoring and periods of breathing difficulties during his sleep. You suspect the boy has obstructive sleep apnea (OSA) due to adenotonsillar hypertrophy. Of the following, the most serious complication if this condition is not recognized and treated is:

A. Cor pulmonale.
B. Craniofacial abnormalities.
C. Daytime narcolepsy.
D. Failure to thrive.
E. Severe behavioral problems.

7. A clear-cut indication for referring a child for tonsillectomy is:

A. A single episode of peritonsillar abscess.
B. Chronic sinusitis.
C. Recurrent hemorrhagic tonsillitis.
D. Tonsillar diphtheria.
E. Two episodes of tonsillitis in the past year.

8. A 3-year-old girl has been snoring and having increasing sleep disruptions for the past 6 months. Her mother is very resistant to considering an adenotonsillectomy for treatment of her daughter’s suspected OSA without confirmation of the cause of this condition. You tell her that the test that can confirm the diagnosis of OSA most accurately is a(n):

A. Arterial blood gas measurement.
B. Audiotape recording of the girl’s breathing at night.
C. Echocardiogram.
D. Lateral neck radiograph.
E. Polysomnograph.

9. Parents are considering the risks and benefits of their 4-year-old son having an adenotonsillectomy for his OSA. They are concerned about possible complications from the operation. Of the following, the most likely serious complication with this procedure is:

A. Dehydration.
B. Hemorrhage.
C. Methicillin-resistant *Staphylococcus aureus* infection.
D. Otalgia.
E. Reactive airway disease.