



Review Article

Surgical management of the tonsillectomy and adenoidectomy patient

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Tonsillectomy and adenoidectomy were developed hundreds of years ago, but they enjoyed wide popularity beginning in the early 20th century as a preventive treatment of Group A beta-hemolytic streptococcal (GABHS) pharyngotonsillitis and its feared complication – rheumatic heart disease. During that era, many children underwent tonsillectomy and adenoidectomy that was not indicated due to a negative history of streptococcal infection, but became surgical candidates because another family member suffered frequent streptococcal disease or worse – rheumatic heart disease. Development of potent antibiotics, specifically penicillin, altered the treatment of recurrent streptococcal disease, and decreased the incidence of rheumatic fever and heart disease. Along with a decrease in the incidence of

tonsillectomy and adenoidectomy, there have been marked improvements in both surgical and anesthetic techniques that have decreased both morbidity and mortality. While tonsillectomy and adenoidectomy have become much safer in the past fifty years, postoperative complications still exist but can be minimized by careful history-taking, good surgical technique and excellent attention to detail postoperatively.

Indications for tonsil and adenoid surgery

Recurrent infection/recurrent tonsillitis

Symptoms and signs of GABHS infection are often difficult to distinguish from other bacterial or viral pharyngitis. In the Pittsburgh pharyngotonsillitis study reported by Paradise et al,¹ the following symptoms and signs – sore throat, fever (>38 °C), tonsillar exudates, cervical lymphadenopathy, drooling, muffled voice, malaise and a positive culture for GABHS – were inclusive for the study. All of these symptoms and signs can be seen with viral infections, and so the gold standard of proof for GABHS infection remains the throat culture. Rapid streptococcal assays are helpful in determining the need for early treatment with antibiotics, but may have false positives.

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Because there is overlap in the symptoms and signs of GABHS compared with either other bacterial or viral infections, recurrent infection as a surgical indication was often difficult to document and categorize which group of patients may benefit from surgery. Paradise reported on criteria for surgery that have separated those children who would benefit from tonsillectomy and adenoidectomy from those whose disease is not severe enough to warrant surgery. The "Paradise Criteria" are listed in Table 1 and remain the standard for surgical decision-making in cases of recurrent pharyngotonsillitis infection. A subsequent report in 2002² examined children with milder symptoms and less evidence of streptococcal disease and discussed the indications for adenotonsillectomy in this group of patients. Blakely and Magit³ and Burton⁴ conducted meta analyses that demonstrated improvement of chronic sore throats following tonsillectomy and adenoidectomy. Clinical Practice Guidelines for Tonsillectomy and Adenoidectomy⁵ mirror the "Pittsburgh Criteria" and represent the current recommendations for performing tonsillectomy in children with recurrent tonsillitis as a cause.

Streptococcal carriage

In spite of the development of potent antibiotics against streptococcal infection, carriage remains a condition that is difficult and controversial to treat. Affected children have positive cultures for GABHS, but have no or minimal symptoms. Some have suggested that streptococcal bacteria reside in biofilms in the tonsil and adenoid tissue, a place where they are difficult to eradicate.⁶ Antibody titers both in the convalescent and active infection periods help to confirm carriage from infection. Table 2 lists the major reasons for treatment of streptococcal carriage. Medical treatment for carrier state has been delineated by the Infectious Diseases Society of America guideline in 2012 which listed the following as strong recommendations: Amoxicillin-clavulanate, Penicillin and Rifampin (not rifampin alone) or Clindamycin. Surgical treatment with tonsillectomy and adenoidectomy is curative in resistant cases.

Table 1 Paradise criteria for tonsillectomy in recurrent tonsillitis.

Frequency of sore throat events 7 or more episodes in the preceding year
OR
5 or more episodes in each of the preceding 2 years
OR
3 or more events in each of the preceding 3 years

Table 2 Streptococcal carriage who to treat?

Family history of rheumatic fever
History of acute glomerulonephritis
Ping-pong spread of disease through family
School has GABHS epidemic

Sleep disordered breathing

Sleep disordered breathing (SDB) ranges from upper airway resistance syndrome to obstructive sleep apnea (OSA). Children with upper airway resistance have a normal polysomnogram but symptoms of airway obstruction at night including snoring and straining to breathe. Daytime symptoms of OSA are listed in Table 3, while nighttime symptoms can be found in Table 4. Sleep disordered breathing has effects on other body systems. Cardiovascular symptoms include signs of right heart failure in extreme cases but may include arrhythmias and evidence of right heart strain in milder cases. Growth hormone is secreted during sleep, and secretion of it may be affected by OSA. Controversy still remains as to whether SDB can be associated with neuropsychiatric effects. The CHAT study failed to show improvement of neuro-psychiatric effects following tonsillectomy and adenoidectomy, but did confirm that other behavioral abnormalities associated with SDB improved following surgery.⁷ While enuresis as a symptom of OSA remains controversial, several studies have suggested an association.^{8,9}

Polysomnography remains the "gold standard" for diagnosis of SDB. In children, the procedure is usually performed in a controlled environment (not home) because a sleep technician is necessary to ensure all of the equipment remains in place. Since some children are on positive airway pressure (CPAP or BiPAP), a respiratory therapist may need to be present to monitor the patient.

Tonsillectomy and adenoidectomy is curative in most, but not all cases of OSA. Children with co-morbidities, high body mass index (BMI) or unfavorable anatomy may require non-surgical treatment such as CPAP or BiPAP. Table 5 lists the usual monitors employed in polysomnography. Parameters of most interest in children with SDB include the apnea-hypoxia index (AHI), the oxygen desaturation nadir and evidence of hypercapnia.

Table 3 Daytime symptoms of obstructive sleep apnea.

No daytime symptoms
Chronic mouth-breathing
Chronic rhinorrhea
Change in quality of speech
Anosmia
Choking or gagging on food
Decreased appetite
Prolonged eating time
Food preferences
Morning headaches
Behavioral problems

Table 4 Nighttime symptoms of obstructive sleep apnea.

Snoring, gasping, choking, cough	Frank apnea
Sleepwalking	Sleep talking
Night terrors	Diaphoresis
Enuresis	

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