

BRANCHIAL FISTULA – A REVIEW

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ABSTRACT

Congenital branchial fistula and their embryology is well described in the literature. The accepted standard treatment method includes stepladder excision for extensive fistulas.

This paper presents two cases (Case 1 and 2) which are embryologically typical of second and third arch origin respectively; and a third case (Case 3) which has not been previously described. Case 3 appears to be a hitherto unreported combination of first and second arch origin.

Case 1 and 2 were treated via a standard stepladder excision approach. A different newer approach was utilised in Case 3, that is, stripping of the fistulous tract with Myer's vein stripper. Unlike the stepladder approach, this is simple and avoids extensive time consuming dissection.

However, being a blind procedure, it is not generally advocated if vital structures exist in the proximity.

Keywords : Branchial, fistula, stepladder excision, tripping

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INTRODUCTION

Congenital branchial fistulae, cysts and sinuses are known to present with recurrent infections in the neck, supratornsillar region and pyriform fossa. A brief review of embryology will help in understanding the pathogenesis of these conditions.

The pharynx forms five outpocketings known as pharyngeal pouches while four grooves form on the ectodermal aspect developing into pharyngeal clefts. The arrangement of these clefts and pouches results in five mesodermal bars which form the branchial arches. Each arch, cleft and pouch develops into definite structures. Anomalies of development result in fistulae, cysts and sinuses which can be embryologically traced according to their eventual anatomical relationships. The following cases were seen at the University Hospital, Kuala Lumpur, in the latter half of 1987.

CASE REPORTS

Case 1

A two-year old female presented with an opening at the base of the right neck which intermittently discharged pus and clear fluid since birth. Examination revealed a skin hood along the anterior border of the right sternomastoid muscle at the junction

of the middle and lower thirds with a sinus opening. The remainder of the examination was normal. Contrast studies demonstrated a fistulous tract extending from external opening on the neck to the right supratornsillar fossa (Fig 1).

A 7 cm fistulous tract was excised via stepladder incisions, the first encompassing the sinus opening and the second overlying the carotid bifurcation. The tract was traced running between the carotid bifurcation with the internal opening at the supratornsillar fossa, deep to the hypoglossal nerve and superficial to the glossopharyngeal nerve. Histological examination revealed a fistulous tract lined by stratified epithelium. The subepithelial stroma was infiltrated by lymphocytes, plasma cells and macrophages.

Case 2

A twenty-year old male gave a history of having had a swelling at the base of his left neck of seven years' duration. He was treated elsewhere by an incision and drainage, and remained well until a year prior to the present admission when the swelling recurred with discharging pus through a sinus opening. He was treated at another hospital on two further occasions by excision but the discharging sinus recurred at the same site. Following the second operation, he had a hoarse voice and left cord paralysis was confirmed. Clinical examination at the present admission revealed a discharging sinus opening along the anterior border of the left sternomastoid at the junction of the middle and lower thirds. There was a surgical scar overlying the sinus opening. Contrast studies through the external opening demonstrate the fistulous tract opening into the pyriform fossa on the left side (Fig 2)

Pharyngoscopy was normal. The tract was excised through two stepladder incisions on the left side of the neck and it was found to extend from the external opening to the left pyriform fossa. The tract coursed superiorly to the level of the hyoid and looped downwards deep to the superior pole of the left thyroid lobe and turned up to open into the left pyriform fossa.

Case 3

An eighteen-year old male gave a history of high fever and subsequent purulent discharge into the oral cavity fifteen years previously. He was diagnosed to have left quinsy and was treated with incision and drainage. Following this, he was asymptomatic till a year later when he developed a swelling in the left infra-

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Fig. 1 — Fistulous tract demonstrated extending from the lower neck to the right supratonsillar fossa. Arrows indicate fistula.

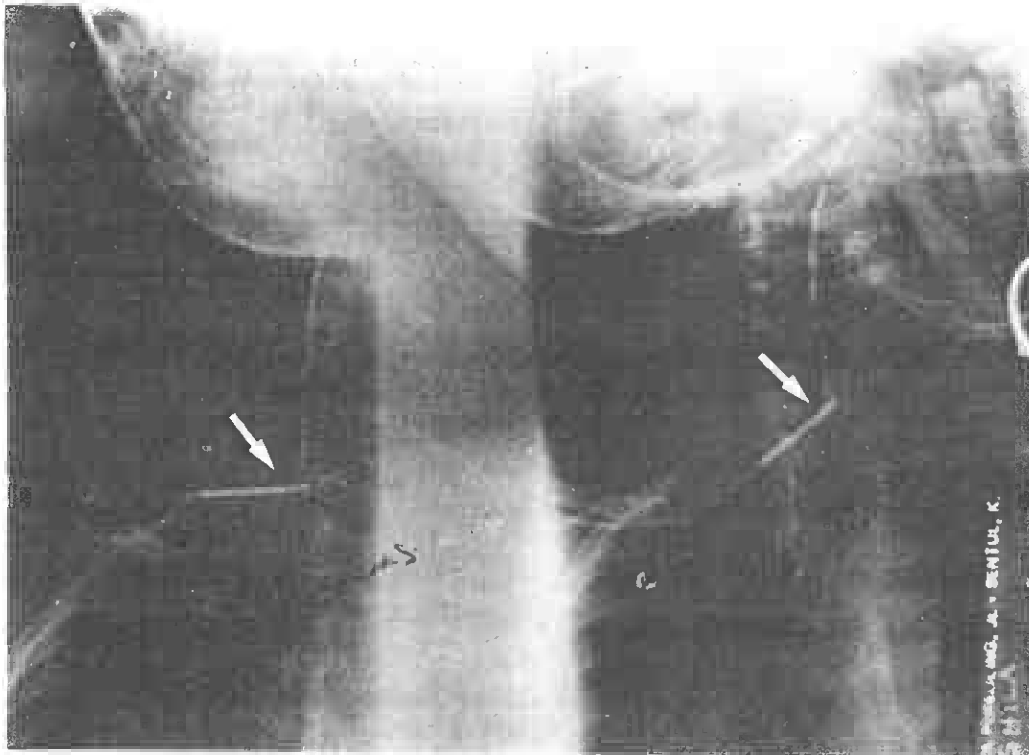
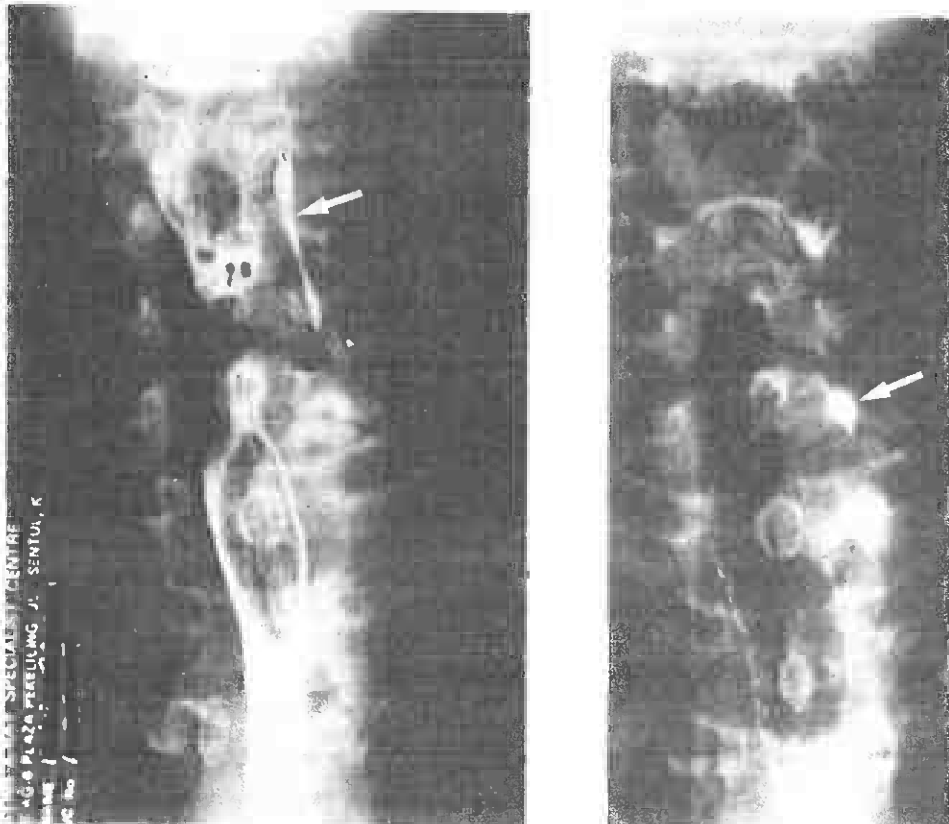


Fig. 2 — Fistulous tract demonstrated from the lower neck to the left pyriform fossa. Arrows indicate fistula.

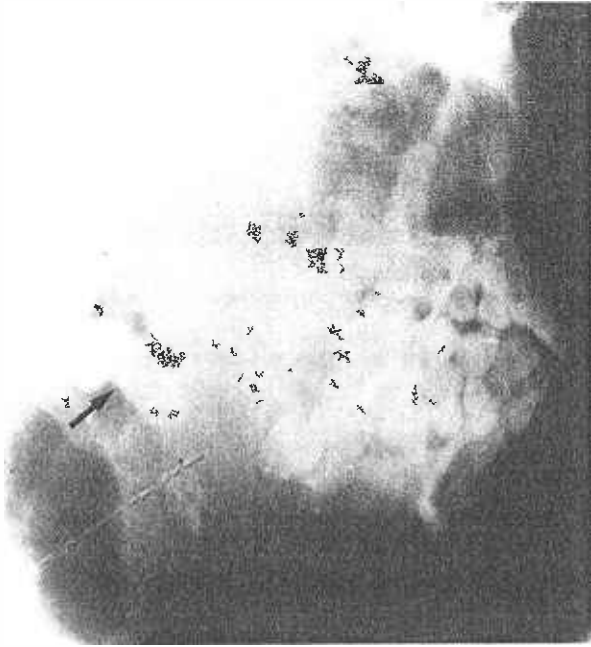


auricular region. An incision and drainage was performed. He had a recurrence of the same swelling in this region eighteen months later and the same procedure was repeated. He was referred to us subsequently because of an intermittent swelling in the left infra-auricular area and discharge of pus into his mouth.

Examination revealed a scar over the left infra-auricular area. Two small depressions were seen here but there was no definite swelling. However, pressure over this area elicited purulent discharge from the left supratonsillar fossa.

Contrast studies demonstrate the fistulous tract from the infra auricular area to the supratonsillar fossa (Fig 3).

Fig. 3 – Fistulous tract from the infraauricular area to the region of the supratonsillar fossa. Arrow indicates fistula.



At operation, the previous scar was excised via a modified "S" shaped facio-mastoid cervical incision. The tract was cannulated with a polyethylene tube via the internal opening in the supratonsillar fossa.

A Myers vein stripper was introduced with the smaller olive end into the supratonsillar fossa. The whole tract was then stripped from the internal to the external end (Fig 4). The tract was 6 cm long with a 3 mm thick wall. The supratonsillar opening was closed in two layers and a Penrose drain was placed into the cavity. There was no facial palsy and his postoperative recovery was uneventful. At follow up two months later, the wound was well healed.

DISCUSSION

These three cases demonstrate two different methods of branchial fistula excision, i.e. a stepladder incision and stripping of the tract. The stepladder method was described by Bailey in 1933. This method often requires meticulous dissection; with multiple incisions. It is currently the standard surgical method of treatment⁽¹⁾. The stripping of branchial fistulae by passing the stripper inside the tract is a newer method, described in 1977⁽²⁾ and 1983⁽³⁾. Wire stilettes, vein strippers and arterial intimal strippers have been used. The advantage of this method is its simplicity and avoidance of extensive dissection.

However, for fistulae in close proximity to the facial nerve trunk and its branches, a preliminary superficial parotidectomy with identification of the nerves is to be recommended before proceeding with stripping of the fistulous tract. In Case 3, we were technically unable to identify the branches of the facial nerve due to extensive fibrosis following two previous surgical interventions. It was fortunate that the facial nerve and its branches were not injured. We do not advocate a blind stripping technique as the procedure of choice in this situation.

The embryology of these lesions is well described⁽⁴⁾. Cases 1 and 2 are in accordance with 2nd and 3rd arch branchial fistula. Case 3 does not conform to the standard embryological pattern of development. The position of the external opening suggests a 1st arch aetiology but yet the internal opening is consistent with a 2nd arch origin. This combination has not been described elsewhere. The accepted theory of cervical cysts and fistulae is

that they are derived from remnants of the branchial grooves and pouches with failure of fusion or burying of cell rests in the branchial grooves^(1,5).

Fig. 4 — Thick fistulous tract being stripped using Myers vein stripper. Arrows indicate intraoral and external ends of stripper.



The external auditory meatus is developed from the dorsal end of the first branchial cleft⁽⁴⁾. The ventral portion of this groove usually disappears but rarely it remains forming a fistula with an opening in the infra auricular area⁽⁶⁾. These have been classified into type I and II lesions⁽⁷⁾.

Blind recesses of the second, third and fourth pouch are prolonged dorsally and ventrally as angled wing-like diverticula⁽⁴⁾. It is assumed that the ventral portion of the second pouch forms a part of the tonsillar fossa with its supratonsillar cleft⁽¹⁾. This process is one of epithelial proliferation, budding and penetration into the surrounding mesenchyme⁽⁶⁾.

It is postulated that the proliferation and invagination of this ventral portion of the second pouch was so extensive that it fused with a persistent ventral portion of the first branchial groove. Subsequent breakdown of this tissue gives rise to a fistula which is like a prolongation of a type I first cleft origin extending right up to the supratonsillar cleft. An alternative explanation is that the second branchial cleft can contribute to formation of the external auditory canal⁽¹⁾. If this was true, the anomaly in Case 3 is conceivable.

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