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TOTAL EXCISION OF SECOND ARCH BRACHIAL FISTULA

ENT

KEYWORDS: Embyology, branchial anomaly, fistula;sinus, fistulogram

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ABSTRACT

Branchial fistulas are formed due to the abnormal persistence of the embryonic branchial clefts. Complete branchial fistula with internal and external opening is extremely rare. This is regarding a case of unilateral complete second arch branchial fistula and incomplete branchial fistula(branchial sinus) on other side in a 5 year old boy, which was confirmed by a CT fistulogram of neck. The tract was completely excised and the patient was successfully treated.

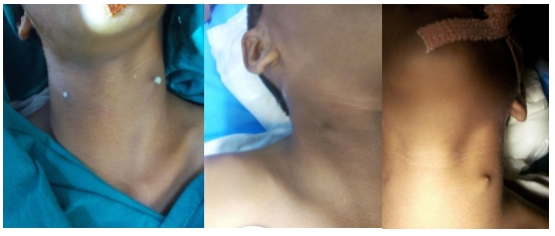
Introduction

Anomalies in the development of branchial clefts can lead to four unique but closely related lesions such as cysts, external sinuses, internal sinuses, and complete fistulas.

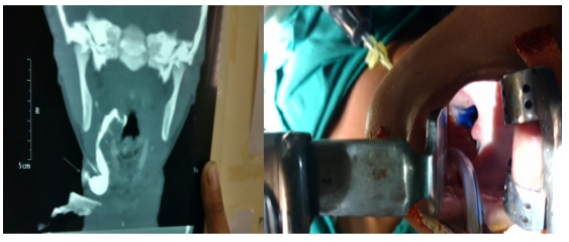
Demonstration of complete fistula by fistulogram is considered rare. The branchial fistula arising from each arch can be identified from the position of the internal and external openings. Branchial fistula arising from second and third arches are common(90%) than from first and fourth arches. In majority of cases, the tracts end blindly, leading to the formation of branchial sinuses. We report a case of complete second arch branchial fistula on right side and branchial sinus on left side in a 5-year-old child, which was successfully treated by complete excision.

Case report

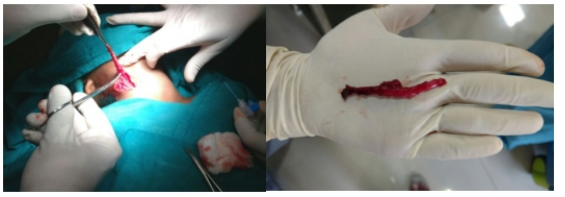
A 5-year-old boy presented with complaints of mucopurulent discharge from an external opening on both sides of neck (on and off) since 3 years of age. The discharge occurred during drinking or taking meal. On examination, there was pinhead-sized opening seen at the junction of middle and lower third of b/l sternocleidomastoid at its anterior border [Figure 1]. A clinical diagnosis of branchial fistula was made.



On out pt. basis CT fistulogram of neck was done, which showed complete fistulous tract arising from skin surface over right side of neck extending to the right lateral wall of oropharynx. The child was planned for surgery under general anesthesia. Dye injection study was done intra-operatively. Methylene blue dye injected first on right side from external opening with the help of 24G needle and free flow of dye seen coming out intra-orally from the opening between posterior pillar and tonsil, while on left side dye could not be seen due to incomplete fistulous tract.



An elliptical incision was made encircling the opening on right side. Subplatysmal flaps were raised. A prolene suture (size 1) was used to probe the fistulous tract. The fistulous tract was traced along carotid sheath where it turned medially to pass between the internal and external carotid arteries. The tract was deep to posterior belly of digastric muscle and open into the cleft between tonsil and posterior pillar. The fistula was excised completely by transcervical and transoral approach. Wound was closed without drain. Postoperative recovery was uneventful.



Discussion

The embryonic appearance and differentiation of branchial apparatus occur between the 3rd and 7th week in the human embryo. Five ridges representing branchial arches develop on the ventrolateral surface of the embryonic head. Each ridge has a core of mesenchyme, which is covered externally and internally by ectoderm and endoderm, respectively. Ectodermic clefts separate each adjacent arch externally and endodermic pouches separate them internally. The clefts and pouches move toward each other to form a closing membrane. The mesenchyme gradually grows and obliterates the cleft and pouch in humans. Failure of the second arch tract to obliterate would result in the formation of a branchial sinus or fistula.

Patients commonly present in the first two decades of life with intermittent, mucopurulent discharging sinus in the neck. History of recurrent infectious exacerbations and abscess formation may be present. There is slight female preponderance. Although bilateral branchial fistulas(10%) have been documented, unilateral right-sided lesions are commonly seen. External opening is often situated between the upper two-thirds and lower one-third of sternocleidomastoid. Radiologically demonstrable complete branchial fistula with complete patency from internal to external opening are extremely uncommon in clinical practice. The tract in second arch fistula extends deep to the platysma, along the carotid sheath, passing between the bifurcation of the carotid arteries after crossing over the hypoglossal and glossopharyngeal nerves and passes below the stylohyoid ligament. It opens internally in the lateral wall of the oropharynx.

Fistulogram can trace the tract up to the internal opening and is a commonly done preoperative evaluation it also obviates the need for further imaging. Histology of the sinus tract usually reveals

respiratory epithelium with submucosal lymphoid tissue. Rarely, squamous cell lining, mixed cell lining, and branchiogenic carcinoma have also been documented. Tuberculous sinus should be considered possible differential diagnosis.

Treatment of choice for branchial fistula is complete surgical excision . Two surgical methods are commonly used: The stepladder method and the stripping method. Stepladder approach with two incisions in the neck gives good exposure of the fistulous tract with less tissue dissection. The tract has to be traced till the internal opening and excised completely to prevent recurrence. Complete excision of the fistula is difficult with external approach alone. Recurrence rate of 3% has been reported with open approach alone, probably due to incomplete surgical excision of fistulous tract in the parapharyngeal space. In a complete branchial fistula with a probe in situ, the trans-cervical approach can be combined with intra-oral approach. No recurrences have been documented with this combined approach. Surgery can be delayed in infants with uncomplicated branchial fistula up to 3 years of age. Infective exacerbations should always be treated before surgery is planned.

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