Otitis Media and Ear Tubes

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KEYWORDS

• Otitis • Ear infection • Tubes • Otorrhea • Effusion

KEY POINTS

- Myringotomy tube insertion is one of the most common pediatric ambulatory procedures performed in the United States and is used in the treatment of recurrent acute otitis media (RAOM) and chronic otitis media with effusion (COME).
- Several anatomic, genetic, environmental, and pathogenic factors contribute to the development of RAOM and COME and should be identified when considering placement of a myringotomy tube.
- Preoperative evaluation includes a good history and physical examination with adjunctive tests such as audiometry.
- Myringotomy tubes are usually placed in children with more than 3 episodes of acute otitis media in 6 months or 4 in a year, or persistent otitis media with effusion for at least 3 months.
- Both otolaryngologists and primary care physicians should observe a child closely for complications and adverse events of myringotomy tubes including tube otorrhea, early tube extrusion, retained tubes, refractory middle ear disease, and other suppurative or otologic sequelae of chronic middle ear disease.

INTRODUCTION

The placement of myringotomy tubes is one of the most common procedures performed in children. In 2006, more than 667,000 procedures were performed in the Unites States in patients younger than 15 years.[1] Recurrent acute otitis media (RAOM), chronic otitis media with effusion (COME), and their associated suppurative and otologic complications are commonly managed with the procedure. Eighty percent of infants experience at least 1 episode of acute otitis media (AOM), with 40% having 6 or more recurrences by the age of 7 years. The significance of the disease entity cannot be overstated.[2,3] COME is one of the most important causes of preventable, acquired hearing loss in children, making optimal management of the condition vital.[4]

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In 2007, there were some 11 million primary care visits for AOM.[5] The critical issue for any primary care provider surrounds the decision for subspecialty referral. Failure to offer myringotomy tubes in the patient with RAOM or COME can have grave sequelae. Hearing loss, speech delay, poor school performance, and decreased quality of life are significant factors in the development of a child.[6] Inadequately managed AOM can also lead to suppurative complications, including cholesteatoma, labyrinthitis, meningitis, and sigmoid sinus thrombosis. Primary care providers should identify those patients who should be evaluated for placement of myringotomy tubes as early as possible.

In this article, the relevant developmental anatomy that predisposes the young child to middle ear disease, the clinical spectrum of diseases that can be managed effectively with myringotomy tube placement, and the indications and basic steps for the procedure are reviewed. The primary care provider plays an integral role in postoperative surveillance, and thus, we also cover some of the more common complications and issues surrounding postoperative care.

DEVELOPMENT AND ANATOMY OF THE MIDDLE EAR AND EUSTACHIAN TUBE

The tympanic membrane (TM) is a trilaminar structure that is important in converting sound pressure waves into mechanical vibrations. The outer epithelial layer is derived from ectoderm and has migratory properties that are important in the pathophysiology of cholesteatoma. The central fibrous layer is mesodermally derived, with collagen fibers arranged within the lamina propia. The inner lamina is a mucosal layer that is a continuation of the lining of the middle ear.

Fig. 1 shows the surface anatomy of the TM. The color, mobility, integrity, and translucence of the ear drum should be assessed during the physical examination. Mobility should be assessed by pneumatic otoscopy. A normally concave TM moves easily with the application of negative and positive pressure. Disruption of this pattern could indicate eustachian tube dysfunction.

The eustachian tube is the pressure regulator of the middle ear. A negative pressure normally develops in the middle ear because of an imbalance in the atmospheric air delivered via the eustachian tube and the passive transmucosal absorption of nitrogen

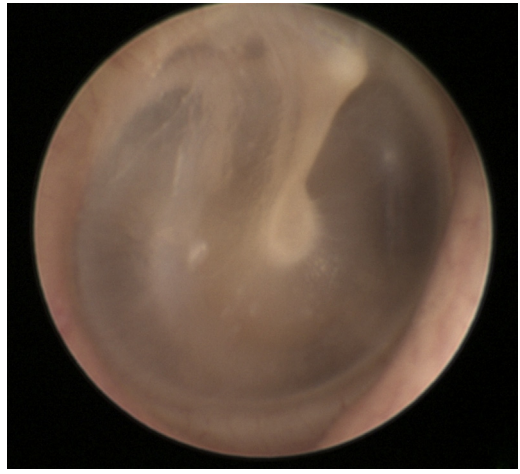

Fig. 1. Normal TM.