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Surgery

BRANCHIAL FISTULA DIAGNOSIS AND MANAGEMENT: A CASE REPORT.

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ABSTRACT The branchial arches are the embryological precursors of the face, neck and pharynx. During development of branchial arches anomalies can occur congenitally. The anomalies of the branchial arches are Second most common congenital lesions of the head and neck in children. Clinically, these congenital anomalies may present as cysts, fistulae, sinus tracts, with typical clinical and radiological findings. We report the case of 18 yr old female patient with congenital Type 2 Second branchial fistula on the left side of neck.it was managed by surgical excision of fistula track.

KEYWORDS : Branchial cleft anamolies, Branchial fistula, Branchial apparatus, Congenital cervical lesions.

INTRODUCTION

Anomalies of branchial arches are uncommon anomalies which represent the embryological precursors of face, neck and pharynx. They are the second most common congenital lesions of head and neck in children and account for approximately 17% of all pediatric cervical masses[1-3]. branchial arches develop in the fourth week of gestation and are the embryological precursors of ear and muscles, blood vessels, bones, cartilage and mucosal lining of the face, neck and pharynx. In total, six pairs of branchial arches are formed on either side of the pharyngeal foregut in cranio-caudal succession. The fifth pharyngeal arch is usually rudimentary, or disappears and the sixth arch is often represented as part of the fourth arch due to its small size.[2-4]

Thus, depending on the anatomic location, branchial anomalies have been classified into first, second, third and fourth arch anomalies. Second branchial arch anomalies are the most common accounting for approximately 95% of cases. First branchial arch anomalies account for 1-4% cases; third and fourth branchial arch anomalies are extremely rare.[2-5] It may present as cysts, sinus tracts, fistulae or cartilaginous remnants. Cysts are the entrapped remnants of branchial clefts; sinuses are remnants of clefts or pouches; and fistulae can result from persistence of both pouch and cleft.[1,2]

The branchial apparatus was first described by Von Baer while its anomalies were first described by von Ascheroni.[6] The branchial fistula is an uncommon anomaly of embryonic development of branchial apparatus. Amongst these, anomalies of second branchial arch as well as pouch are common. They represent 90-95% of branchial anomalies[7].

Second branchial cleft anomalies

During embryonic development, the second arch grows caudally and it covers the second, third, and fourth branchial clefts. The cervical sinus of "His" is formed by the fusion of this second arch with the enlarging epipericardial ridge of the fifth arch. The edges of cervical sinus in the due course fuse and hence in life no defect is seen.

However, it is the persistence of intervening ectoderm that gives rise to branchial cyst. The branchial fistula results from breakdown of the endoderm, usually in the second pouch. In the normal course a persistent fistula of the second branchial cleft and pouch passes from the external opening in the mid or lower third of neck in the line of the anterior border of the sternocleidomastoid muscle, deep to platysma, as in our case, along the carotid sheath. The tract then passes medially deep between the internal and external carotid arteries after crossing over the glossopharyngeal and hypoglossal nerves. Finally, it opens internally in the tonsillar fossa[4]. Second branchial cleft anomalies most commonly present as cysts followed by sinuses and fistulae[8].They have previously been classified into four different sub-types by Bailey in 1929:[9]

Type I- Most superficial and lies along the anterior surface of sternocleidomastoid deep to the platysma, but not in contact with the carotid sheath

Type II- Most common type where the branchial cleft cyst lies anterior to the sternocleidomastoid muscle, posterior to the submandibular gland, adjacent and lateral to the carotid sheath

Type III- Extends medially between the bifurcation of the internal and external carotid arteries, lateral to the pharyngeal wall

Type IV- Lies deep to the carotid sheath within the pharyngeal mucosal space and opens into the pharynx

Types I-III are the most frequently occurring second arch anomalies, with type II being the most common.

Case report

18 year old female patient was brought to the surgery OPD of Pakwasa hospital having the chief complaints of mucoid discharge from small opening in the lower part of neck on the left side since birth. The discharge was more after taking meal.

There was no history of any other swelling in the neck and no any systemic disease. The patient had achieved normal milestones up to her age.

LOCAL EXAMINATION:

On examination there was small pin point opening in the lower part of the neck left side at anterior border of sternocleidomastoid muscle, at its lower 1/3rd and 2/3rd junction, situated 3cm above medial end of left clavicle. Surrounding the external opening there was hyper pigmented area. some mucoid discharge was found on pressing of fistula near its external opening. Probing was tried with lacrimal dilator which was inserting completely into the tract.

MRI REPORT: Linear abnormal t-2 hyperintense sinus track seen extending superiorly from let parasegittal supraclavicular skin surface to deeper tissue of neck ends blindly in submandibular region. No evidence of any cyst or abscess in underlying soft tissue.? branchial sinus/fistula.

TREATMENT: Patient was planned for exploration and excision of fistula under general anesthesia.

Pre operative: written and informed consent
Inj. T.T. 0.5ml im
Pre anaesthesia checkup
Physician fitness
Part preparation

NBM 6Hrs prior to surgery.

Operative procedure: External opening of the fistula was cannulated with lacrimal dilator and methylene blue dye was injected, inside the tract and internal opening was confirmed by dye coming out at the level of tonsillar fossa. A transverse elliptical skin incision was made around the external opening, subplatysmal flaps were raised and the tract was found to be going below the platysma, along the anterior surface of sternocleidomastoid muscle.it was going posterior to submandibular gland and just lateral to carotid sheath internal opening was noted in the pharynx via dye pushed.Through the elliptical incision track was dissected from adjacent tissue along the medial margin of sternocleidomastoid another step ladder incision was taken just above previous one at the level of submandibular gland, track was again traced upto carotid sheath then it was ligated and excised. Grossly 8 cm sized tract was excised with mucoid material inside its cavity, Platysma was closed with absorbable suture material (vicryl 3-0). Tube drain was kept inside the wound. Both incisions were closed with subcuticular suturing with non absorbable suture material(Ethilon 3-0).

Procedure was uneventful. 8cm tack was excised and sent for histopathological examination of tissue.

Histopathology confirmed tract lined by keratinoid stratified squamous epithelium with confirmation of branchial fistula as final diagnosis.

Post operative management: NBM for 12 hrs
Antibiotics anti-inflammatory, analgesics for 3 days
Sutures removed after 10 days.

IMAGES:

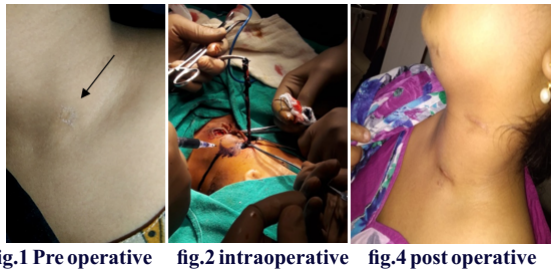

Fig.1 Pre operative fig.2 intraoperative fig.4 post operative

DISCUSSION

During embryonic development, the second arch grows caudally, enveloping the third, fourth, and sixth arches and fusing with skin caudal to these arches, forming a deep groove (cervical sinus). The edges of this grove then meet and fuse. The ectoderm within the fused tube then disappears.

Persistence of the ectoderm gives rise to a branchial cyst. A branchial fistula results from the breakdown of the endoderm. A persistent fistula of the second branchial cleft and pouch usually has its external opening in the neck near mid or lower part of SCM muscle. As it ascends it pierces platysma. At the level of hyoid, it curves medially and passes between the external and internal carotids in relation to the hypoglossal and glossopharyngeal nerves. It opens in to the oropharynx usually in the intra-tonsillar cleft of palatine tonsil.

Branchial fistulas commonly present with persistent mucoid discharge from an opening in the skin of the neck. But rare and unusual presentation like parapharyngeal mass located in the supratonsillar fossa and extending to the lateral nasopharynx, malignancy of tract were noted.[10,11] A complete branchial fistula with external and internal opening is rare and which was noted in this case. The completeness of a fistula is diagnosed by a dye test in which methylene blue is injected through the outer opening and appears in the throat. A negative preoperative outcome on the test might become positive under general anaesthesia because of muscle relaxation.

Occasionally, the fistula tract may be blocked by secretion or granulation giving negative fistula test.[12] In many a case, saliva is seen dribbling from the neck opening, which itself proves the completeness of the tract. Several surgical approaches have been described for the management of a branchial fistula. The stepladder approach was described in 1933.[13] The fistulous tract can be approached through a series of stepladder incision first encompassing the sinus opening and second overlying the carotid bifurcation. Subsequently the parapharyngeal portion of the fistula can be approached per orally after tonsillectomy. A wide cervicotomy incision (hockey stick) can also be used which allows for adequate exposure of neck structure for accurate dissection.

CONCLUSION

Amongst all the presentation of sinuses in the neck region branchial fistula is one of the differential diagnoses. It is confirmed by external opening at lateral side of neck with intermittent discharge especially at the time of swallowing of liquid. Surgery is the treatment of choice for these lesions due to the fact that these lesions do not regress spontaneously, and they have a high incidence of recurrent infection. Amongst all surgeries the step ladder incision is one of the best approaches as it is minimal invasive and cosmetic surgery.

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