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Cholesteatoma following stapedectomy

by

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Abstract
Among the possible complications of stapedectomy for otosclerosis, cholesteatoma is extremely rare. We report a case which was secondary to implantation of keratinising squamous epithelium inadvertantly included in the fat graft taken from the ear lobe to seal the footplate.

Introduction

The complications which may occur following stapedectomy for otosclerosis are well recorded. Among the more common are sensori-neural hearing loss, perilymph fistula, necrosis of the long process of the incus, reparative granuloma and persistent performation of the tympanic membrane. Cholesteatoma induced by stapedectomy is an exceptional complication. It may occur secondary to perforation of the tympanic membrane but in the following case the keratinising epithelium was introduced into the middle ear with the fat graft from the ear lobe.

Case report

A 30-year-old women presented with a recurrent conductive hearing loss. She had previously undergone a unilateral stapedectomy for bilateral otosclerosis in another unit. A slim-shaft teflon-wire piston had been used and the small fenestra sealed with fat taken from an incision in the ear lobe. The operation was without complication and there was initially an excellent result. The hearing gradually deteriorated over the next 20 months with a recurrence of the conductive hearing loss. There was no vertigo. On exploration of the ear, a small cholesteatoma was found. This was lying over the oval window and had displaced the prosthesis. It separated easily from the promontory but had to be cut away from the fat graft in the oval window. No further reconstruction was attempted but deferred for 6 months to ensure that no further cholesteatoma was developing.

Histological appearances

Lying deep to the pseudostratified columnar epithelium of the middle ear was a cyst lined by keratinising, stratified squamous epithelium (Fig. 1). The epithelium was orthokeratotic and of varying thickness. The cyst itself contained numerous concentric laminae of keratin.

Adjacent to the cyst was a small mass of very vascular adult adipose tissue with a surrounding inflammatory infiltrate of lymphocytes and plasma cells set in maturing granulation tissue: occasional foreign body multinucleate giant cells associated with refractile foreign material were present on the periphery of the focus of inflammation (Fig. 2).

The adipose tissue probably represented the ear-lobe fat used to seal the oval window during the original stapedectomy operation and the cyst had arisen from a fragment of epithelium derived from the skin of the ear-lobe. The absence of parakeratosis in the epithelium indicated that the cyst epithelium was derived from a hair follicle and not from the surface epidermis.

Discussion

Otosclerosis and chronic suppurative otitis

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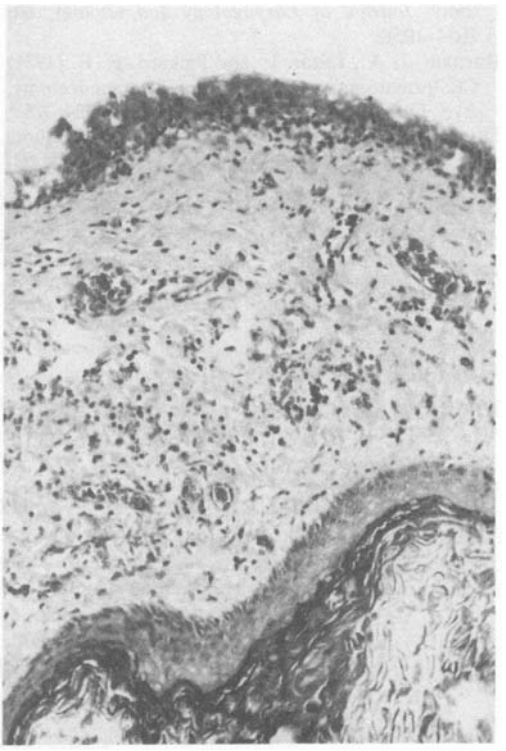


FIG. 1.
The cyst lined by stratified squamous epithelium (bottom) lies deep to the ciliated, pseudo-stratified columnar epithelium of the middle ear (top). Haematoxylin and eosin × 160.

media with cholesteatoma are both moderately common and might be expected to occur together by chance. However, it is extremely rare for a middle aged adult to develop cholesteatoma spontaneously in an ear which was free of it 20 months previously. This is a consequence of either post-operative ingrowth of squamous epithelium from the tympanic membrane or intra-operative implantation of squamous epithelium. The teflon and wire prosthesis is not known to stimulate squamous metaplasia in the middle ear cleft. In this case, the fat graft is the obvious source of the cholesteatoma which lay on the promontory, adherent to the fat graft in the oval window. Histological examination confirmed the intimate relationship.

Five previous cases of cholesteatoma following a stapedectomy have been reported. Mawson (1975) noted one case out of a series of 2,000 stapedectomies but the details of the case are not discussed. In two other cases in the literature, ear lobe fat was not used and the cause was almost certainly a defect of the tympanic membrane: in one of these (Eviatar and Jamal, 1983) the gelfoam wire prosthesis had eroded through the tympanic membrane, allowing ingrowth of squamous epithelium around the wire; in the other (Burnam *et al.*, 1971) the tympanic membrane was perforated at the posterior margin whilst lifting the flap. The patient subsequently underwent two tympanoplasties before the cholesteatoma was found.

In the remaining two reported cases, ear lobe fat was used and may have been the source of implantation. In one case (Birt, 1966) a fat-wire prosthesis was used and 21 months later a cholesteatoma was found completely filling the middle ear. However, the patient had undergone a previous stapes mobilisation procedure when the tympanic membrane had been perforated and although this healed spontaneously it is not clear whether the perforation or the fat graft was the source of the squamous epithelium.

In the last case (Dunkelberger, 1970) a fat-wire prosthesis was inserted but at the second revision operation, this was removed and replaced with a gelfoam-wire prosthesis. This was also eventually removed to disclose a cholesteatoma entirely contained within the vestibule. The author suggests that the cause was either a primary cholesteatoma or implantation with the initial fat graft.

Conclusion

This case strongly suggests that implantation

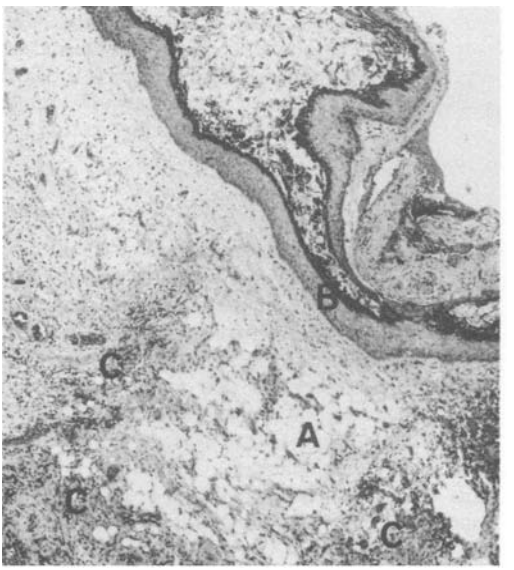


FIG. 2.
The mass of fat (A) lies in close association with the squamous cyst epithelium (B) and is surrounded by granulation tissue and a chronic inflammatory infiltrate (C). Haematoxylin and eosin × 50.

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cholesteatoma is a possible complication of stapedectomy with a fat graft. Great care must be taken when harvesting the fat graft to avoid inclusion of squamous epithelium. The temptation to use a very small incision on cosmetic grounds must be resisted in order to take the fat from well within the ear lobe. Even greater caution is necessary when the lobe is pierced, this being increasingly common in both sexes.

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