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# Post-traumatic cholesteatoma

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**Abstract**
Post-traumatic cholesteatoma often presents many years after the original injury. This case occurred 24 years after a head injury which represents the longest recorded interval. A further interesting feature was that the patient presented with an infected skull prosthesis that was inserted at the time of the original injury.

## Introduction

Post-traumatic cholesteatoma is a rare late complication of a fractured temporal bone, which receives relatively little attention compared to the acute consequences of temporal bone fracture.

This case shows cholesteatoma presenting as an infected skull prosthesis inserted at the time of the original injury 24 years previously.

## Case report

A 29-year-old man presented to the ENT outpatient department in July 1986 with a nine-month history of intermittent painless otorrhoea and fluctuating deafness.

His past medical history revealed that he fell three storeys onto a concrete floor when he was five years old. He sustained a skull fracture of the right temporoparietal region, and was unconscious for one week. The fracture necessitated the insertion of a skull prosthesis. He was in hospital for a total of eight weeks.

As a result of his injuries he had a mild left hemiparesis and a left-sided facial weakness. There was no mention of any ear trauma as a result of his fall.

In 1984, he sustained a mild head injury following a road traffic accident and was unconscious for 15 minutes. He had minor cuts and bruises and a small haematoma over the occipital region. There was no evidence of aural trauma and skull X-rays showed no fracture.

In January 1986, he was admitted to the neurosurgical department with a three-month history of an intermittent swelling over the right temporoparietal region, in the vicinity of his skull prosthesis. This rapidly increased in size over a three day period becoming hot and tender.

This was thought to represent an infection of his prosthesis which was removed operatively with a rim of infected bone. Pus grew *Bacteroides* and *Staph. aureus*. Three months later he was admitted with further discharge from the lower end of the right temporal wound. This was explored and a small defect was found at the lower end of the cranioplasty. At this stage the possibility of a fistula into the middle ear was raised, but on review by an ENT surgeon, no tympanic membrane or middle ear pathology was found. He was discharged after 10 days and has had no further problems with his wound.

On examination, the left ear was normal; the right external auditory meatus was full of debris and pus. The tympanic membrane appeared normal, but in the attic there was a large white cystic mass, the limits of which could not be accurately visualized.

A swab of the pus was taken and grew *Staph. aureus*, 'anaerobes' and *Diptheroides*. An audiogram showed a 20 dB conductive loss on the right with normal bone conduction bilaterally (Fig. 1). Mastoid X-rays showed a massive defect in the attic region he was therefore admitted for exploration of his right ear.

At operation, there was a 0.5 cm defect on the squamous temporal bone above the external auditory meatus leading to a 1 cm smooth cavity containing a huge cholesteatoma. On the medial wall of the cavity there was an irregular area, thought to represent the old fracture site, from which the cholesteatoma was arising. The tympanic membrane and ossicles were normal with normal mobility. The cholesteatoma was removed and the cavity remaining was expanded into the cortical mastoidectomy, produced to gain access to the middle ear, to leave one large cavity (Fig. 2).

He made a good recovery initially but on review in out-

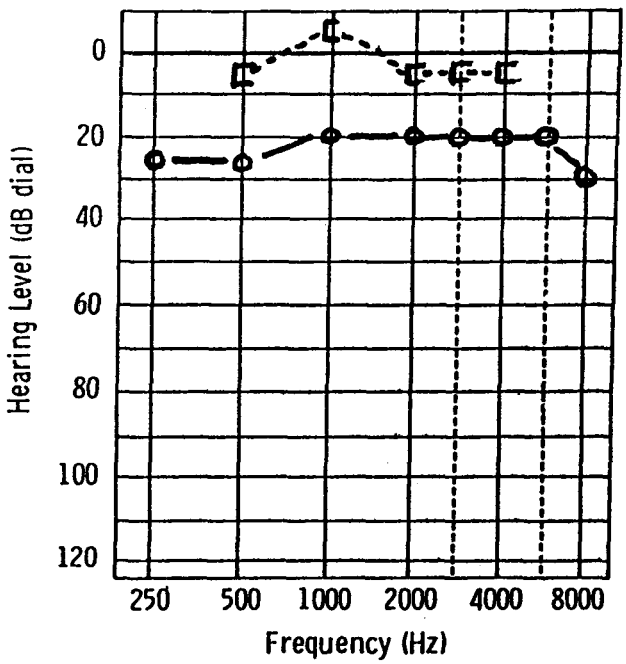



Fig. 1
Right pure tone audiogram, July 1986.

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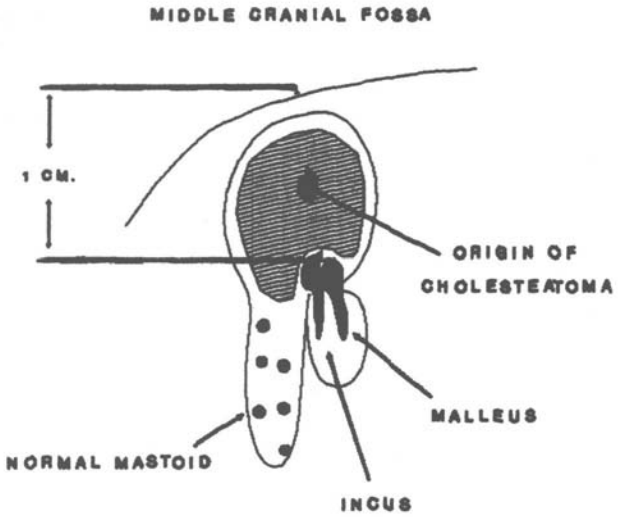



FIG. 2
Right ear, operative diagram.

patients a post aural fistula was present in the scar, which did not close on conservative treatment and therefore was closed surgically with a rotation flap in February 1987.

Regular review in outpatients has been uneventful apart from one cavity infection which responded rapidly to topical antibiotics. A post-operative audiogram shows a partial closure of the air bone gap (Fig. 3).

**Discussion**

Post-traumatic cholesteatoma is a difficult association to prove as often there exists a long time interval between the original injury and the onset of symptoms but the appearance of disease in the proximity of an old fracture site in the presence of a previously normal ear imples a strong causal relationship.

Cholesteatoma formation following a fracture may appear in unusual sites, possibly in a well pneumatized mastoid cavity and, at operation, the cholesteatoma may be seen arising from the old fracture site.

Classically, temporal bone fractures are described as longitudinal, transverse and mixed; the majority being of the longitudinal type, also referred to as extra-labyrinthine, as these tend to spare the vestibular and cochlear apparatus (Gros *et al.*, 1967).

The implantation of squamous epithelium occurs at the time of injury as the appearance of callus has been shown to be a strong barrier against epithelial migration. Complex displaced bony fragments, diastasis of the suture lines or tears in the tympanic membrane have all been shown to produce foci of cholesteatoma formation (Harwood-Nash, 1970).

This case has several points of interest. At operation, the most unusual feature was the abnormally large distance from the floor of the middle cranial fossa to the roof of the middle ear. This must be as a result of a healed displaced fracture. This is supported by the origin of the cholesteatoma being centred on an irregular area in the wall of the cavity, which represents implantation of squamous epithelium at the time of the fracture. The absence of any evidence of tympanic membrane, ossicular or mastoid cell disease lends strong support to the post traumatic implantation theory.

Assuming this to be the case, the appearance of the disease 24 years after the injury represents one of the longest time intervals recorded. On reviewing the literature, other studies have recorded intervals of 2 to 12 years (Freeman, 1983; McKennan and Chole, 1989).

It may be suggested that the head injury sustained in 1984 may be the source of his cholesteatoma, but this is unlikely as the head injury sustained at the time consisted of bruising over the occipital region, with no documented ear trauma and no skull fracture was detected clinically or radiologically.

It is interesting to note that the infection of the skull prosthesis occurred after the onset of the discharge. Swabs of the pus drained from the skull grew *Staph. aureus* and *Bacteroides* and a swab taken at the first out patient visit grew *Staph. aureus, Diptheroides* and'anaerobes'. This must lend strong support to the, as then, occult cholesteatoma being the source of the original infection.

Cholesteatoma occurring secondary to chronic secretory otitis media is usually associated with abnormalities of the tympanic membrane; however, on at least two occasions the tympanic membrane was reported as being normal in appearance. Therefore in a patient presenting with deafness and discharge without evidence of chronic middle ear disease, cholesteatoma may still be present if there is a history of a significant head injury.

**Conclusion**

Implantation cholesteatoma is a rare clinical entity. This case has one of the longest recorded time interval between the head injury and the onset of symptoms. Its presentation may mimic many other conditions, and the presence of a normal tympanic membrane does not exclude the possibility of cholesteatoma being present. A history of a skull fracture in a patient presenting with ear disease should raise the clinicians index of suspicion, especially if the patient develops signs of dural irritation. In practical terms if this condition is discovered at operation then added caution must be taken as the cholesteatoma may appear in an unusual site and the area may be distorted by the previous fracture.

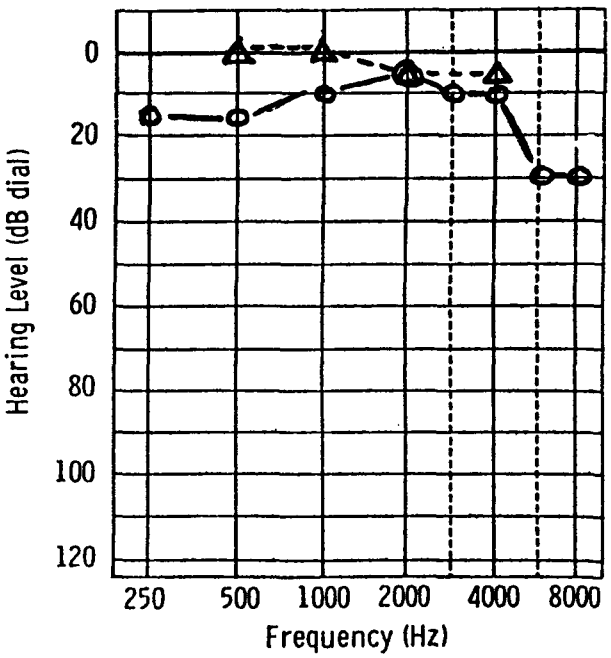



FIG. 3
Right pure tone audiogram, November 1986.

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