

MRI reveals inner ear anomalies in children with hearing loss

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Using magnetic resonance imaging (MRI), physicians can identify soft-tissue defects that contribute to hearing loss in children, according to a report in the September issue of *Archives of Otolaryngology–Head & Neck Surgery*, one of the *JAMA/Archives* journals.

Sensorineural (related to sensory nerves) hearing loss affects thousands of children per year, according to background information in the article. About half of all cases are thought to be genetic, 25 percent acquired and 25 percent of unknown cause. Radiography, including plain film X-rays and computed tomography (CT), is often used to evaluate inner ear abnormalities in children with hearing loss. These methods evaluate the bones that contain the working components of inner-ear hearing. However, defects in the soft tissue within these bones also may be responsible for hearing loss.

John E. McClay, M.D., and colleagues at University of Texas at Southwestern Medical Center and Children's Medical Center Dallas analyzed the medical records of 227 children age 1 month to 17 years (average age 5.3 years) with a diagnosis of sensorineural hearing loss. The children underwent MRI between June 1996 and June 2002. A total of 170 children had clinical information available and were included in the study. Of these, 101 (59 percent) had hearing loss in both ears and 69 (41 percent) had hearing loss in one ear, adding up to a total of 271 ears with sensorineural hearing loss.

On the MRIs:

- 108 ears (40 percent) had inner ear abnormalities
- 87 (32 percent) had abnormalities of the cochlea, a spiral structure containing hair cells integral to hearing, including 63 (23 percent) with mild abnormalities and 24 (9 percent) with abnormalities considered moderate to severe

- 49 ears (18 percent) had either missing (26 of 49, or 53 percent) or deficient (23 of 49, or 47 percent) cochlear nerves

- Ears with severe and profound hearing loss had more abnormalities than those with mild and moderate hearing loss (48 percent vs. 29 percent)
- Children with moderate, severe or profound hearing loss in one ear had more inner ear abnormalities than children with hearing loss of the same severity in two ears (62 percent vs. 38 percent)

"Although the specific origin of sensorineural hearing loss may remain undiagnosed in many patients, a thorough workup to identify the cause of sensorineural hearing loss should be considered in each patient," the authors write. "Historically, high-resolution CT has been the imaging modality of choice in the initial workup of these patients. However, the soft tissue structures of the inner ear responsible for the electrochemical transfer of sound to the brain, such as the membranous labyrinth and the cochlear nerve, are not evaluated well with high-resolution CT."

Source: JAMA and Archives Journals

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