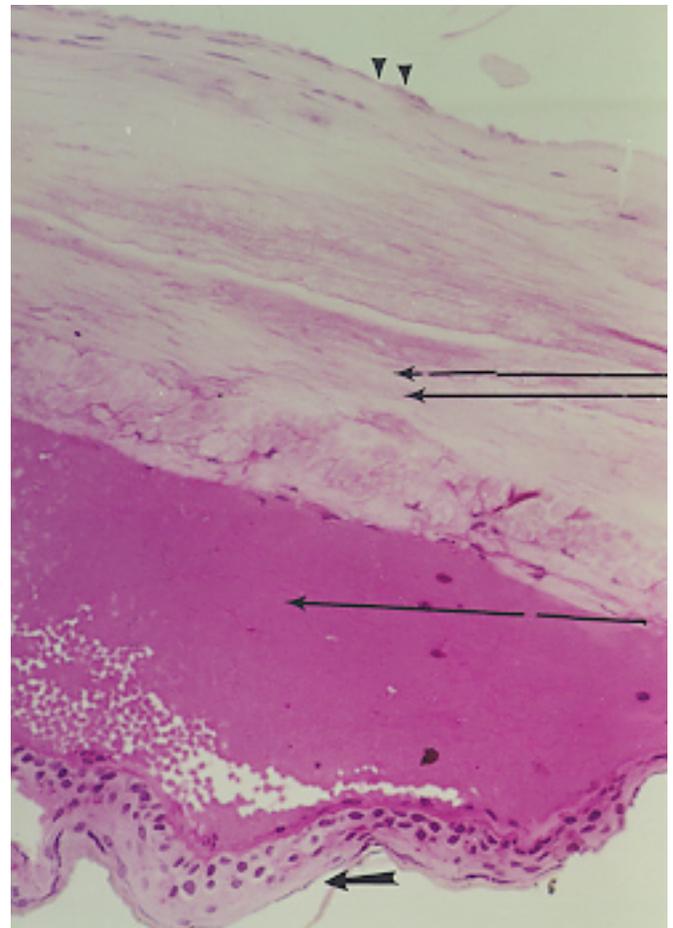


TYMPANOSCLEROSIS

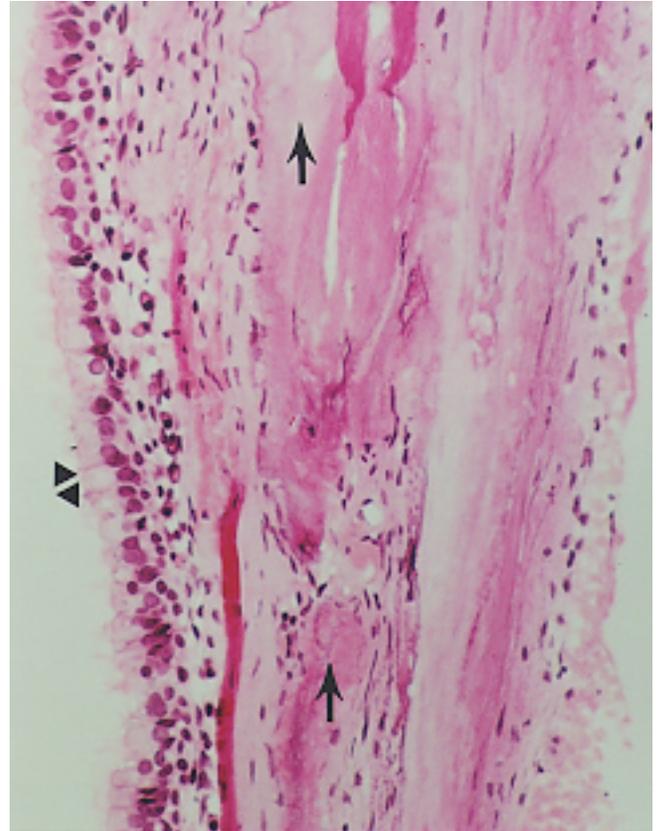
Tympanosclerosis is seen in the tympanic membrane as a white deposit, often slight, just enough to make the drumhead vaguely opaque rather than translucent. In more marked cases the deposit is dense and arranged in spots, patches, and circumferentially around the rim of the annulus, or in any fashion. If there is a perforation of the tympanic membrane, in a patient having advanced tympanosclerosis, a white deposit may be seen in the middle ear mucosa on the promontory, about the stapedial footplate, or fusing the heads of the incus and malleus to the walls of the epitympanum. If dissected out, tympanosclerosis feels firm, looks dead white and is plaque-like.

Microscopically, there is hyalinized collagen in the submucosa with a lamellar arrangement. Mature fibrocytes may be seen between collagen fibers. Calcification or ossification occurs in some plaques.

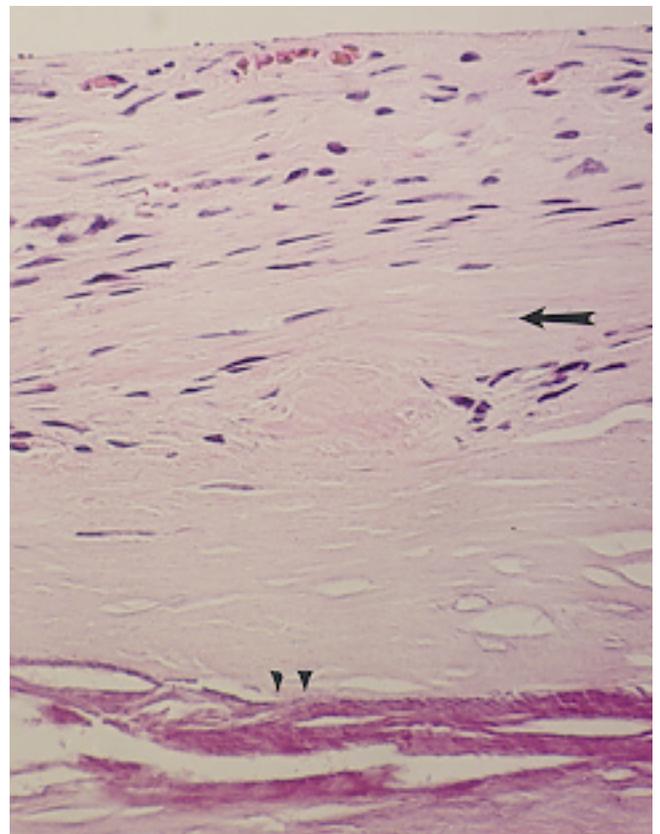
Tympanosclerosis. There is a greatly thickened tympanic membrane caused by a plaque of hyalinized tympanosclerosis (long single arrow) and then additional collagenous formation (double arrows) also representing tympanosclerosis. Squamous epithelium (short arrow) on the outer surface of the drumhead is thickened while the middle ear surface of the drumhead is lined by a single layer of flattened cells (triangles).

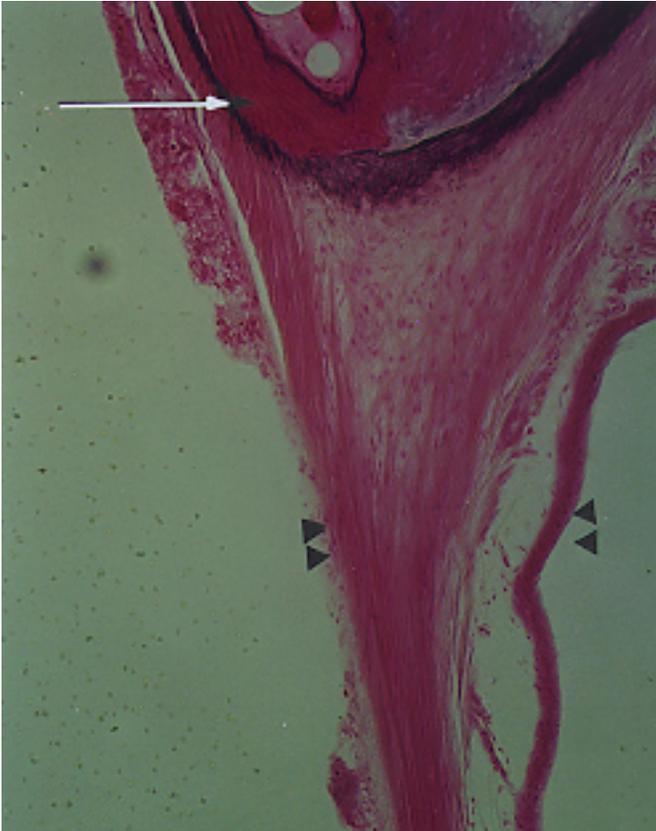


Tympanosclerosis. Lying immediately under the cuboidal or low columnar mucosa (triangles) of the middle ear is a lamellated mass of hyalinized collagen (arrows) with a few fibrocytes.



Tympanosclerosis. Greatly thickened tympanic membrane (arrow) with moderate number of adult fibrocytes and some dystrophic calcification (triangles).





Normal tympanic membrane for comparison. The section includes the manubrium of the malleus (long arrow) which is imbedded in the drumhead. Here the membrane is thicker (triangles) than in its remaining portion because of attachment to the malleus.

CLINICAL ASPECTS

Tympanosclerosis is the result of an earlier middle ear infection, usually in childhood, and is thought by some to be a specific autoimmune response. In minimal tympanosclerosis there is a faint cloudiness of the tympanic membrane, just enough to call it dull. More advanced examples show small to large dense white plaques in the tympanic membrane located in its middle or fibrous portion.

When there has been a perforation of the tympanic membrane that healed, often the middle fibrous layer which is the site of deposition of tympanosclerosis, does not regenerate and the outer squamous and inner cuboidal layers being very thin, make the healed perforation transparent so that this thin area appears sharply delineated from the rest of the drumhead which often contains varying amounts of tympanosclerosis. Such a thinly healed, transparent area of the drumhead frequently is mistaken for a perforation.

Tympanosclerosis limited to the tympanic membrane does not cause appreciable hearing loss, but when deposited about the heads of the malleus and incus or across the footplate of the stapes, the auditory ossicles are rendered immobile and a

severe conductive type hearing loss may result.

Once the tympanosclerotic process has developed it is fixed and does not progress. Thus it is possible to remove obstructive parts of the tympanosclerotic process from the middle ear and restore normal hearing in at least some cases.

As noted in the discussion under otosclerosis, tympanosclerosis covering the footplate of the stapes could easily be mistaken for otosclerosis since both fix the footplate and look similar. Tympanosclerosis, however, is confined to the mucosa covering the footplate (and other parts of the middle ear) while otosclerosis invades and replaces bone. Therefore, tympanosclerosis can be peeled off, while an otosclerotic footplate requires removal of at least a part of the footplate to restore hearing. Also, the preoperative diagnosis of otosclerosis is dependent on a slowly progressive hearing loss and a normal-appearing tympanic membrane. Tympanosclerosis, on the other hand, if it causes hearing loss, is expected to show dense deposits in the tympanic membrane; and the hearing loss, while not sudden, is not as slow in developing as in the loss caused by otosclerosis, and may well appear much earlier in life than otosclerotic deafness which usually begins in the second or third decade.