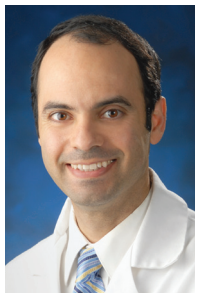


Symptoms: Hearing Loss and Facial Paralysis

By Hamid R. Djalilian, MD

A 58-year-old woman comes to the office complaining of hearing loss. Her hearing had declined gradually until it appeared that, all of a sudden, she had a total loss on one side.

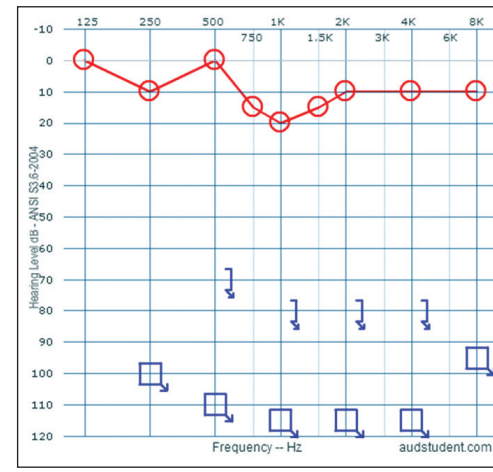
The patient can't hear anything when using the telephone on that side, she said. Her other ear does not seem to be terribly bad. She has a history of diabetes and high blood pressure.

Her ear is normal on examination, but a facial paralysis on the same side as the hearing loss is noted. Upon questioning, the patient said that her facial nerve started to become weak and gradually lost function over several weeks.

A picture of the patient's audiogram is on the right.

What is your diagnosis? See p. 14.

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



The patient's audiogram demonstrates her total deafness on the left side.

Diagnosis: Facial Schwannoma

By Hamid R. Djalilian, MD

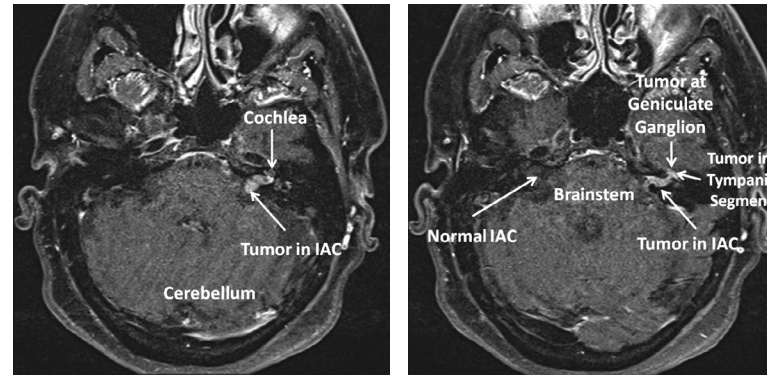
Continued from p. 11

Gradual unilateral hearing loss is always a cause for concern. When it's combined with facial paralysis on the same side, the concern is even greater.

Understanding the complex anatomy of the facial nerve and its relationship to the ear is important to the evaluation of patients with hearing loss and facial paralysis.

The facial nerve carries sensory branches (sensation to portions of the outer ear), motor fibers (movement of the facial muscles, stapedius muscle, and other muscles), a special-sensory component (taste to the anterior two-thirds of the tongue), and parasympathetic parts (stimulation to salivary glands).

The nerve is intimately involved with the temporal bone and enters the internal auditory canal with the cochlear and vestibular nerves. In its labyrinthine segment, the facial nerve travels within 0.4 mm of the cochlea.



Left: This axial post-gadolinium, T1-weighted MRI at the level of the internal auditory canal demonstrates the enhancing (white) mass in the left internal auditory canal (IAC). The left side of the patient is on the right side of the image. Right: This axial post-gadolinium, T1-weighted MRI at one level (3 mm) above shows the tumor extending along the facial nerve into the geniculate ganglion and the start of the tympanic segment.

At the geniculate ganglion, the nerve gives off the greater superficial petrosal nerve as a branch. The petrosal nerve stimulates the lacrimal gland (tear gland in upper eyelid) as well as glands in the nose and sinuses.

The facial nerve then travels around the middle ear, above the stapes footplate. Next, it makes a turn and becomes vertical in the mastoid.

In the mastoid, the facial nerve has three branches. The chorda tympani nerve supplies taste to the anterior two-thirds of the tongue as well as stimuli to the submandibular and sublingual glands.

The facial nerve has a sensory branch to the ear canal that comes off in the mastoid as well. This is why patients with facial paralysis sometimes complain of ear pain.

The third branch of the facial nerve in the mastoid causes contraction of the stapedius muscle. In patients with facial paralysis, dysfunction in this branch causes hyperacusis.

Once the facial nerve exits the mastoid, it supplies branches to the auricularis muscles, which move the auricle.

The facial nerve also travels through the parotid gland–the salivary gland on the sides of the face, anterior and inferior to the ears.

TREATMENT VARIES WIDELY

The hearing loss that occurs with facial paralysis can be conductive or sensorineural. The differential diagnosis for facial paralysis and sensorineural hearing loss includes skull base tumors, which can be malignant or benign.

Vestibular schwannoma (acoustic neuroma) almost never causes facial paralysis. Therefore, if a cerebellopontine angle tumor that causes facial paralysis and sensorineural hearing loss is seen, one should think of a facial schwannoma rather than a vestibular schwannoma.

This patient had a facial schwannoma, a benign tumor of the facial nerve that most often occurs in the area around the geniculate ganglion, where the neural cell bodies that code for taste are.

While it is most common to obtain a brain MRI as part of the evaluation of facial paralysis, this approach often misses a facial schwannoma because of the very small diameter of the facial nerve–about 1 mm–and the thicker image slices–5 mm.

The optimal imaging technique is an MRI of the internal auditory canals, with and without the contrast agent gadolinium. Since this imaging technique allows thinner slices through the temporal bone, it is much more likely to show the tumor.

Treatment of this tumor depends on the tumor's location and size, involvement of the various structures around the tumor (e.g., cochlea), and the patient's age and medical status.

For example, a tumor that has caused total hearing loss and facial paralysis is best managed through a translabyrinthine approach.

Sometimes, observational management is chosen if the tumor is small and does not cause facial paralysis (discovered on MRI) or hearing loss, among other factors. However, observation carries the risk of cochlear invasion and resultant total hearing loss.

Recently, stereotactic radiosurgery, or focused radiation, has been used to treat these tumors. This method does not cause the tumor to disappear but stops its growth. The patient will need long-term observation with MRIs to ensure that further growth does not occur.