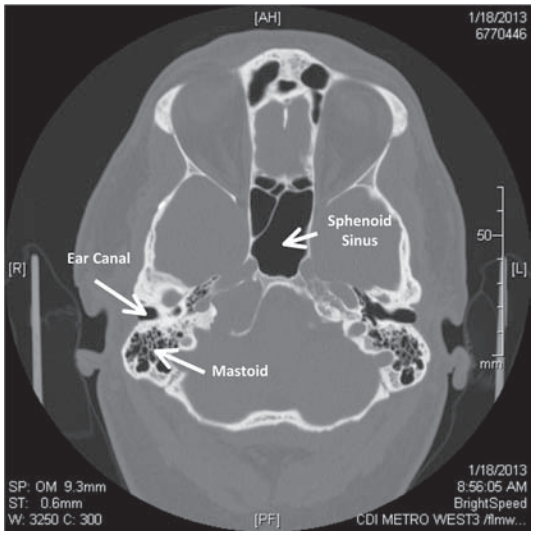
Symptom: Deep-Seated Ear Pain

By Hamid R. Djalilian, MD

A 40-year-old patient calls the office with a symptom of right ear pain. He states that he has had the pain intermittently for several years, but it became constant in the last week. He has a history of headaches, also mostly on the right side of his head. The patient thinks he has an infection because the pain is constant and deep-seated, he described, adding that he went swimming last week and believes the "water may have stayed in" his ear. He does not note any hearing problems.

Dr. Djalilian is the director of neurotology and skull base surgery and an associate professor of otolaryngology and biomedical engineering at the University of California, Irvine.



The patient had recently gotten the above CT scan because of headaches.

Examination of the ear is completely normal, as are the audiogram, tympanogram, acoustic reflex testing, otoacoustic emissions, and examination of the oral cavity and pharynx. Laryngoscopy shows that the bilateral vocal folds are mobile and symmetric. Nasopharyngoscopy is negative for masses, as is palpation of the neck. The patient brings a head CT that he recently got because of his headaches, which is shown to the left.

What is your diagnosis? Turn the page for the answer!

Diagnosis: Petrous Apex Cholesterol Granuloma

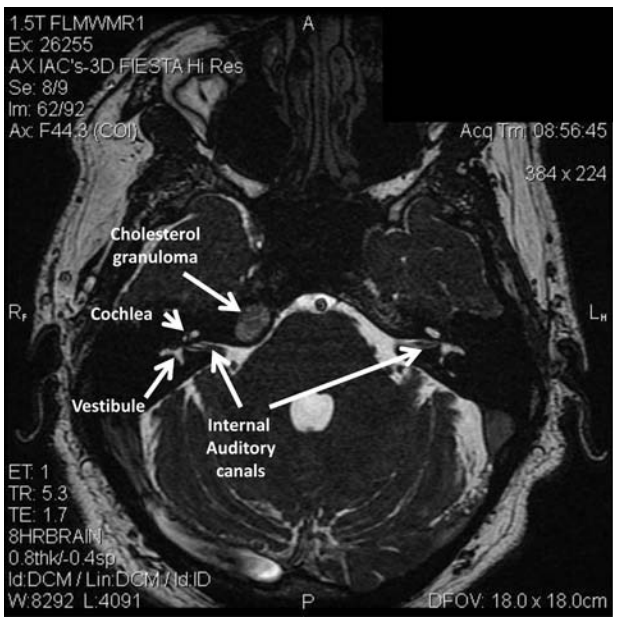
By Hamid R. Djalilian, MD

Continued from p. 15

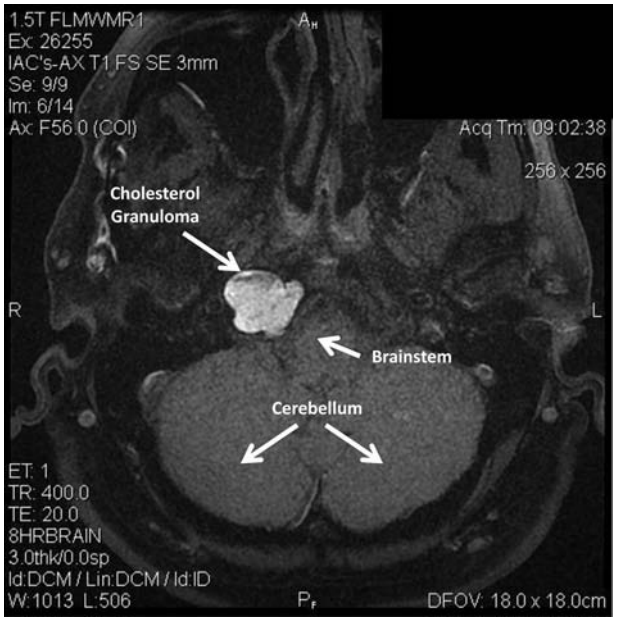
Ear pain is a common scenario in adults. The ear has an extensive sensory nerve supply from cranial nerves (V, VII, IX, and X) and cervical nerves; any irritation of these nerves in their other sites of innervation will lead to ear pain. The differential diagnosis of ear pain is extensive, including abnormalities of the outer or middle ear; temporomandibular joint dysfunction; tumors of the skull base; and lesions in the pharynx, nasopharynx, and larynx. For example, tonsillitis causes ear pain due to irritation of the glossopharyngeal nerve (cranial nerve IX), which travels behind the tonsillar fossa.

The evaluation of the patient with ear pain involves examination of all areas innervated by nerves that supply sensation to the ear. In an adult, the most common cause of ear pain is dysfunction of the temporomandibular joint. In children, however, otalgia is most often caused by otitis media. Adults have a greater propensity to develop cancers of the upper aerodigestive tract, which derives its sensory innervation from cranial nerves V, IX, and X. Therefore, a comprehensive examination of the head and neck is necessary.

If the examination of the ear is normal in an adult with one-sided ear pain, nasopharyngoscopy and laryngoscopy is performed to rule out the presence of tumors. Palpation of the base of the tongue also is necessary to exclude a deep tumor of the tongue base, which is especially important in patients who have an extensive history of smoking or alcohol abuse. A commonly missed cause of ear pain is laryngopharyngeal reflux; refluxate from the stomach can reach the pharynx and larynx, causing irritation of the vagus nerve (cranial nerve X) and ear pain. When the cause of the ear pain cannot be identified on examination, a CT generally is obtained to evaluate the skull base for masses.



This T1-weighted, non-enhanced, fat-saturated, axial MRI of the internal auditory canals shows enhancement of the mass.



T2 CISS image of the same patient shows hyperintensity (bright signal) in the lesion. The combination of a hyperintensity on T1 and T2 MRI images is highly suggestive of a cholesterol granuloma.

The patient in this case had a lesion in the petrous apex of the temporal bone. The differential diagnosis of a petrous apex lesion includes cholesteatoma, cholesterol granuloma, asymmetric marrow space, and benign and malignant tumors. In order to differentiate these lesions, an MRI must be obtained to evaluate the area. Specifically, an MRI of the internal auditory canals with and without gadolinium enhancement, including diffusion-weighted images, is needed to fully understand the diagnosis.

The lesion turned out to be a cholesterol granuloma of the petrous apex. A cholesterol granuloma is an expansile cyst that histologically contains blood with cholesterol crystals and is, therefore, named for its contents. It can occur anywhere in the temporal bone, including the mastoid, middle ear, and the petrous apex.

Treatment of cholesterol granuloma of the petrous apex is surgical drainage. Occasionally, these lesions can be multicystic and require no intervention, only follow-up imaging. In order to drain the lesions, the cyst must be opened and a stent placed within it to allow continuous drainage into the mastoid or middle ear.

Due to the proximity of the petrous apex to the cochlea, internal auditory canal, carotid artery, and other cranial nerves in that area (V and VI), surgical approaches are complex. These lesions are traditionally approached through small corridors in the temporal bone to reach the apex. These corridors include the infracochlear (under the cochlea, between the carotid artery and jugular vein), retrolabyrinthine (behind the superior and posterior semicircular canals and the posterior fossa dura), transarcuate (between the crura of the superior semicircular canal), infralabyrinthine (between the posterior semicircular canal and the jugular bulb), and middle cranial fossa (via a craniotomy). Lesions that extend anteriorly and medially toward the sphenoid sinus can be approached endoscopically through the nose. This approach allows the surgeon to remove the posterior wall of the sphenoid sinus and open the cyst wall. Care has to be taken to avoid the carotid artery, which travels in the posterior lateral aspect of the sphenoid sinus.

The prognosis after petrous apex drainage is good. Most patients—about 90%—will not require a second drainage procedure. Follow-up with imaging is necessary in order to monitor for closure of the drainage tract.

The prognosis after petrous apex drainage is good. Most patients—about 90%—will not require a second drainage procedure. Follow-up with imaging is necessary in order to monitor for closure of the drainage tract.

Read past Clinical Consultation columns in a special collection on this *HJ* website: http://bit.ly/HJClinicalConsultation.