

# Branchial Fistula Excision: Climbing Heights on Elevator, Rather than using a Ladder

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## ABSTRACT

**Introduction:** Branchial anomalies are the end result of defects in the development of the branchial arches, pouches and clefts. Based on the origin, branchial anomalies are classified into first, second, third and fourth branchial anomalies. Morphologically, they are classified into fistula, cyst and sinus. Branchial anomalies associated with second arch derivatives are the most common (90-95%), which commonly presents during the 2<sup>nd</sup> decade of life.

**Case Report:** A 12 years old female patient presented to ENT OPD in our institution with Second Branchial Anomaly Type III Fistula; which was excised completely with combined transcervical and transoral approach, that is, lateral portion through the neck with a single neck incision instead of the classical step-ladder incision for better cosmetic results and the remaining medial portion through the oral cavity using an operating microscope, which enables the operating surgeon to use his both hands freely along with proper visualization.

**Conclusion:** The complete excision with combined approach avoids the recurrence. Hence, complete branchial fistulae are better managed by Otorhinolaryngologists who are capable of performing the combined approach.

**Keywords:** Branchial Fistula, Complete Branchial Fistula, Management of Complete Branchial Fistula

complaint of discharge from the opening in neck in her family, for her father and younger sister.

## On examination

- An opening 1mm X 1mm on the left side of neck at the lower 1/3<sup>rd</sup> of anterior border of sternocleidomastoid muscle.
- No swelling
- Discharge on applying pressure
- Surrounding skin appears normal
- Ear, Nose, Oral Cavity and Oropharynx appears normal

## Investigations

CT - Neck (Fistulogram) was done which showed contrast filled tract with external opening at C4-5 disc level, on the left side of the neck extending superiorly into the deep neck spaces (lying superior-medially to sternocleidomastoid muscle and anteriorly to carotid and jugular vein), medially opening internally into the oropharynx at the level of tonsillar fossa. Features are suggestive of Branchial Fistula (? Type II).

## Procedure

Under general anaesthesia, complete excision of the fistula was planned. After endotracheal intubation and attaining general anaesthesia, patient was positioned in supine and neck extended with sand bag placed under the shoulder and head supported by head ring, and face rotated to the opposite side of the lesion. Parts painted and draped. Probing of the sinus tract done with 24 gauge needle and methylene blue dye was injected. A single transverse elliptical incision was made around the external opening of the lesion and extended on either side. The upper and lower skin flaps were elevated for dissection of the tract. The tract was just deep to the anterior border of sternocleidomastoid muscle, which passed upwards, deep to digastric muscle, superficial to hypoglossal nerve, between the Internal Carotid Artery (ICA) and External Carotid Artery (ECA), and it deviated medially to enter into the pharynx. Bulk of the lateral portion of the tract with its ramifications were cut and removed through the single incision on the neck rather than using a classical step-ladder incision and tunnelling the tract through the upper

## INTRODUCTION

Branchial anomalies are the end result of defects in the development of the branchial arches, pouches and clefts. Based on the origin, branchial anomalies are classified into first, second, third and fourth branchial anomalies. Morphologically, they are classified into fistula, cyst and sinus. Branchial anomalies associated with second arch derivatives are the most common (90-95%), which commonly presents during the 2<sup>nd</sup> decade of life.<sup>1,2</sup> They are classified into Type I – Type IV based on anatomic location and Type II being the commonest among them. They usually presents with recurrent neck infections associated with upper respiratory tract infections. Complete excision of the anomaly with step ladder incision and removal of the medial portion through pharynx prevents recurrence. Herein, we present a case of Second Branchial Anomaly Type III Fistula, which was excised completely with combined transcervical and transoral approach.

## CASE REPORT

A 12 years old female patient, who is a student, presented to our ENT Out-Patient Department of Shri. B. M. Patil Medical College, Hospital and Research centre, BLDE University, Vijayapura, with repeated episodes of discharge from an opening of the left side of the neck from childhood. The discharge was purulent, associated with pain and occasional fever. She gives a history of repeated upper respiratory tract infections and it was usually followed by discharge from the neck. There is similar

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incision. Remaining medial portion was traced between ICA and ECA to reach the tonsillar bed. Fistula tract was pushed medially, through the upper pole of the left tonsil to enter into the oropharynx. Boyle-Davis mouth gag with tongue blade was introduced into the mouth and supported by Draffins bipod and Maguarans plate. With the help of Operating Microscope (Figure-1), the medial portion of the tract was identified, cut and delivered out using a bipolar cautery. The excised fistula tract specimen (Figure-2) was approximately 7cm in length and was sent for histopathological examination. Neck incision was closed in layers and extubation done. Recovery of the patient from general anaesthesia was uneventful.

## DISCUSSION

In 1827 von Baer described branchial apparatus, but the anomalies in its development and its relation to branchial apparatus was credited to von Ascherson in 1832.<sup>2</sup> Branchial anomalies are an interesting topic, as we need a thorough knowledge on embryology and anatomy. During the 4-5<sup>th</sup> week of embryonic development of head and neck, six pairs of branchial arches appear which will form future lower face and neck, and disappear by 7<sup>th</sup> week. Arches (mesodermal) are separated from each other internally by four branchial pouches (endodermal) and externally by four branchial clefts (ectodermal). As development progresses the second arch extends over the third and fourth branchial clefts, and meets the enlarging ridge of the fifth arch resulting in the formation of an ectoderm lined cavity called Cervical Sinus of His. This sinus is obliterated by the opposition of its walls, resulting in a uniform contour to the external surface of the neck.<sup>3</sup> The branchial anomalies like cysts, sinuses (external or internal) and fistulas develop due to Incomplete obliteration of branchial clefts, arches and pouches. Branchial cleft anomalies are second most common head and neck congenital lesions.

Branchial anomalies associated with second arch derivatives are the most common (90-95%).<sup>1</sup> Complete second arch fistulae comprises of 2% of all branchial anomalies, which is rare. The fistula has a male preponderance with 60% incidence than females and the size of the fistula tract can be 1 to 8 cm in length.<sup>4</sup> It commonly presents in the first and second decade of life, even though it can present at any age. Bilateral occurrence is 2-10%. When it is presented unilaterally, it accounts for 70% chance to occur on the right side. Branchial fistula is rarer when compared to branchial cysts, which is more common with 80.8% incidence.<sup>5</sup>

External opening of the second branchial cleft fistula lies along the middle and lower third of anterior border of sternocleidomastoid muscle (SCM). Second arch anomalies are divided into four types based on their anatomical course. Type I lesions pass anterior to the SCM and do not come in contact with the carotid sheath. Type II lesions pass deep to the SCM and either anterior or posterior to the carotid sheath, and they are commonest type. Type III lesions are close to the pharynx and pass between the internal and the external carotid arteries. Type IV lesions pass medial to the carotid sheath, close to the pharynx and tonsillar fossa.

Most of the cases are symptomatic and surgical excision is carried out to avoid the risk of recurrent infections and cosmetic reasons. There are two types of incisions described - hockey



**Figure-1:** Surgeon adjusting Boyle-Davis mouth gag for visualisation of oropharynx, using operating microscope for transoral approach and assistant showing the single incision of transcervical approach.



**Figure-2:** Specimen removed from the combined approach

stick type or step ladder incision (Bailey). Two transverse incisions are recommended for the removal of branchial fistula to avoid injury to carotid vessels.<sup>6</sup> In 1992 Taalat described another variation, that is pull through technique.<sup>3</sup> In this method, with one or two (stepped) neck incisions, the dissection of the infrahyoid portion of the fistula is carried out. Dissection of the parapharyngeal segment of the fistula is done through oral cavity and is continued upto the level of the hyoid bone. It is followed by tonsillectomy; after which the fistula is removed through the oral cavity. Due to the greater risk to the adjacent structures, the stripping method described by Taylor and Bicknell in 1977 has not been widely practiced. Incomplete removal of fistula leads to recurrence. There is no recurrence reported in the combined transcervical and transoral approach.<sup>6</sup>

As in our case, a single neck incision was used instead of the classical step ladder incision. Intraoperatively, it was found to be a Type III fistula of second branchial arch, passing between the internal and external carotid arteries. Combined approach of transcervical and transoral, with the help of operating microscope, was done for complete excision and to avoid recurrence.

## CONCLUSION

Complete second branchial cleft fistula is rare entity. The total excision of the complete branchial fistula with transcervical approach alone is not possible. This is a case of complete branchial fistulae, which was managed through combined

approach, transoral route with an operating microscope, which enables the operating surgeon to use his both hands freely along with proper visualization and transcervical route in which a single neck incision is used instead of step ladder incision for better cosmetic results. The complete excision with combined approach avoids recurrence. Hence, complete branchial fistulae are better managed by Otorhinolaryngologists who are capable of performing the combined approach.

## REFERENCES

1. Yilmaz I, Cakmak O, Ozgirgin N, Boyvat F, Demirhan B; Complete fistula of the second branchial cleft: Case report of catheter aided total excision. *Int J Pediatr Otorhinolaryngol.* 2004;68:1109-13.
2. Lahey FH, Nelson HF. Branchial cyst and sinuses. *Ann Sur.* 1941;113:508.
3. Talaat M; Pull-through branchial fistulectomy: a technique for the otolaryngologist. *Ann Otol Rhinol Laryngol.* 1992; 101:501-502.
4. Burton MG. Second branchial cleft cyst and fistula. *Am J Radiol.* 1980;134:1067-69.
5. Rattan KN, Rattan S, Parihar D, Gulia JS, Yadav SPS; Second branchial cleft fistula. Is fistulogram necessary for total excision. *Int J Pediatr Otorhinolaryngol.* 2006;70: 1027-30
6. Shinde KJ. Complete second branchial fistula: A study of four cases. *Int J Head Neck Surg.* 2013;4:129-32.

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