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Surgical management of a case of third branchial pouch fistula

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Abstract
A case of left pyriform sinus fistula in a 20-year-old male is presented. The surgical management of this uncommon condition is discussed. Its embryological and clinical aspects are reviewed.

Key words: Branchial region; Fistula; Surgery

Introduction

The literature pertaining to sinuses, fistulas and cysts of the branchial apparatus is a confusing conglomeration of jumbled theories and nomenclature. Clear understanding of the subject is dependent upon knowledge of the embryology and anatomy of the neck and the ability to sort out the various terminologies applied to the branchial arch anomalies. Third and fourth arch anomalies are seldom described, hence the need for awareness of these conditions. We present here a case of a third arch fistula and its surgical management.

This condition was not separately recognized as late as the 1970s. Third and fourth arch fistulae were largely grouped under 'branchial cleft/pouch anomalies' in general, along with the more common first and second arch fistulae. Chandler and Mitchell (1981) described the embryological aspects of the third and fourth arch fistulae lucidly. Since then, Miyachi *et al.* (1981) have described 15 cases, Burge and Middleton (1983) seven cases, Liu and van Hasselt (1992) one case and Nonomura *et al.* (1993) four cases. So, to date, about 27 cases of third and fourth arch fistulae have been reported in the literature.

Case report

A 20-year-old male presented to the ENT outpatient clinic at St John's Medical College Hospital, Bangalore, with a history of recurrent attacks of a painful swelling on the left side of the lower part of his neck over the last five years. Each episode consisted of a small painful swelling which ruptured spontaneously after three to four days with release of pus and ulcer formation. He had undergone an incision and drainage procedure six months previously (for a similar complaint) at a District Hospital. His symptoms had recurred after five months.

This time he presented with an ulcer on the left side of the neck at the junction of lower third and upper two-thirds of the sternomastoid muscle. The scar of the previous surgery was seen. As there was no definite external opening (closed probably due to scarring) a fistulogram was not performed. With a high index of suspicion of a branchial fistula, pharyngoscopy under anaesthesia was carried out, which revealed an internal opening in the floor of the left pyriform sinus close to the apex. A clinical diagnosis of third branchial pouch fistula was made and the patient was admitted for excision of the fistula.

A transverse skin crease incision with an elliptical extension around the healed scar of previous ulcer (external opening) was made (Figure 1). A cord-like tract was traced running superiorly piercing the deep cervical fascia medial to the sternomastoid muscle. Further dissection revealed the tract running along, and medial to, the carotid sheath and piercing the thyrohyoid membrane just above the upper border of thyroid cartilage (Figure 2). The tract opened into the floor of the left pyriform fossa in the hypopharynx. The fistula was completely excised, the pharyngeal defect sutured and the wound closed in layers under suction drainage. The post-operative period was uneventful and the patient was asymptomatic for more than six months of follow-up. Histopathological examination of the operative specimen revealed a fibrous tract with an inner lining of squamous epithelium.

Discussion

Congenital pyriform sinus fistula, a developmental remnant of the third branchial pouch, is an extremely rare clinical condition.

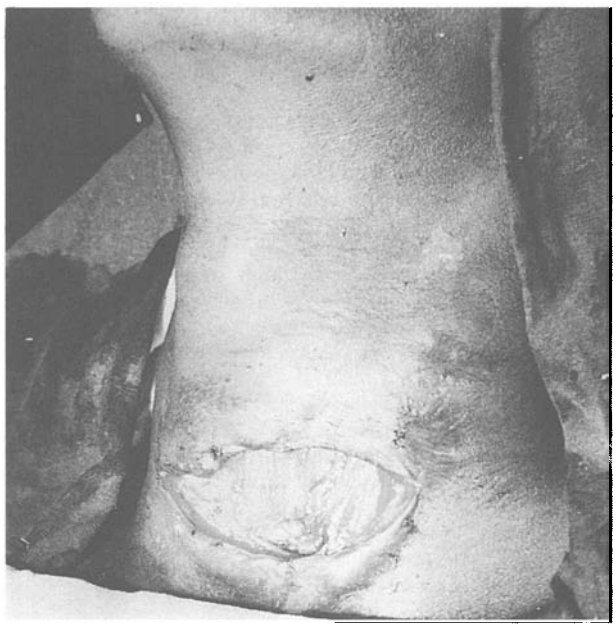

FIG. 1
Skin incision and exposure of the fistula tract.

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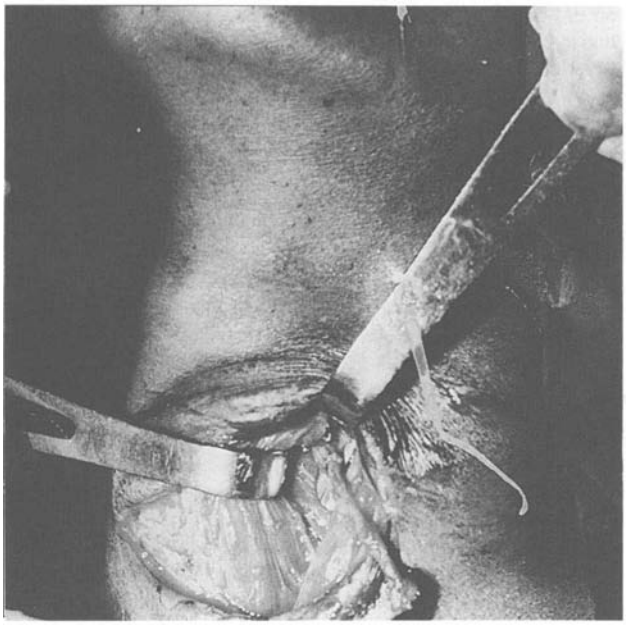

FIG. 2

Further dissection showing fistula dipping into the thyrohyoid membrane.

This condition is occasionally described among the uncommon third and fourth branchial cleft anomalies (Miyachi *et al.*, 1981). It usually affects the left side as a consequence probably of the asymmetry of transformation of the fourth branchial arch to form the aorta and innominate arteries (Burge and Middleton, 1983). The external opening may be anywhere (on a line between the tragus and sternoclavicular joint) along the anterior border of sternomastoid muscle (Maran, 1987). The fistulous tract may course along one of three routes – through the left thyroid lobe and lateral to, or medial to, the left thyroid lobe (Miyachi *et al.*, 1981). It passes posterior to the glossopharyngeal nerve and internal carotid artery, crossing over the hypoglossal and superior laryngeal nerves and then pierces the thyrohyoid membrane to enter the pyriform fossa (Chandler and Mitchell, 1981) (see Figure 3). This is unlike the more common second pouch fistula with a tract passing between the two carotid arteries and an internal opening in the posterior tonsillar pillar (Ellis, 1987). Some cases present with an internal opening only. The sinuses and fistulae are lined by squamous or respiratory epithelium. Respiratory epithelium may undergo metaplasia to squamous epithelium due to recurrent infection (Chandler and Mitchell, 1981).

The clinical presentation is usually in the form of an acute neck abscess with sore throat and high fever. Some cases may present as suppurative thyroiditis (Liu and van Hasselt, 1993). A case of respiratory embarrassment due to tracheal compression by a large abscess in a neonate has also been described (Burge and Middleton, 1983).

Initial therapy involves incision and drainage of the abscess and broad spectrum antibiotics followed by a contrast study of the pharynx to reveal the fistula tract. Management involves complete excision of the tract. For easy identification of the tract

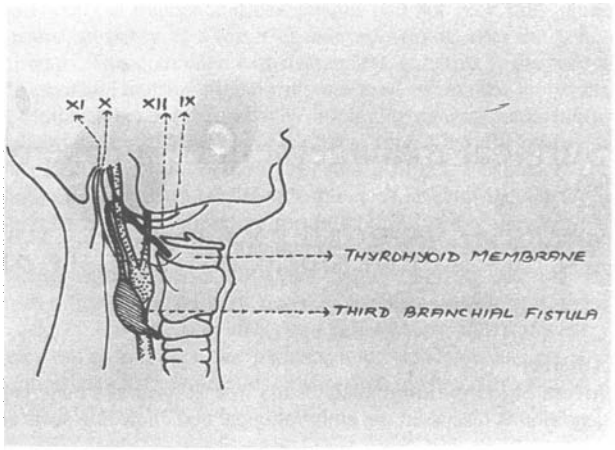

FIG. 3

Schematic diagram showing pathway of third branchial pouch fistula.

during surgery, endoscopic cannulation of the fistula using a Fogarty catheter has been described (Liu and van Hasselt, 1983). Incomplete resection results in recurrent infection and a pharyngocutaneous fistula.

Conclusion

Third branchial pouch fistulae are extremely rare. Awareness of this condition avoids delayed diagnosis and increased morbidity from repeated infections.

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