Management of Conductive Hearing Loss in Children

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KEYWORDS

• Congenital aural atresia • Conductive hearing loss • Middle ear anomaly
• Canalplasty • Chronic otitis media in children

KEY POINTS

- Children with conductive hearing loss (CHL) are identified at several possible diagnostic points of care: newborn hearing screening, parental concern for hearing loss, hearing screening in the pediatrician's office, otoscopic examination either in the pediatrician's or in the otolaryngologist's office, or school hearing screening examination.
- The evaluation of any child with hearing loss involves a thorough history with careful otoscopic examination to include pneumatic otoscopy.
- Audiological assessment is a critical part of the evaluation and depends on the child's age and cooperability (see article by Singleton and Waltzman elsewhere in the issue).
- Any child with an unexplained CHL (normal ear canal, tympanic membrane, middle ear space) should undergo radiologic evaluation, usually high-resolution computed tomography (HRCT) of the temporal bone at some point (see later discussion and article by DeMarcantonio and Choo elsewhere in the issue).
- Management of the child with acquired CHL depends on the cause and may range from simple cerumen disimpaction to ventilation tube insertion, to more complex chronic ear surgery for tympanic membrane perforation or cholesteatoma.
- Management of the child with congenital CHL may include observation with monitoring of the hearing, an individual education (Individual Education Plan [IEP]) or 504(c) plan, amplification (conventional or bone conducting), or surgery. Management depends greatly on the diagnosis, degree of hearing loss, relevant anatomy, parental decision making, and educational and psychosocial factors.

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INTRODUCTION

While sensorineural hearing loss (SNHL) is far more common in adults, CHL accounts for 90% to 95% of all childhood hearing loss, with middle ear effusion (MEE)/otitis media with effusion (OME) far outpacing all other causes. Whether OME causes lasting deficits in speech and language development remains unclear, probably due to the transient, fluctuating nature of the associated hearing loss, involvement of one or both ears, mild degree of associated hearing loss, and medical and surgical options for management. Fixed, moderate, or moderate to severe congenital CHL such as that caused by congenital aural atresia (CAA) or other ossicular abnormality (eg, congenital stapes ankylosis) is rarer but may cause lasting deficits in speech and language development and educational progress, especially if bilateral and not evaluated and managed early and properly.[1]

Prevalence estimates of congenital SNHL range in the 1 to 3 per 1000 range, whereas estimates for congenital CHL are less well reported; however, clearly, this type of hearing loss, caused by some obstruction, dysfunction, or maldevelopment of the ear canal, eardrum, or middle ear impedance system, is also relatively rare. In a study of 234 Australian infants referred for diagnostic testing from a newborn hearing screening program, prevalence of CHL in the newborns was 2.97 per 1000 while the prevalence of middle ear pathology (with or without CHL) was 4.36 per 1000. As one investigator noted, "In the literature pertaining to CHL in children, the emphasis is on cause rather than severity, making prevalence data difficult to compare."[2] The ongoing and lasting effects of both congenital and acquired CHL in children, especially with regard to OME, have been studied exhaustively, yet no clear conclusions have been made.[3–6]

Options for hearing habilitation in children with congenital CHL include observation with monitoring—both hearing and academic progress—and possible individualized education plan (IEP)/504(c); amplification, either conventional or through bone conduction technology; and surgery. In children with bilateral moderate or moderate to severe fixed CHL such as that seen in CAA, amplification and/or surgical intervention is strongly recommended to support normal speech and language development, but controversy remains on the ideal management of the child with unilateral CHL.

This article provides the clinician with guidelines to inform the evaluation and management of childhood CHL—acquired and congenital as well as unilateral and bilateral.

ACQUIRED CONDUCTIVE HEARING LOSS

Otitis Media with Effusion

Prevalence

By far the most common cause of acquired CHL in children, OME is defined as the presence of fluid in the middle ear without the signs or symptoms of acute, active infection. It is estimated that at any given point in time, approximately 20% of young children have a MEE, with nearly all children having at least 1 episode during their childhood.[7] OME commonly follows an upper respiratory tract infection or is a sequela of acute otitis media and is usually self-limited. Certain populations have a higher prevalence of OME than the general population of young children. Children with Down syndrome have poor eustachian tube function because of decreased motor tone, predisposing them to persistent OME. OME also occurs with increased prevalence in children with cleft palate. In fact, it is nearly universal in children with cleft palate because of abnormal insertion of the levator veli palatini and tensor veli palatini muscles on the eustachian tube, resulting in poor active opening.[8–10] Other risk factors