

CASE REPORT

Persistence of stapedial artery, our experience: A case report

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Stapedial artery persistence is an uncommon issue to encounter in ordinary ENT practise. If they are, they typically show up as a pulsatile mass or as a sneaky discovery. Due to the condition's rarity, most individuals are asymptomatic, but occasionally it can induce vertigo, pulsatile tinnitus, or conductive hearing loss in certain people. Hereby, we present a case of incidental discovery of persistent stapedial artery in a patient with complaints of nasal obstruction.

Keywords: persistent stapedial artery, tinnitus, intratympanic mass

1. Introduction

The artery is a simple vascular structure that develops about the third month of fetal development in humans (1). The stapes get its stirrup-like shape from the stapedial artery, which frequently appears throughout the development of the human embryo. The range of the expected prevalence of this uncommon postembryonic persistence was 0.02 to 0.48% (2).

2. Case report

A 44-year-old man who had been complaining of nasal blockage and discharges for a month visited the ENT OPD. He also had a history of 3 episodes of meningitis in the past, the last of which occurred at the age of 15 years. Afterwards, his left-sided hearing decreased, and he preferred using his right ear for telephonic conversations. He noticed tinnitus in the left ear. It was not associated with any complaints of ear discharge or ear pain.

On examination, the patient was afebrile and vitals were stable. Anterior rhinoscopic examination revealed mild deviated nasal septum to the left, with pale nasal mucosa. No nasal discharge or polypoidal changes are appreciated. He was evaluated, and a blood panel for allergy was sent which was reported as within normal limits. He was managed as a case of allergic rhinitis and started on antihistamines. On review after 1 week, the patient

reported relief of his nasal obstruction, but reported that his tinnitus, even though it was not affecting his routine functions, persisted. On otoscopic examination, the left ear showed an intact tympanic membrane with a retro-tympanic mass along the anterior quadrant of the middle ear that was pulsatile, the pulsation being synchronous with carotid pulsations. No blanching on pressure over carotids during signalization was observed. The right ear showed a normal intact tympanic membrane. The rest of the findings were normal.

The pure tone audiogram, left ear, shows profound hearing loss with a pure tone average of around 60 dB and a fall in air conduction in all frequencies with an AB gap of more than 60 dB. Right ear thresholds were within normal limits. On impedance, an "A"-type curve was obtained with ipsilateral reflexes present in the right ear, with the inability to attain seal in the left ear. HRCT temporal bone showed diffuse bony changes, with areas of demineralization and sclerosis noted involving left temporal bone, adjacent sphenoid, occipital, and left half of C1 vertebrae. Erosions of tegmen tympani, petrous apex, adjacent carotid canal, and jugular bulb are noted. Linear soft tissue density in the left middle ear cavity's superior aspect, next to the cochlea, is suggestive of the potential presence of a persistent stapedial artery. The ear ossicles are normal in position. The mastoid air cells are not opacified.

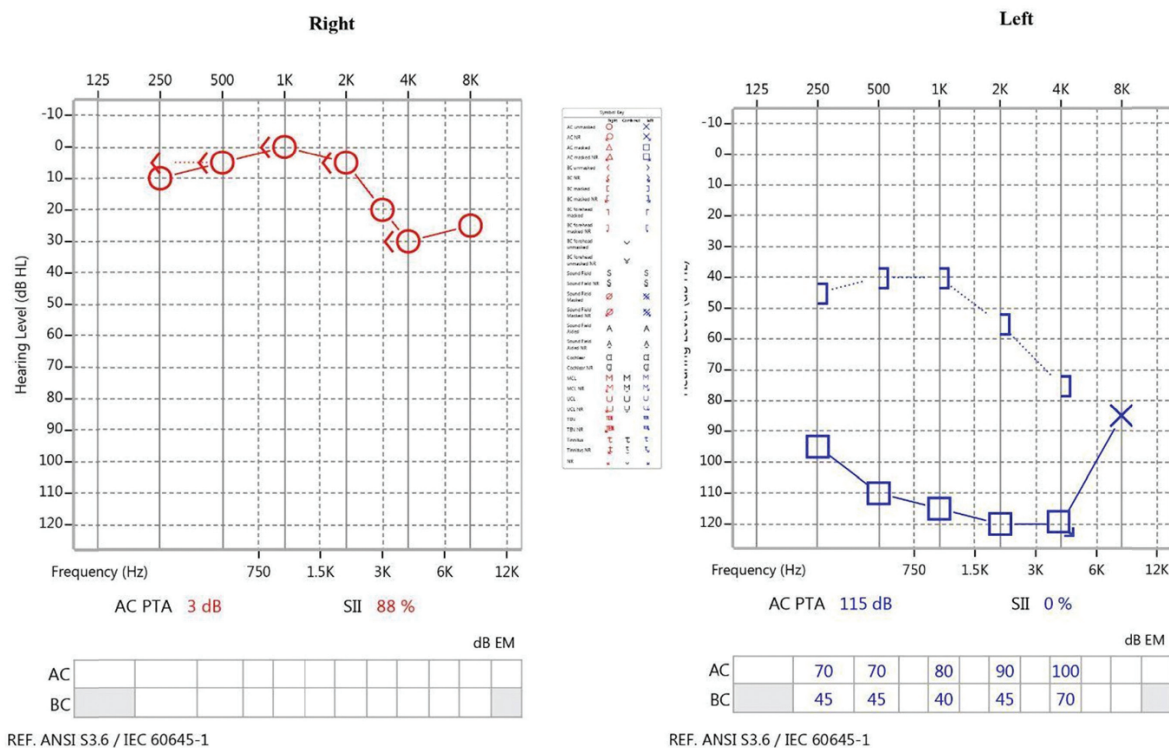


FIGURE 1 | Left profound hearing loss.

3. Discussion

The internal carotid artery gives birth to the stapedia artery, which enters the middle ear in the anteroinferior quadrant, proceeds forward through the stapes' obturator foramen, and then turns anteriorly into the horizontal segment of the bone canal by a dehiscence. They later enter through the middle cerebral fossa, where they end up in the middle meningeal artery. Maxillomandibular and supraorbital divisions are the stapedia artery's two main divisions. The anterior branch of the middle meningeal artery eventually divides from the supraorbital branch, which anastomoses with the ophthalmic artery. The internal maxillary artery, which serves the lower face, infraorbital, and inferior alveolar areas, anastomoses with the maxillomandibular division. The external carotid artery anastomosis often replaces both of these divisions as the stapedia artery stem atrophy. When this transition fails, the ocular artery or persistent stapedia artery supplies the middle meningeal artery.

Various series have different incidences of stapedia artery persistence. According to Moreano et al.'s study on dissections, it accounts for 0.01 to 0.02% of procedures for otosclerosis (3, 4). The persistent stapedia artery has four different anatomical types, each of which is

- Aorta hyodo-stapedia

The internal carotid artery of the intra-petrous region instantly gives way to the persistent stapedia artery, which proceeds down the promontory, begins at the floor of the

tympanic cavity, and eventually travels between the two branches of the stapes. The second portion of the artery, which connects to the fallopian canal before traversing the base of the skull at the level of the geniculate ganglion, forms the middle meningeal artery. This sample has the inferior branch of the stapedia artery since it was still growing at 6 weeks. Here, the internal carotid artery divides into the middle meningeal artery.

- Aorta, pharynx, and spine

The external carotid artery or, more often, the middle cerebral artery may be the source of the pharyngeal artery in



FIGURE 2 | Diffuse bony changes with areas of demineralization and sclerosis noted involving left temporal bone, adjacent sphenoid, occipital, and left half of C1 vertebrae.

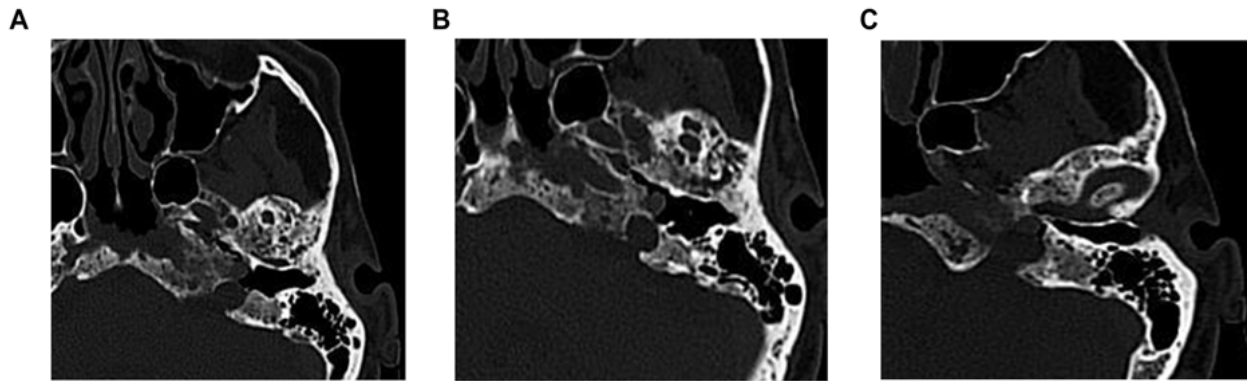


FIGURE 3 | (A–C) Linear soft tissue density in superior aspect of left middle ear cavity, abutting anterior aspect of cochlea suggestive of persistent stapedial artery.

this instance, internal carotid artery. After passing through the stapes branches and the Jacobson's nerve to reach the tympanic cavity, the middle meningeal artery travels along the promontory until emerging from the center of the base of the skull at the level of the geniculate ganglion, and returning to the fallopian tube the way it was. In this instance, the ascending pharyngeal artery gives birth to the middle meningeal artery.

- The pharyngo-hyo-stapedial artery

The ascending pharyngeal artery and the hyoid artery are the sources of the stapedial artery in the situation under discussion, which is a straight internal carotid artery branch. The hyoid artery and the stapedial artery showed no signs of resorption. Thus, this vascularization type resembles the embryological seventh week the most. This form is unique since just one example has been recorded up until this point (5).

- Both the stapedial and internal carotid arteries are permanent.

Clinically, stapes artery persistence is mostly asymptomatic or undiscovered. The occlusion of the stapes footplate, pulsatile tinnitus, or vertigo, however, can occasionally cause conductive hearing loss. As a result, imaging must be routinely carried out when there is conductive hearing loss or pulsatile tinnitus with normal otoscopy (3). Understanding the stapedial artery's path, which leaves a dehiscence for organism access to the meninges, can also help explain the very high prevalence of meningitis.

The typical approach relies on the size of the vessel in cases of unexpected findings during surgery, especially for otosclerosis surgery: if the artery is tiny and the footplate is visible, the footplate can be fenestrated. To prevent an unintentional bleeding during fenestration, abstinence is the rule in other situations. Additionally, instances of paralysis or

facial paresis following deliberate stapedial artery coagulation are recorded. Four examples of straightforward coagulation have been described by other writers (6).

4. Conclusion

Persistent stapedial artery is a very rare anatomic variant. Its existence, mostly left undiagnosed pointing to its benign nature, might be diagnosed from a high-resolution CT scan as an insidious finding. A hint to the diagnosis can be the absence of the foramen spinosum on plain radiographs or CT scans, however, this look is general and can also happen when the middle meningeal artery originates from the ophthalmic artery. Imaging discovery of this change may suggest using considerable caution to prevent injury to the artery. It is frequently suggested to halt the operation.

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