Pulsatile Tinnitus

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Tinnitus is auditory perception of internal origin. When this auditory perception is experienced by the patient alone, it is called subjective tinnitus. If what the patient hears is also heard by another person, it is termed objective tinnitus. Tinnitus can also be classified as pulsatile (synchronous to the heart beat) or non-pulsatile (continuous). Both types of classifications can be useful in the deciding if radiological investigations should be carried out or the pathological processes that might be encountered in such patients.

How large is this clinical problem? It is reported that about 10% of the US and UK population have tinnitus. Approximately, 96% of patients have non-pulsatile tinnitus while 4% have the pulsatile variety. It is useful to note that of the non-pulsatile variety is almost always subjective in nature and the imaging findings are negative. Pulsatile tinnitus is 90% subjective (usually negative imaging findings) and 10% are objective (usually positive imaging findings).

It is currently believed that in the majority of cases the tinnitus is a functional abnormality located in the brainstem which explains why in the majority of patients, imaging findings are negative. However, in a small number of cases the internal origin of sound could be traced to vascular lesions. These lesions include vascular anomalies (for example, aberrant carotid artery), vascular malformation (arteriovenous malformation), vascular tumours (for example, paragangliomas, endolymphatic sac tumours) and conditions of uncertain etiology (for example, otosclerosis, Paget disease).

In view of the high negative scans in the overall investigation for tinnitus, imaging is most likely to be positive in patients with pulsatile tinnitus (especially when tinnitus is objective). It is generally agreed that the contrast-enhanced high resolution CT of the temporal bone should be the initial investigation. In a high percentage of these patients, imaging “anomalies” are seen although their clinical significance is uncertain. These findings include variants of the jugular bulb (large or high riding). Such findings maybe incidental as they are relatively common in the asymptomatic general population. If CT findings are negative, CT angiography of the neck may detect lesions such as carotid stenosis, dissection or mass. Conventional angiography maybe required to detect dural AVM, AVF, and other vascular abnormalities of the extra-cranial carotid arteries.