

Viral Conditions Associated with Hearing Loss

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Implications and case management considerations for hearing care professionals

The World Health Organization (2012) estimates 35 million children have disabling hearing loss (greater than 30 dB) worldwide. In many of these cases, the hearing loss occurs with no previous family history and without a genetic cause. This includes viruses acquired in utero (before birth), at birth, and in childhood. Some of these cases can be prevented, while others can only be treated after the fact to reduce the long-term damage. In this article, we specifically examine some of the more common viruses and virus-related conditions that are associated with childhood hearing loss.

Because it is well known that there are far-reaching implications of [childhood hearing loss](#), we'll also consider current practice standards for identification and management of these children. Early identification and effective management of childhood hearing loss is critical for developing the best possible communicative, educational and social outcomes for children with hearing loss secondary to these conditions.

Otitis Media

This condition is not a virus itself, but rather the secondary result of a virus, such as influenza or chicken pox. It can lead to inflammation in a child's middle ear due to fluid buildup. [Otitis media](#) with effusion affects nearly 75% of children between one and three years old, and is the most common cause of hearing loss in children. It is important to note that otitis media episodes peak between ages 6 and 18 months (Slavin et al., 2005), a critical time period for auditory, speech-language and cognitive growth.

Most episodes of otitis media cause temporary conductive hearing loss (usually mild to moderate in degree). Hearing loss associated with otitis media is often fluctuating, varying in degree within and between episodes. It can also affect just one ear. This fluctuant characteristic, potential unilaterality and the frequency with which a child contracts otitis media have implications that may reach beyond just a sensory impairment. The American Academy of Audiology (1992) suggests this *can contribute to the lack of a stable auditory base, which normally serves as the very foundation of communication and attention behaviours.*

Treatment for otitis media can range from observation or antibiotics to surgical placement of ventilation tubes. Children considered at risk for otitis media should be screened for hearing, middle ear function and speech-language development. This includes children with history of

contracting otitis media prior to age 6 months and those in multi-child daycare settings. Other risk factors include Native American children, those with cleft lip/palate, and those that present with Down syndrome. The American Academy of Pediatrics recommends hearing testing for children with otitis media that has persisted for three months or longer and that the placement of tympanostomy tubes are the preferred surgical intervention, when indicated.

Bacterial Meningitis

Meningitis is an inflammation of the meninges, the membranes that cover the brain and spinal cord. It can be acquired directly or as a secondary infection from group B strep disease, a condition that can be transferred to babies before or during birth. In children, meningitis is the most common cause of acquired bilateral sensorineural hearing loss (Morzaria et al., 2004). Meningitis is extremely dangerous if left untreated, particularly within the first 24 to 48 hours of the illness.

Permanent sensorineural hearing loss in cases of bacterial meningitis is estimated to occur in between 5 and 35% cases (Fortnum, 1992) and can range from mild unilateral to severe and bilateral. It most often manifests in the early stages of the infection and immediate medical intervention can lower the risk of permanent hearing loss. The does not belie the need for continued audiological monitoring of these children, as there are some cases where the hearing loss can be delayed in onset. From an audiological perspective, treatment can be complicated in cases when the hearing loss is of sufficient severity to indicate cochlear implant candidacy. The potential for rapid cochlear ossification in post-meningitic children can affect success of implantation (Durisin et al., 2010).

If a child experiences a high fever that comes on suddenly, flulike symptoms, and a rash, immediate medical treatment is indicated.

Routine immunizations are available to guard against meningitis. Some of the viruses associated with meningitis are very common. Therefore, good hygiene practices and avoiding those infected can prevent the spread of the virus.

Measles, Mumps, and Rubella (MMR)

These viruses are all associated with sudden hearing loss. Once commonly acquired during childhood, vaccinations are now routinely given to protect against contracting them or infecting infants in utero.

Measles is an extremely contagious and dangerous virus that can lead to serious complications, including swelling of the brain, clotting disorders, seizures and even death if left untreated. Sensorineural hearing loss secondary to measles infection is usually permanent, moderate to profound in degree, and affects both ears (bilateral).

Mumps affects salivary glands and is characterized by visible lower facial swelling. It can lead to serious complications, including encephalitis (swelling of the brain) and possible temporary or permanent hearing loss. Hearing loss secondary to mumps is often unilateral (affecting only one ear) and can be profound in degree.

Congenital rubella syndrome, like CMV (see below), is passed from an infected mother to her baby. A mother's infection during the first trimester presents the most risk. Hearing loss associated with congenital rubella can cause severe and bilateral hearing loss.

There have been rare cases where hearing loss is suspected to be caused by the actual vaccine against MMR. This risk can be weighed against the vaccine's very effective prevention of these life-threatening diseases. Parents should be encouraged to discuss the potential risks specific to their child with their pediatrician prior to immunization.

Cytomegalovirus

Cytomegalovirus (CMV) is actually a very common virus to which many adults have already been exposed and experience no symptoms. CMV can be dangerous when infecting a pregnant woman for the first time, particularly during the first half of pregnancy. 40 percent of these cases will result in transplacental transmission of the virus to the baby and approximately 10 percent of them will exhibit symptoms of CMV at birth (Duff, 2010). Symptoms can include intrauterine growth retardation, hyperbilirubinemia, microcephaly, mental retardation, seizures and hearing loss. Infection can also be passed from mother to infant via contaminated blood or body fluids during birth or through breast milk; however these cases rarely result in any significant complications.

Thirty to fifty percent of infants with symptomatic congenital CMV and even about 10% of those that are asymptomatic at birth will develop hearing loss (Dahle et al., 2000). Hearing loss secondary to congenital CMV infection does not follow any common pattern with respect to degree or configuration. It can also be progressive, fluctuant or delayed in onset from the time of infection. The American Academy of Pediatrics recommends that children with congenital CMV infection should have their hearing tested every six months. They further suggest that at times when a change in hearing status is documented in a child the schedule for monitoring hearing change to every three months. The potential for progression of the hearing loss in this population should influence the hearing care practitioner's choice in amplification, ensuring technology is flexible enough to accommodate the fluctuating or progressive tendencies in these children.

There is no vaccine against CMV at this time, but practicing good hygiene before and during pregnancy, including regular hand washing, safe sex, and taking extreme care if exposed to the blood and bodily fluids of others (particularly young children), can help reduce the odds of initial infection.

Summary

The viruses described in this article together account for the majority of non-syndromic, acquired hearing loss in children. It is critical that hearing care professionals serving the pediatric population be aware of these common viruses and the potential for hearing loss in those affected. This information can assist in making clinical decisions regarding audiological assessment and treatment plans.