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A variation of first branchial cleft anomalies

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Abstract
First branchial cleft anomalies are considered to be duplications of the external auditory meatus (EAM) and pinna with a sinus that runs parallel to the EAM (*Type 1*) or with a sinus that runs from an opening in the neck and ends blindly near the cartilaginous EAM (*Type 2*). In this paper we discuss a young patient that presented with an infected sinus that did not resemble either of the two known types of first branchial cleft anomalies.

Key words: Branchial region, first branchial cleft, sinus; Ear, external

Introduction

Six paired branchial arches appear between the fourth and sixth week of intra-uterine development. The first branchial arch divides into maxillary and mandibular processes, and between the mandibular process and the second arch lies the first branchial cleft. The dorsal end of this cleft forms the external auditory canal and outer surface of the tympanic membrane whereas the ventral part disappears. First branchial cleft anomalies arise from incomplete obliteration of this cleft with entrapment of squamous epithelium that eventually forms a cyst, sinus or fistula.

Case report

A 13-year-old Asian boy (J.S.) presented to the ENT outpatient department as an emergency in September 1991 with a history of a lump behind the left ear which had been present for many years. Over the period of one week the lump had increased in size and become painful and tender. This had been treated by his general practitioner with amoxycillin for the preceding five days. There was discharge from the ear which was purulent and offensive. He had had no previous ENT problems or ear operations.

On examination the patient was apyrexial, the left pinna was pushed forward and laterally and there was a diffuse tender fluctuant swelling overlying the mastoid process (Fig. 1). There was also an offensive discharge in the external auditory meatus and it was not possible to visualize the tympanic membrane. Pure tone audiometry showed a 20–30 dB conductive loss in the high tones of the left ear only. Microbiological culture of the otorrhoea revealed bowel flora including *Candida species*. White cell count was 7.5×10^9/l. He was started on intravenous ampicillin, flucloxacillin and metronidazole and underwent surgical exploration the following day.

The surgeon noticed pus arising from a punctum in the posterior part of the posterior meatal wall at the junction of bony and cartilaginous meatus. A post-aural incision was made and an infected squamous lined cyst was entered. The 'silver lined' matrix was noted to extend over the mastoid process inferiorly into the sternocleidomastoid muscle origin and medially halfway down the mastoid process (Fig. 2). However, the mastoid bowl was not involved. The cyst was wholly excised and histological examination confirmed the lesion to be a squamous epithelium lined cyst. He made an uneventful recovery and was discharged home three days post-operatively. On review a year after surgery he remains well with no recurrence of this anomaly; hearing is normal.

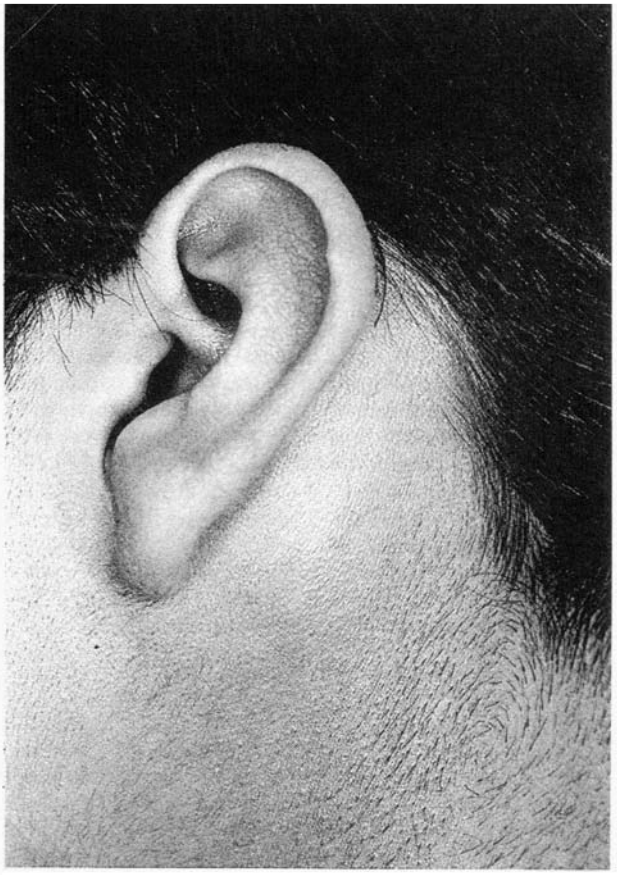

FIG. 1
Post-auricular swelling–left ear.

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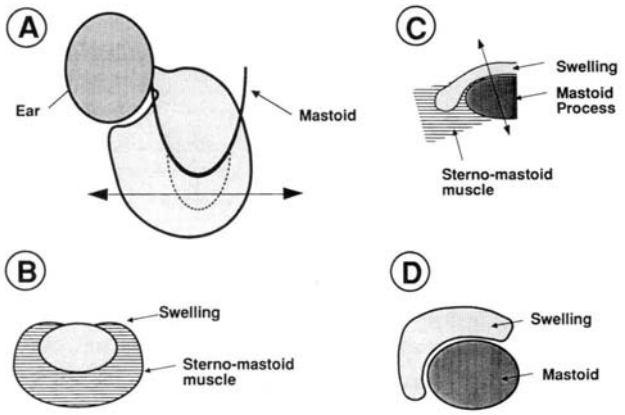

FIG. 2

Diagrammatic representation of operative findings. Cyst extending inferiorly (A) into the sternomastoid (B): extension of cyst (C) over and medial to (D) mastoid process. (B and D are sections at arrow level of A and C).

Discussion

Work (1972) classified first branchial cleft anomalies into two types:

Type 1

Considered to be a duplication of the cartilaginous EAM. A cystic mass in the pre-auricular area extends medially and anteriorly to the external ear canal. It usually passes lateral to the facial nerve and ends at the bony meatus. The lining is of skin plus adnexae, indicating ectodermal origin. No external opening is present except after infection and discharge.

Type 2

Considered to be duplication of the cartilaginous EAM and pinna. A sinus passes from an opening in the neck along the anterior border of sternocleidomastoid muscle, superficial or deep to the facial nerve and closely related to the parotid gland, to end either blindly near the floor of the cartilaginous EAM, or to open into the canal in the same area as a complete fistula. The lining is of skin with cartilage, indicating ectodermal and mesodermal origin.

Randal and Royster (1963) emphasized that diagnosis may be difficult and Ford *et al.* (1992) reported five cases which presented before the age of four years in which the average time taken for the correct diagnosis to be made was four years. Incision and drainage is frequently carried out for infection before definitive surgery which is usually curative if the lesion is completely excised (Belenky and Medina, 1980; Ford *et al.*, 1992). The facial nerve is at great risk during surgical removal of first branchial cleft anomalies and must be exposed and protected (Olser *et al.*, 1980; McCrae *et al.*, 1983; Miller *et al.*, 1984; Ford *et al.*, 1992).

Our 13-year-old was not typical of the type of first branchial cleft anomalies as described by Work (1972) and presented at a much later age than the expected age of four years. The sinus extended from a posterior opening at the junction of cartilaginous and bony meatus and extended over the mastoid process, inferiorly into the sternocleidomastoid muscle origin and medically halfway down the mastoid process, towards, but not reaching the main trunk of the facial nerve. The diagnosis was made at operation which is similar to the experience of the other authors (Ford *et al.*, 1992). The silver lining matrix was easily dissected away from underlying tissues and this was greatly facilitated by the lack of previous surgery to this lesion. The case presented is a variant of the first branchial cleft anomalies and perhaps should be labelled as *Type 3*.

Summary

A posterior first branchial cleft sinus arising from the external ear canal is presented.

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