

HEARINGS

From the Capital Region Ear Institute

An Informational Newsletter for Medical Professionals
from the Capital Region Ear Institute®
and the Capital Region Children's Hearing Foundation, Inc.
"Hear for our Children"



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Pulsatile Tinnitus or "Doctor, I hear my heart beat in my ear."

Pulsatile tinnitus is a symptom often encountered in clinical practice.

Patients describe a pulsing, whooshing, or "machine-like" sound in one or both ears. This symptom must be taken seriously and appropriately evaluated.

The causes may be simple and benign, however, several potentially catastrophic disorders need to be ruled out.



Laser middle ear microsurgery for pulsatile tinnitus. Photo © D. Foyt

Differential Diagnosis of Pulsatile Tinnitus:

Eustachian Tube Dysfunction - allergies, upper respiratory tract infection, serious or acute otitis media.

Any Conductive Hearing Loss - ear infection, tympanic membrane perforation, otosclerosis, exostosis.



Dural AVM

Vascular (Arterial) - Atherosclerosis, carotid artery stenosis, fibromuscular dysplasia, intracranial arteriovenous malformation (AVM), dural arteriovenous fistula (AVF), cerebral aneurysm.

Vascular (Venous) - Pseudotumor Cerebri, prominent sigmoid sinus.

Central/ Metabolic - hypervascular state including pregnancy, anemia, hyperthyroid, and/or polycythemia.

CASE REPORT: Unilateral Pulsatile Tinnitus

Foyt D, Rapoport R, Carfrae M; Fibromuscular Dysplasia Causing Pulsatile Tinnitus. *Oto HNS* 2006;134:701-702

A 40-year-old woman presented with a one month history of pulsatile tinnitus in the right ear. She denied history of hearing loss, hypertension, or thyroid problems. Physical exam of the tympanic membrane, middle ear, head and neck were normal. Carotid, auricular, or temporal bruits were not appreciated. Compression of the jugular vein did not stop the tinnitus. Audiogram, tympanogram, CBC, chemistry panel and TFT were normal. Carotid ultrasound, CT, MRI/MRA (fig 1) of the temporal bone and neck were normal.

Due to continued symptoms a formal catheter arteriogram of the carotid system was done (Fig 2). The arteriogram revealed fibromuscular dysplasia of both internal carotid arteries. Vascular surgery and interventional radiology subspecialtists were consulted. Brain SPECT scan and duplex sonogram of the kidneys were recommended and found to be negative. Intravascular balloon angioplasty dilation and stenting of the internal carotid artery as curative therapy were recommended.



(fig 1) MR Angiogram showing near normal internal carotid artery architecture. © D. Foyt



(fig 2) Selective carotid angiogram revealing the typical "stippled" appearance of Fibromuscular Dysplasia of the Carotid Artery
© D. Foyt

Discussion

Fibromuscular Dysplasia (FMD) is a rare multifocal vasculopathy most commonly presenting in young to middle aged woman. It affects small to medium size vessels and ultimately leads to arterial narrowing. The internal carotid artery is the most commonly affected vessel leading to pulsatile tinnitus. Other arteries including the aortic branch and renal arteries can also be involved. Clinical manifestations reflect the arterial system involved. This includes hypertension when the renal arteries are involved, and cerebrovascular accident when the cerebral vasculature is involved. Angiography in this patient secured the diagnosis and prompted further imaging of associated structures.

Work up of Pulsatile Tinnitus

The vast majority of patients who present with pulsatile tinnitus have a normal physical exam. In this case further investigation is required to ascertain the cause of the tinnitus and to make certain that potentially dangerous problems are not missed. The following is our standard protocol for diagnosis up of patients with suspected pulsatile tinnitus.

Physical Exam – Full otologic exam. Auscultation of the heart for arrhythmia; neck and mastoid for carotid artery and sigmoid sinus bruits; blood pressure and heart rate, and oral exam looking for palatal myoclonus.

Audiological Exam – Pure tone audiogram and tympanogram, and dynamic tympanogram to demonstrate stapedial muscle spasm (requires specialized equipment and audiologist).

Blood tests – Complete blood count, and thyroid function test.

Carotid Ultrasound – Looking for atherosclerotic plaques, and carotid stenosis.

Computed Tomography of the Temporal Bone – CT is reasonably quick, and inexpensive but relatively low yield. Look for jugular bulb abnormalities, abnormal sigmoid sinus, middle ear masses.

MRI Head – Looking for: Hydrocephalus, Chiari Malformation, Pseudotumor Cerebri, Glomus tumors.

MRI Angiogram Head – Usually done in conjunction with head MRI. Looking for AVM, dural AVF and aneurysms.

MRI and MRA Neck – Looking for carotid stenosis, fibromuscular dysplasia and carotid body tumors.

Cerebral Angiogram with Selective Internal and External Carotid Artery Injections: Considered the gold standard with highest yield for assessment of AVMs, dural AVFs and aneurysms.

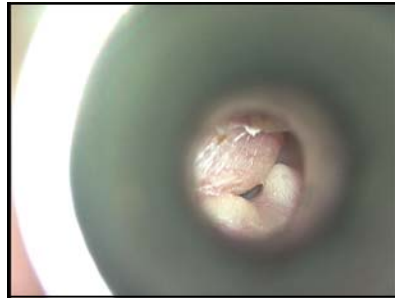


Dr. Foyt in clinic with pulsatile tinnitus patient at Capital Region Ear Institute © D. Foyt

Common Causes of Pulsatile Tinnitus Seen on Otoscopic Examination



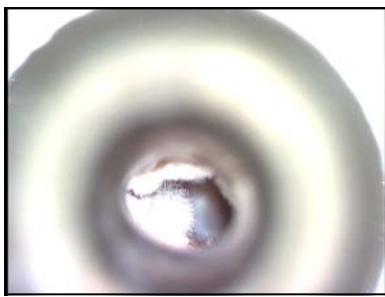
Glomus Jugulare



Ear Canal Exostosis



Glomus Tympanicum



Fungall Otitis Externa



Tympanic Membrane Perforation

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