Hearing Loss and/or Vertigo

The auditory system is responsible for hearing and balance. It translates sound waves into signals received and processed by the brain. Hearing loss and vertigo (the sensation of a spinning environment) are symptoms that can point to diseases of these auditory structures.

Conductive hearing loss (CHL) occurs when sound waves do not properly reach the brain because of lesions in the ear that stop the waves before they reach the nerves that conduct the auditory signals. CT (https://www.radiologyinfo.org/en/info/headct) of the temporal bone without contrast is appropriate when CHL is suspected. CT also shows the tiny bones in the middle ear cavity that vibrate to pass and amplify sound waves.

Sensory hearing loss (SHL) occurs when auditory signals do not properly reach the brain because of lesions in the structures responsible for transmitting and receiving the auditory signals. MRI (https://www.radiologyinfo.org/en/info/mri-brain) with and/or without contrast appropriate to diagnose hearing loss due to problems with SHL. CT and MRI, sometimes used together, are appropriate when a mix of CHL and SHL are suspected.

MRI is appropriate for vertigo that does not stop (persistent). For vertigo that comes and goes (episodic), CT is appropriate.

CT and MRI are often used together to provide a complete view of the entire ear canal and associated nerve cells for presurgical planning and for diagnosing complicated cases of hearing loss. These include cases of total deafness, surgical planning for a mass in the inner ear, and planning to surgically implant hearing devices (cochlear implant).

— By Frank Rybicki Jr., Bruno Policeni, MBA, MD. This information originally appeared in the *Journal of the American College of Radiology*.

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