Advanced Otosclerosis

Stapes Surgery or Cochlear Implantation?

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KEYWORDS

- Advanced otosclerosis • Cochlear implant • Stapedotomy • Hearing loss
- Facial nerve stimulation

KEY POINTS

- Diagnosis of advanced otosclerosis may be challenging, requiring a comprehensive patient history combined with an audiologic evaluation and imaging.
- The treatment dilemma is selecting stapedotomy and hearing aid over cochlear implantation to be more helpful.
- Cochlear implant surgery may be challenging in these patients, sometimes requiring drill out of the promontorium to detect lumen of basal turn. The insertion of an electrode may also encounter some resistance.
- Facial nerve stimulation may be observed after cochlear implant surgery, which may require deactivation of some electrodes.

Video content accompanies this article at http://www.oto.theclinics.com.

DEFINITION OF ADVANCED OTOSCLEROSIS

Otosclerosis is an abnormal process of the otic and labyrinthine capsules that involves continuous osteolysis and osteogenesis of the bone. Although otospongiotic lesions typically occur during the active phase of otosclerosis, newly formed and more compact lamellar bones dominate during the late inactive phase of otosclerosis.[1] During the active phase, a reddish tint called Schwartze sign can also appear through the tympanic membrane. Schwartze sign can aid in the diagnosis of otosclerosis and is related to the promontorium vascularity that is associated with the active otospongiotic focus of otosclerosis.[2] Otosclerosis usually occurs during the postlingual period between the second and fifth decade of life.[3] It also typically affects the area adjacent to the oval window and causes conductive hearing loss through stapes fixation.[4] It has

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been reported that 96% of affected patients have otosclerosis foci that are located in the anterior part of the oval window, and round window niche involvement also occurs in 30% of clinical otosclerosis.[5] In a series of advanced otosclerosis that was treated by cochlear implant (CI) surgery, round window membrane ossification was detected in 60%, and scala tympani ossification was identified in 30% of the patients.[1]

Once started, hearing loss usually worsens in otosclerosis patients. Hearing loss is initially observed at low frequencies and later at higher frequencies (**Fig. 1**). Studies show that 10% of otosclerosis patients with conductive hearing loss also develop sensorineural hearing loss (SNHL).[6] In 1961, House and Sheehy[7] defined advanced otosclerosis as hearing loss in air conduction (AC) threshold by 85 dB with nonmeasurable bone conduction (BC) (probably because of limitations in audiometry at that time).[7] There is no universally accepted definition for advanced otosclerosis.[8] Recently, the term advanced otosclerosis is used when a patient with otosclerosis has severely decreased speech recognition.[9] Calmels and colleagues[10] described advanced otosclerosis by its audiologic and radiologic criteria. The audiologic criteria for diagnosis was the detection of dissyllabic words less than 30% of the speech discrimination (SD) score at 70 dB, with a well-equipped hearing aid and a blank audiogram.

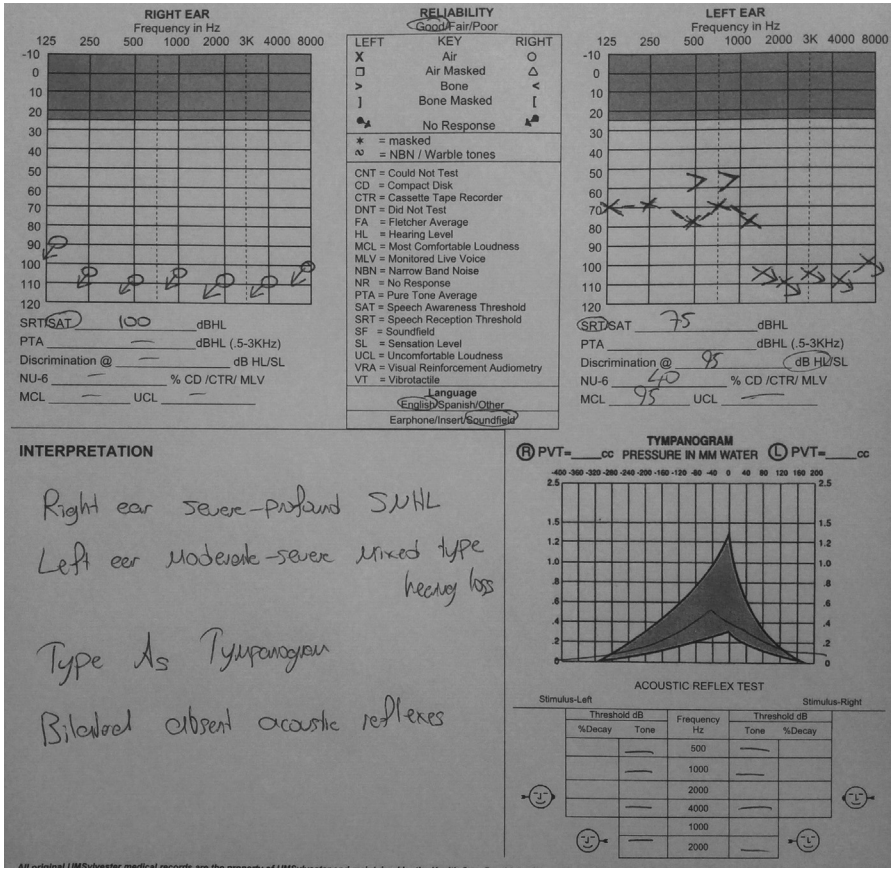

Fig. 1. The audiogram of a patient with bilateral far-advanced otosclerosis.