

Malleus Bar as a Rare Cause of Congenital Malleus Fixation: CT Demonstration

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Summary: Among congenital ossicular anomalies without external ear atresia, malleus fixation is least common. We report a case of congenital malleus fixation by a bony bar connecting the malleus neck to the posterior tympanic wall, which was depicted on thin-section CT scans.

Congenital ossicular anomalies without external atresia are subdivided into malleoincudal fixations, stapes fixations, and incudostapedial disconnections (1). In malleoincudal fixations, which are least common, the malleus head and incus body are usually fused or fixed to the epitympanic walls (2). The malleus handle is rarely fixed to the posterior wall of the tympanic cavity with a bony bar (3, 4). This anomaly is designated a malleus bar (4). We report a case of a malleus bar that was diagnosed preoperatively from findings on CT scans.

Case Report

An 18-year-old man presented with right-sided hearing loss that had been recognized since childhood. There was no history of ear disease. The right external canal was patent and the

tympanic membrane was normal. An audiogram showed a 45-dB air/bone gap on the right. A flat tympanogram was obtained on the right side. Thin-section (1.5 mm) CT scans revealed a bony bar connecting the malleus neck to the posterior tympanic wall on the right (Fig 1). The temporal bone was well pneumatized and there was no soft tissue suggestive of the mucosal lesion within the middle ear cavity on either side. At right-sided tympanotomy, the mucosa of the middle ear was normal. Palpation revealed that the stapes and incus were mobile but the malleus was fixed. There was a bar of bone adjacent to the chorda tympani nerve extending from the malleus neck to the posterior tympanic wall. The bony bar was severed, resulting in good mobility of the ossicular chain. The postoperative audiogram showed an average hearing gain of 35 dB on the right.

Discussion

In patients without external ear atresia, congenital conductive hearing loss is caused by congenital ossicular deformity or congenital cholesteatoma of the middle ear (5). A diagnosis of congenital cholesteatoma is usually suggested by the presence of a homogeneous mass of soft-tissue attenuation in the middle ear on CT scans (5); on the other hand, a diagnosis of

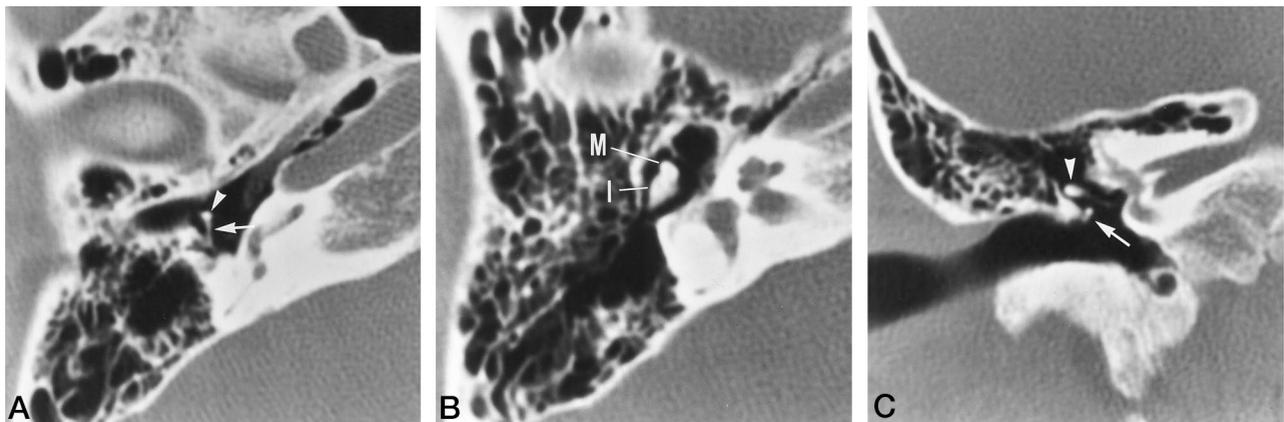


FIG 1. 18-year-old man with a malleus bar.

A, Axial CT scan at a level slightly inferior to the incudostapedial joint shows a bony bar (arrow) between the malleus neck (arrowhead) and the posterior tympanic wall.

B, Axial CT scan at the level of the epitympanic recess shows normal incudomalleal joint. M = malleus head, I = incus body.

C, Coronal CT scan shows a bony bar (arrow) below the incus (arrowhead).

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congenital ossicular deformity is often a challenge to radiologists.

From an audiologic point of view, conductive hearing loss may be due to either transmission fixation or transmission discontinuity. Congenital transmission discontinuities most commonly involve incudostapedial articulation: absence of the incus long process and/or stapes superstructure (1, 5). Incudostapedial disconnection is usually apparent on CT scans (5). Congenital transmission fixations occur either at the malleoincudal or the stapedial region. Congenital stapes fixations without deformity of the stapes at the annular ligament may be difficult to appreciate on CT studies (5). Congenital malleoincudal fixations are less common than stapes fixations. The malleus head and incus body are fixed to the epitympanic wall by a fibrous band or a bar of bone (2). Rarely, the malleus handle is fixed to the posterior tympanic wall by a bony bar; Nomura et al (3) designated this a malleus bar. Although our case is different from the series reported by Nomura et al (3) in that in our patient the bony bar arose from the malleus neck, we think that this may be labeled a malleus bar as well.

At the fifth week of gestation, the ossicles are recognized as a mass of mesenchymal cells in the primordial middle ear. With differentiation of the ossicles, there is gradual absorption of much residual mesenchyme, facilitating the development of the tympanic cavity. Although the mechanism by which a malleus bar develops is unknown, it is presumed that the mesenchyme behind the malleus handle is incom-

pletely absorbed and this persistent mesenchymal tissue differentiates into osseous tissue.

The differential diagnosis is limited. Tympanosclerosis is a healing variant of chronic otitis media characterized by deposition of hyalinized collagen in the tympanic cavity; the suspensory ligaments and tendons may calcify or ossify (6). The location of a malleus bar is not consistent with that of the preexisting ligaments and tendons (7).

Sands and Napolitano (4) advocate the use of an argon laser for severing a malleus bar, which reduces the risk of high-frequency sensorineural hearing loss that would be incurred by using a drill (4). The preoperative diagnosis of a malleus bar with thin-section CT would help direct surgical repair.

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