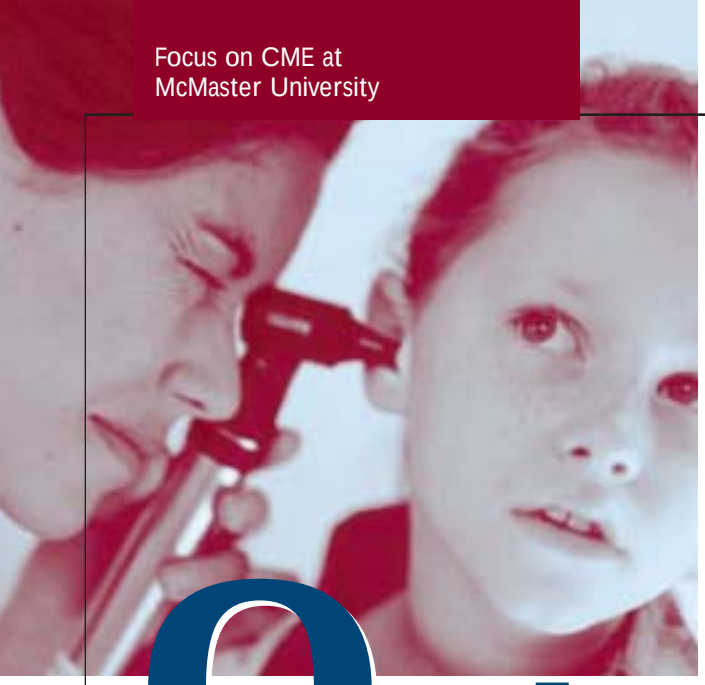

Common Pediatric Indications For Referral To Otolaryngology

By Doron Sommer, MD, FRCSC; and Vito Forte, MD, FRCSC

Presented at McMaster University Pediatric Update, Jordan, Ontario, October 2001.

Problems related to the ears, nose and throat, and the head and neck region are seen very frequently by family doctors and pediatricians. Specific training in the field of otolaryngology and head and neck surgery, however, is frequently lacking in many medical school undergraduate curriculums and primary-care residencies. It is often obtained only through elective rotations. Many primary-care physicians, therefore, have an incomplete knowledge of the common indications for potentially beneficial otolaryngologic surgical interventions.

This article aims to address the most frequent surgical indications for referral of children to otolaryngologists. The two most common groups of procedures are myringotomy/tympanostomy (M&T) tube insertion and tonsillectomy/adenoidectomy (T&A). Other, less frequent indications include: nasal complaints (*i.e.*, obstruction, rhinitis, sinusitis); laryngeal problems, including hoarseness and stridor; neck masses; and cosmetic concerns, such as protruding ears or nasal deformities (Figure 1, Table 1).

Dr. Sommer is assistant clinical professor, department of surgery, division of otolaryngology, McMaster University, and otolaryngologist, McMaster University Medical Centre, Hamilton, Ontario.

Dr. Forte is associate professor, department of otolaryngology, University of Toronto, and pediatric otolaryngologist, Hospital For Sick Children, Toronto, Ontario.

Myringotomy and Tympanostomy Tube Insertion

M&T tube placement is the most common surgical procedure performed in children.[1,2] The two most common indications for this procedure are serous otitis media and recurrent acute otitis media (AOM).

The incidence of AOM has a bimodal distribution, with peaks in the six- to 11-month-old and four- to five-year-old ranges.[3] Risk factors include male gender, sibling history of recurrent AOM, early occurrence of AOM, absence of breast feeding, day-care attendance and second-hand smoke.

The most important factor in the pathogenesis of otitis media is believed to be eustachian tube dysfunction. This occurs more frequently in the pediatric population for a number of reasons:

- The muscles associated with eustachian tube pressure equalization (mainly the tensor veli palatini) are believed to be less co-ordinated in young children.
- The infant eustachian tube is about half as long as an adult's, and lies on a more horizontal plane.
- The cartilaginous portion of the eustachian tube is less firm in children.
- Enlargement of the adenoid leads to mechanical obstruction of the tube.

It is believed these factors together are more likely to result in negative middle ear pressure and reflux of nasopharyngeal secretions and, ultimately, lead to otitis media.

There are several rationales for M&T in children with otitis media. In the past, prevention of temporary hearing loss has been a main line of reasoning for M&T due to evidence that it has future implica-

tions on academic and language skills.[4-7] Other reports, however, contest some of these findings.[8] Data are still lacking regarding language acquisition in later stages of development, as some speech and language problems and milder developmental disorders will be virtually imperceptible at earlier ages (younger than three years) and may only become clearly evident a few years later.[9]

Other grounds for tympanostomy tube placement in children are to prevent and/or decrease the discomfort and possible complications that may occur with AOM (Table 2). Complications are generally grouped into intratemporal and intracranial complications, although systemic complications, such as sepsis and febrile seizures, also may occur.

Indications for M&T generally fall into two main categories:

1. Treatment of recurrent AOM or its complications; and
2. Treatment for chronic otitis media with effusion (serous otitis media).

Although variations in indications for M&T exist amongst otolaryngologists,[10] the following discussion is meant to serve the primary-care physician as a general guideline for referral.

Myringotomy and tube placement is recommended for children who have had at least three well-documented episodes of AOM in the preceding six months or a minimum of four episodes during the past year.[11] Consideration also should be given to

Summary

Common Pediatric Indications For Referral To Otolaryngology

- The two most common groups of procedures are myringotomy/tympanostomy (M&T) tube insertion and tonsillectomy/adenoidectomy (T&A).
- M&T tube placement is the most common surgical procedure performed in children. The two most common indications for this procedure are serous otitis media and recurrent acute otitis media (AOM).
- In the past, prevention of temporary hearing loss has been a main line of reasoning for M&T due to evidence that it has future implications on academic and language skills.
- Myringotomy and tube placement may be recommended for children who have had at least three well-documented episodes of AOM in the preceding six months or a minimum of four significant episodes during the past year.
- Typically, myringotomy and tube insertion is performed under sedation in children (*i.e.,* via mask inhalation). Patients often can be discharged from hospital within one to two hours.
- M&T tube insertion is effective both for reducing the number of episodes of AOM and for improving hearing secondary to otitis media with effusion.
- Most frequently, T&A are performed to alleviate recurrent or chronic infection, or obstruction of the aerodigestive tract.
- Due to the increase in complications as compared with M&T alone, adenoidectomy may be reserved for patients who need repeat reinsertion of their tympanostomy tubes and in those whom nasal symptoms also are present.
- The most common complication of T&A is bleeding. This occurs most commonly in the first week following surgery.

the duration and morbidity of each episode. Patients who experience complications from AOM, such as febrile seizures or vertigo, should be given earlier consideration for M&T. Those patients whose episodes resolve rapidly and completely, and have little in the way of morbidity, may postpone or avoid surgical consultation. For children whose middle ears resolve completely between each attack, an alternative treatment involves antibiotic chemoprophylaxis. This latter form of treatment is becoming less desirable with the increasing emergence of antibiotic resistance.

Chronic otitis media with effusion is quite common after an episode of AOM or an upper respiratory tract infection. These episodes of serous otitis are self-limiting in approximately 90% of children within three months.[3] M&T placement should be considered for bilateral serous otitis media with hearing loss (greater than 20 dB) for a duration of greater than 10 to 12 weeks. Some authors also recommend M&T for unilateral serous otitis media of longer than six months duration with concurrent hearing loss.[12] If significant vertigo, pain, tinnitus or considerable hearing loss develop, earlier treatment should be considered. As well, if other craniofacial, neurologic or sensory deficits are evident, treatment may be sought sooner.

Additional indications for M&T include impending significant complications of AOM (Table 2), chronic tympanic membrane retraction or retraction pocket formation. It also may be used for treatment or prophylaxis for barotitis media.[11]

Typically, myringotomy and tube insertion is performed under sedation in children (*i.e.*, via mask

Table 1

Signals To Refer To A Pediatric Otolaryngologist

Ear
- Hearing impairment/speech delay
- Vertigo or dysequilibrium
- Severe prolonged pain
- Foul-smelling discharge (*i.e.,* cholesteatoma)
- Facial paralysis (Figure 1)
- Inability to view the eardrum due to wax impaction
- Draining sinuses/fistulas

Nose/paranasal sinuses
- Nasal obstruction, especially if unilateral
- Epistaxis
- Nasal masses, polyps or associated mass signs (*i.e.,* proptosis, cheek swelling, diplopia, parasthesia)
- Facial pain
- Persistent nasal discharge, especially if unilateral or foul smelling

Larynx
- Persistent or progressive hoarseness
- Stridor

Tracheobronchial
- History of repeated aspiration and/or chronic cough
- Persistent wheeze, especially if unilateral
- Hemoptysis

Cosmetic concerns
- Nasal deformity
- Protruding ears (best age for surgery is between five and seven years)

Soft tissues of the face/neck
- Neck lump
- Facial mass
- Draining sinuses/fistulas

Table 2

Otitis Media Complications

Intratemporal
- Hearing loss (*i.e.,* conductive, sensorineural)
- Tympanic membrane perforation
- Atelectasis of tympanic membrane
- Retraction pocket of tympanic membrane
- Chronic serous otitis media/cholesteatoma
- Ossicular pathology (*i.e.,* erosion, fixation)
- Mastoiditis, subperiosteal abscess
- Petrositis
- Labyrinthitis (*i.e.,* serous, suppurative)
- Facial nerve paralysis (Figure 1)

Intracranial
- Meningitis
- Extradural, subdural, brain abscess
- Sigmoid sinus thrombosis
- Otitis-associated hydrocephalus

inhalation). Patients often can be discharged from hospital within one to two hours. The procedure is usually well tolerated, with either no postoperative analgesia or just acetaminophen during the day of surgery. The ventilating tubes stay in place for a variable duration, however, in the majority of patients they remain in place for six to 18 months.

M&T tube insertion is effective both for reducing the number of episodes of AOM and for improving hearing secondary to otitis media with effusion.[13] There are, however, consequences and possible complications from M&T. Thankfully, these are usually rare and minimal. Tympanosclerotic changes of the tympanic membrane are commonly seen, however, this also is often seen in children with a histo-

ry of AOM who have never undergone M&T. This is seldom of any consequence for hearing function. Otorrhea is sometimes seen through a tympanostomy tube. This is usually transient and the consequence of AOM. These episodes are typically treatable with a topical antibiotic preparation applied properly to the ear for a short duration.

Rarely, other tympanic membrane complications can occur, such as perforation, atrophy and retraction pocket formation. These may be due to underlying eustachian tube dysfunction, in addition to scar formation secondary to the tympanostomy tube. It is imperative that otolaryngologic follow-up be maintained until the ventilating tubes are completely out of both ears.

Tonsillectomy/Adenoidectomy

Although T&A are the second most common surgical procedures performed in children, controversy still exists over their indications. Most frequently, these surgeries are performed to alleviate recurrent or chronic infection, or obstruction of the aerodigestive tract. The decision-making process regarding T&A will likely continue to improve as additional trials are performed and reported in the literature.

There is little disagreement concerning absolute (as opposed to relative/elective) indications for T&A.[14] Children with obstructive tonsils and/or adenoids causing sleep apnea, with or without associated cor pulmonale or right heart failure, generally should be treated by T&A. As well, those children with marked swallowing impairment due to hyper-

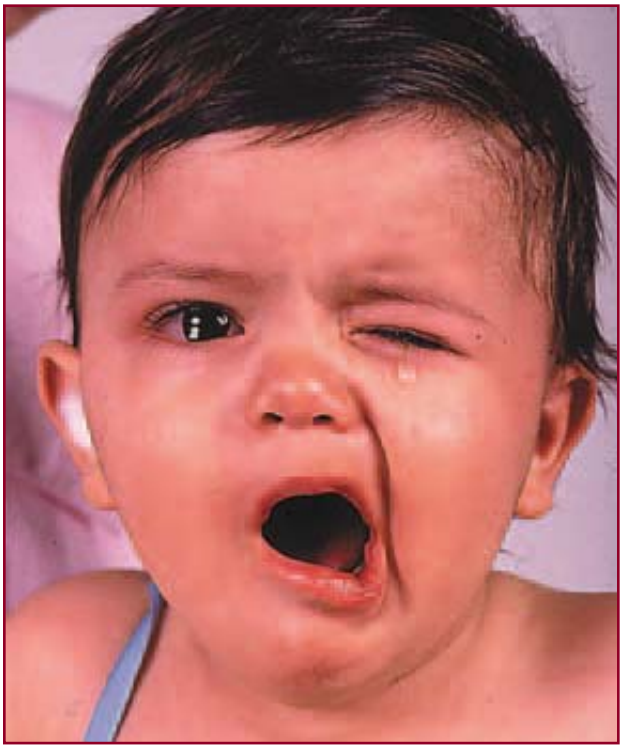

Figure 1. Facial paralysis secondary to acute otitis media.

Figure 2. Acutely infected tonsils; severe enlargement (kissing tonsils), exudate.

trophic tonsils causing failure to thrive are normally treated surgically. In rare cases, tonsillectomy is performed for suspected malignancy or recurrent tonsillar bleeding.

Pediatric obstructive sleep apnea is, at times, difficult to diagnose. In fact, many aspects of the condition remain unresolved, including its definition, diagnosis, treatment and the necessity for post-treatment evaluation.[15-17] The role of pediatric sleep studies continues to be controversial, but may be helpful in suspected cases. Video or audio taping of the child's sleep for short durations for a few nights also may aid in the diagnosis.

Essentially, pediatric obstructive sleep apneic episodes may be defined as more than five to eight seconds of apnea secondary to upper airway obstruction (with continued respiratory effort). In addition to T&A, other therapies that may be beneficial include nasal steroids, oxygen and continuous positive airway pressure.

Heavy snoring with associated mouth breathing that has been persistent and/or progressive over time, and which can be directly attributable to marked enlargement of the tonsils and adenoids, should be given surgical consideration. This is particularly important if there are associated orthodontic implications or significant psychosocial issues attributable to the snoring.

Indications for elective T&A are still evolving, despite the prevalence of the procedure and number of clinical trials relating to the subject. In 1984, Paradise *et al* reported a large National Institute of Health randomized trial conducted at The Children's Hospital of Pittsburgh on the subject of tonsillectomy for the treatment of recurrent pharyngotonsillitis.[18] Significantly fewer episodes of pharyngitis occurred in the surgical treatment arm of the study for the first two years of follow-up. Third-year outcomes also were better in tonsillectomy patients, but the difference was not statistically significant.

Inclusion criteria for the study were as follows:

- At least three episodes of tonsillitis in each of three years, or five episodes in each of two years, or seven episodes in the past one year.
- Each episode must be characterized by at least one of:
  - Oral temperature higher than 38.2 C
  - Enlarged (larger than 2 cm), or tender anterior cervical lymph nodes.
  - Tonsillar exudates (Figure 2).
  - Group A beta hemolytic (GAB) Streptococcus positive.
- Adequate antibiotic therapy for GAB Streptococcus-positive episodes was administered.
- Each episode must have been confirmed by examination, with record at the time of the occurrence.

As is the case with tympanostomy tubes, these indications are not rigid. For example, if episodes are extended and very resistant to treatment, or result in hospitalizations or prolonged periods of school absenteeism, earlier surgical treatment may be sought. In some patients, T&A also may be useful in the treatment of halitosis and dental malocclusion.

In addition to the above, adenoidectomy has been established as playing a role in the treatment of recurrent AOM.[11,19,20] Due to the increase in complications as compared with M&T alone, adenoidectomy may be reserved for patients who need repeat reinsertion of their tympanostomy tubes and in those whom nasal symptoms also are present.

Excision of the tonsils and the adenoids is considered to be generally safe, with no known long-term immunologic effects. The majority of children, however, do experience a significant amount of pain in the first post-operative week. It is important, therefore, they are treated with sufficient analgesics (usually acetaminophen and codeine). Parents should be educated about the signs and symptoms of dehydration. The most common complication of T&A is bleeding. This occurs most commonly in the first week following surgery. Hemorrhage requiring treatment has been reported to occur in between 0.49% and 4% of patients.[18,21] Mortality may occur, but is extremely rare.

Conclusion

The field of otolaryngology covers disorders of the upper aerodigestive tract, as well as those of the related soft tissues of the face and neck. There are a multitude of grounds for referral of children

to otolaryngologists. In a short article, however, it is impossible to cover all but the most frequent reasons for referral. Although M&T tube insertion and T&A are the most common surgical procedures performed, their indications are still evolving and awaiting completion of further trials. CME

References

1. Bluestone CD: Otitis media in children: To treat or not to treat? N Engl J Med 1982; 306(23):1399-1404.
2. Paradise JL: On tympanostomy tubes: Rationale, results, reservations, and recommendations. Pediatrics 1977; 60(1):86-90.
3. Teele DW, Klein JO, Rosner B: Epidemiology of otitis media during the first seven years of life in children in greater Boston: A prospective, cohort study. J Infect Dis 1989; 160(1):83-94.
4. Joint Committee on Infant Hearing: Year 2000 position statement: Principles and guidelines for early hearing detection and intervention programs. Pediatrics 2000; 106:798-817.
5. Teele DW, Klein JO, Chase C, et al: Otitis media in infancy and intellectual ability, school achievement, speech, and language at age 7 years. Greater Boston Otitis Media Study Group. J Infect Dis 1990; 162(3):685-94.
6. Yoshinago-Italo C, Sedney AL, Coulter DK, et al: Language of early- and later-identified children with hearing loss. Pediatrics 1998; 102(5):1161-71.
7. Maw R, Wilks J, Harvey I, et al: Early surgery compared with watchful waiting for glue ear and effect on language development in preschool children: A randomized trial. Lancet 1999; 353(9157):960-3.
8. Paradise JL, Feldman HM, Campbell TF, et al: Effect of early as compared with delayed insertion of tympanostomy tubes for persistent otitis media on developmental outcomes at the age of three years. N Engl J Med 2001; 344(16):1179-87.
9. Perrin, JM: Should we operate on children with fluid in the middle ear? N Engl J Med 2001; 344(16):1241-2.
10. McIsaac WJ, Coyte PC, Croxford R, et al: Otolaryngologists' perceptions of the indications for tympanostomy tube insertion in children. Can Med Assoc J 2000; 162(9):1285-8.
11. American Academy of Otolaryngology – Head and Neck Surgery: Myringotomy and tympanostomy tubes; tonsillectomy and adenoidectomy. *www.entnet.org/indicators*
12. Bailey BJ (ed.): *Head and Neck Surgery – Otolaryngology.* Second Edition. Lippincott-Raven, Philadelphia, 1998, pp. 873-83.
13. Pransky SM: Surgical strategies for otitis media. J Otolaryngol 1998; 27(Suppl. 2):37-42.
14. Bluestone CD, Paradise JL, Kass EH, et al: Workshop on tonsillectomy and adenoidectomy. Ann Otol Rhinol Laryngol 1975; 84:(Part 2, Suppl. 19):78-9.
15. Pelayo R, Powell N, Guilleminault C: Evaluation of obstructive sleep apnea by polysomnography prior to pediatric adenotonsillectomy. Arch Otolaryngol Head Neck Surg 1999; 125(11):1282-3.
16. Messner AH: Evaluation of obstructive sleep apnea by polysomnography prior to pediatric adenotonsillectomy. Arch Otolaryngol Head Neck Surg 1999; 125(3):353-6.
17. Coleman JA Jr.: The diagnosis of OSAS and UARS in children: trying to relieve the frustration. Arch Otolaryngol Head Neck Surg 1999; 125(3):356-7.
18. Paradise JL, Bluestone CD, Bachman RZ, et al: Efficacy of tonsillectomy for recurrent throat infection in severely affected children: Results of parallel randomised and non-randomised trials. N Engl J Med 1984; 310(11):674-83.
19. Paradise JL, Bluestone CD, Rogers KD, et al: Efficacy of adenoidectomy for recurrent otitis media in children previously treated with tympanostomy-tube placement: Results of parallel randomized and nonrandomised trials. JAMA 1990; 263(15):2066-73.
20. Coyte PC, Croxford R, McIsaac W, et al: The role of adjuvant adenoidectomy and tonsillectomy in the outcome of the insertion of tympanostomy tubes. N Engl J Med 2001; 344:1188-95.
21. Yardley MP: Tonsillectomy, adenoidectomy and adenotonsillectomy: Are they safe day case procedures? J Laryngol Otol 1992; 106:299-300.