

## Symptom: Pulsatile Tinnitus

*By Hamid R. Djalilian, MD*

A 70-year-old female presents with a history of hearing her pulse in her right ear. She states that the pulsing started about a year ago and has not gone away.

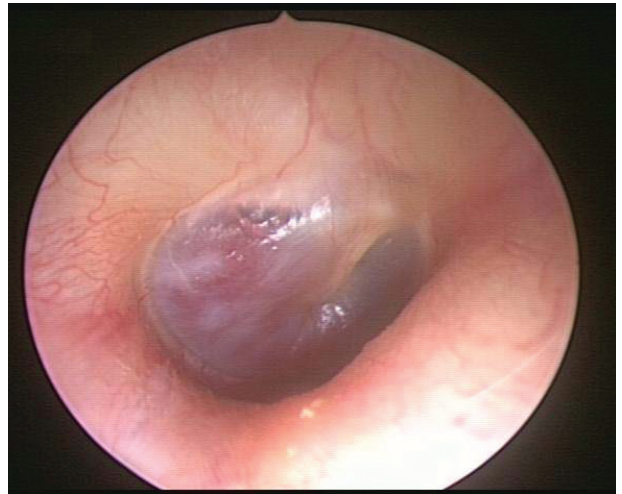
She now reports the appearance of a new symptom—decreased hearing on that side. Her daughter complains that the patient has recently been turning up the television volume significantly.

The patient states that the pulsing sound in her ear speeds up when she exercises. She has a history of hypertension and diabetes, which are controlled with diet, and she says she has never had surgery.

Visualization of the ear under microscopy shows erythema of the tympanic membrane.

**What is your diagnosis? See p. 6.**

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*In this image of the right tympanic membrane, note the erythematous mass behind the tympanic membrane.*

# Diagnosis: Glomus Tumor

By Hamid R. Djalilian, MD

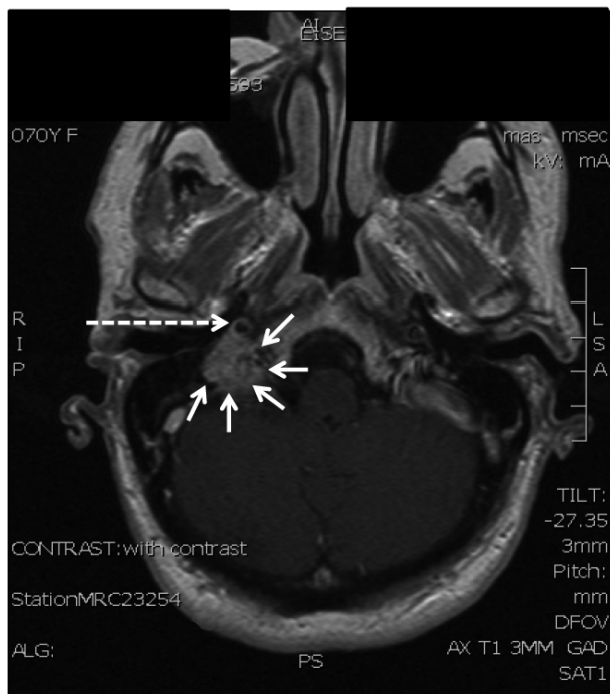
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**A** red tympanic membrane is most commonly associated with acute otitis media, where it occurs as a result of engorgement of the capillaries and thickening of the mucosal layer.

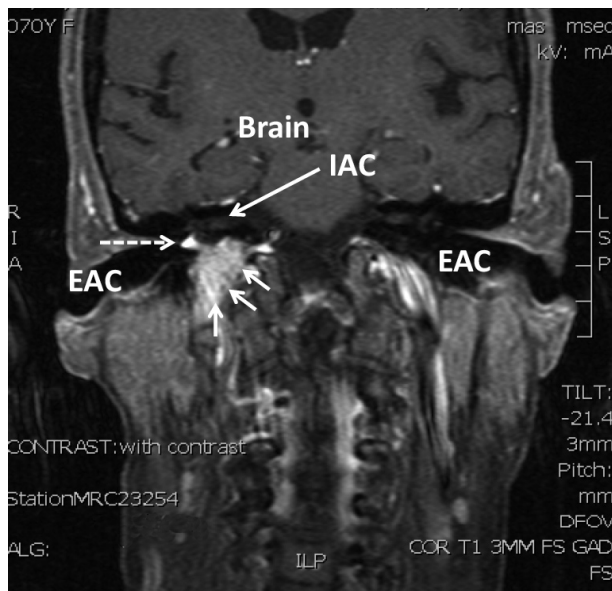
This erythema also can occur in a screaming child during examination; in this case, the increase in venous pressure in the head causes engorgement of the capillaries. Since erythema of the tympanic membrane can be deceiving, it's important to use pneumatic otoscopy when examining a child. Alternatively, a tympanogram can be obtained to check middle ear fluid presence.

Another cause of erythema of the tympanic membrane is hypervascular bone on the promontory of the cochlea. The reddish hue of the promontory, termed Schwartz's sign, is due to the active otosclerotic bone growing on the promontory and becoming visible through a translucent tympanic membrane.

Schwartz's sign is there in 10 percent to 20 percent of patients presenting with otosclerosis. It is best appreciated by



*In this axial T1-weighted post-gadolinium MRI image of the temporal bone, the tumor, which is indicated by small solid arrows, is adherent to the carotid artery (dashed arrow). The top of the image corresponds to the face, the bottom of the image corresponds to the back of the head, and the right side of the patient is on the left side of the image.*



*This coronal T1-weighted post-gadolinium MRI image of the temporal bone demonstrates the tumor (small solid arrows) with extension into the middle ear (dashed arrow). The external auditory canal (EAC) and internal auditory canal (IAC) can be seen. The top of the image corresponds to the top of the head, the bottom of the image corresponds to the neck, and the right side of the patient is on the left side of the image.*

performing a microscopic examination and focusing beyond the tympanic membrane on the middle ear structures.

Some mistake erythema of the tympanic membrane as being caused by blood in the middle ear. However, while we associate a bright red color with blood, the type of blood that accumulates in the middle ear is generally capillary or venous blood, occurring as a result of fractures or barotrauma. Blood in the middle ear will typically appear as a purple tympanic membrane.

Arterial bleeding in the middle ear is extremely rare and would generally be caused by a carotid artery laceration or aneurysm rupture. This phenomenon would invariably lead to bleeding from the nose and mouth, as the blood would be under pressure and track through the Eustachian tube into the nasopharynx and oropharynx, leading to rapid demise.

Finally, erythema of the tympanic membrane can result from a mass behind the tympanic membrane. The most common middle ear tumor is a glomus tumor. When a glomus tumor arises from the glomus bodies of the middle ear, which lie on the promontory of the cochlea, it is called a glomus tympanicum.

A glomus tumor can also arise from the dome of the jugular bulb, which is close to the middle ear. These tumors can expand

# iPad Extra!

## CLINICAL CONSULTATION VIDEO

Read this month's column on glomus tumor by Hamid R. Djalilian, MD, and then watch the video to see the mass in the middle ear and its pulsation—only available in the December iPad issue.



To see the video, download *The Hearing Journal* app for free today at [bit.ly/AppHearingJ](http://bit.ly/AppHearingJ).

silently and will break through the floor of the middle ear, becoming visible behind the tympanic membrane. This tumor, termed glomus jugulare, can fill the middle ear and be indistinguishable from a glomus tympanicum on examination.

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**Erythema of the tympanic membrane can result from a mass behind the tympanic membrane. The most common middle ear tumor is a glomus tumor.**

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During pneumatic otoscopy, air pressure on the tympanic membrane can cause blanching of the tumor on examination, which is called Brown's sign. A glomus tumor generally pulsates behind the tympanic membrane, as is shown in the accompanying video (*see box*). This patient had a glomus jugulare tumor.

### TREATMENT OPTIONS

Glomus jugulare tumors are generally diagnosed using a combination of CT and MRI scanning. On CT imaging, the

tumor is seen as infiltrating the bone surrounding the jugular bulb (the top-most portion of the jugular vein).

Due to their vascularity, the tumors take up contrast intensely on MRI. Glomus tumors are generally benign; aggressive/malignant forms do occur but are uncommon.

The treatment of glomus jugulare tumors is generally surgical resection. In recent years, there has been a trend toward the use of stereotactic radiosurgery in some patients.

Due to the proximity of the lower cranial nerves (IX to XI), surgery for total resection of these tumors has an increased likelihood of injury to some of these nerves, which can cause problems with swallowing or voice.

Stereotactic radiosurgery aims to stop further growth of the tumor but does not cause the tumor to disappear. Sometimes patients are treated with a combination of surgery and radiosurgery, depending on the extent and location of the tumor. [H](#)

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