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Temporal Bone Histopathology Case of the Month Paravestibular Vein Obliteration and Endolymphatic Hydrops

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Although still controversial, there is evidence that the endolymphatic duct (ED) and endolymphatic sac (ES) are important structures in endolymph homeostasis because their obliteration results in endolymphatic hydrops (EH). This case reviews a possible vascular cause for EH.

In 75% of normal human temporal bones, the venous outflow from the cochlea and sensory portions of the vestibule drains into the inferior cochlear vein, whereas that from the utricle, most of the semicircular canals, the ED and ES drains through the Paravestibular vein (PVV). This vein courses in an osseous canal, the Paravestibular canaliculus, and drains into the inferior petrosal sinus or jugular bulb near the ES (1).

A decreased microvascular circulation in the ES, including impaired venous drainage from the duct and sac through the PVV, may lead to morphologic changes that alter normal ES function and may theoretically result in impaired regulation of fluid balance and disturbance of inner ear pressure control (2). It is suggested that those patients with drainage predominantly through the PVV may be more prone to developing EH when there is insufficiency of this vein (3).

The importance of the PVV venous system drainage was first demonstrated and described in a temporal bone with congenital absence of this vein in which endolymphatic hydrops developed (4). Based on this and other histopathologic studies, attention has been directed toward the PVV. Occlusion and partial obliteration of this vein and altered circulation of the ES leading to increased pressure in the PVV have been linked to the development of EH and Ménière's disease (5).

CASE REPORT

A 61-year-old patient presented with conductive hearing loss and tinnitus in the right ear. He was diagnosed with otosclerosis and treated successfully with stapes mobilization. Postoperative audiologic testing confirmed improvement of air conduction at 3 weeks. He had a 15-dB sensorineural hearing loss in the same ear 3 months later.

HISTOPATHOLOGY

Histopathologic findings include oval window and cochlear otosclerosis (Fig. 1). The footplate has been fragmented. The tympanic annulus has been displaced into the middle ear, although there is no perforation. There is also a tympanosclerotic plaque in the ear drum.

There is a mild hydrops in the basal turn manifested by the attachment of Reissner's membrane on a higher portion of the spiral ligament. The hydrops is more evident in the hook area, and Reissner's membrane in this area has expanded to be in contact with part of the stapes footplate. The saccule is also dilated and in direct contact with the stapes footplate (arrow). The vein of the ED is obliterated in the most proximal part (PVV; Fig. 2), which may have been due to an organized thrombus. Hair cells are somewhat reduced in the basal turn to a level of 25% of

normal. Although the otosclerosis reaches the endosteum, there is no hyalinization, but there is a mild striae atrophy.

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REFERENCES

1. Mazzoni A. Vein of the vestibular aqueduct. *Ann Otol Rhinol Laryngol* 1979;88:759–67. [PubMed: 42339]
2. Friberg U, Rask-Anderson H. Vascular occlusion in the endolymphatic sac in Ménière's disease. *Ann Otol Rhinol Laryngol* 2002;111:237–45. [PubMed: 11913684]
3. Hosseinzadeh M, Hilinski JM, Turner WJ, Harris JP. Ménière's disease caused by anomalous vein of the vestibular aqueduct. *Arch Otolaryngol Head Neck Surg* 1998;124:695–8. [PubMed: 9639481]
4. Gussen R. Endolymphatic hydrops with absence of vein in paravestibular canaliculus. *Ann Otol Rhinol Laryngol* 1980;89:157–61. [PubMed: 6966148]
5. Ikeda M, Sando I. Paravestibular canaliculus in Ménière's disease. A histopathological study. *Ann Otol rhinol Laryngol Suppl* 1985;118:11–6.

FIGURE 1.

Hematoxylin and eosin, x20. Hydropic saccular membrane pressing against stapes footplate (arrow). CO indicates cochlear otosclerosis; MEC, middle ear cavity; IAC, internal auditory canal.

FIGURE 2.
Hematoxylin and eosin, x100. ES indicates endolymphatic sac; PVV, Paravestibular vein obliterated by fibrous tissue; VA, vestibular aqueduct.