

Copyright © 2015 by Academic Publishing House *Researcher*



Published in the Russian Federation  
European Journal of Medicine  
Has been issued since 2013.  
ISSN: 2308-6513  
E-ISSN: 2310-3434  
Vol. 9, Is. 3, pp. 180-186, 2015

DOI: 10.13187/ejm.2015.9.180  
[www.ejournal5.com](http://www.ejournal5.com)



UDC 61

### **A Case Series: Outcome of Endoscopic Electrocautery in the Management of Branchial Fistula**

<sup>1</sup> Goh Bee See

<sup>2</sup> Nurfarissa binti Hussin

<sup>1</sup> Director, Institute of Ear, Hearing and Speech, UKM Malaysia; Consultant Otorhinolaryngology, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia  
Department of Otorhinolaryngology, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, Cheras, Wilayah Persekutuan Kuala Lumpur, Malaysia  
Professor

E-mail: irenegbs@yahoo.com

<sup>2</sup> Department of Otorhinolaryngology, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, Cheras, Wilayah Persekutuan Kuala Lumpur, Malaysia

E-mail: farissa.hussin@gmail.com

#### **Abstract**

**Objective:** This is a series of five cases of branchial anomalies which were diagnosed and treated in a span of six years in the Department of Otorhinolaryngology, Head & Neck Surgery, Universiti Kebangsaan Malaysia Medical Centre (UKMMC). The main objective of this article is to highlight the use of endoscopic electrocautery in the management of branchial fistula. **Case report:** five cases were reported of the age group between 11 months old to 16 years who presented with an intermittent mucoid discharge from an external opening in the neck since birth and three cases were on the left side and the other two cases were bilateral fistula. Direct laryngoscopy under general anaesthesia was done as part of diagnostic and therapeutic management for the patients. **Conclusion:** Endoscopic electrocautery is a safe method and appears to be an effective alternative to open excision for branchial fistula.

**Keywords:** branchial fistula, endoscopic, electrocautery, branchial sinus.

#### **Introduction**

Branchial sinus, fistula or cysts are manifestations of a failure of branchial cleft to involute. Branchial anomalies most commonly present during infancy and childhood as cutaneous sinus, cyst or an abscess. Anomalies of the second branchial fistula account for 90 % of the developmental abnormalities of the branchial apparatus. The reported prevalence of third and fourth arch anomalies accounts to 1–4 % of all branchial anomalies. [1]

Branchial fistula usually presents in childhood discharge and defect along the anterior border of sternocleidomastoid muscle at the junction of middle and lower 1/3rd of neck. Traditionally, management consist of treatment of acute infection, followed by surgical excision of the tract and obliteration of the opening. However, recently, it has been suggested that obliteration of the sinus tract alone using laser, chemo or electrocautery is a viable alternative to open surgery.

## Objective

This is a series of five cases of branchial fistula which were diagnosed and treated in a span of six years (2009-2015) in the Department of Otorhinolaryngology, Head & Neck Surgery, Universiti Kebangsaan Malaysia Medical Centre (UKMMC). The main objective is to highlight the use of electrocautery obliteration for the management of branchial fistula.

## Materials & Methodology

Retrospective case note review of all children that received treatment of branchial fistula in the past six years at UKMMC. Patient's demographics, presenting symptoms, investigations and surgical management and operative outcome were analysed.

## Results

There were five cases managed at the Department of ORL-HNS UKMMC and diagnosed with second and third branchial fistulae during the 6 years. They were in the age group between five months and 16 years with male: female ratio being 2:3. Three cases were on the left side and the two cases had bilateral fistula. All of these patients presented with history of small discharging opening in the lower part of the neck since birth. There were symptoms of intermittent, yellowish white discharge from the opening. The discharge from the sinus opening was associated with fever in three of the cases. On examination, a small opening was seen on neck along the anterior border of the sternocleidomastoid at junction of middle and lower third with scanty mucous discharge especially on digital pressure. Examination of the oral cavity did not reveal any visible opening in the pharynx or palatine tonsil. After necessary routine investigations, all patients underwent examination and direct laryngoscopy under general anaesthesia. Once patient was under general anaesthesia, microsuspension was then performed with a Lindholm laryngoscope. The opening of into the pyriform sinus was identified and visualised when methylene blue was injected via the cutaneous opening. Spillage were seen at left pyriform fossa in three of the cases and in one case the internal opening was located at left superior pole of palatine tonsil and the other case, which was bilateral, the internal opening were seen at right superior and left middle pole of palatine tonsil. An electrocautery (diathermy) was then used, where it was placed into the sinus tract to its base through its internal opening and stimulated until the surrounding tissue began to blanch and then stimulated until the sinus opening was cauterized. Patient was then reversed from general anaesthesia and nursed in ward for 24 hours before discharged. Three of the patients presented with recurrence. Two of the patients underwent excision of the sinus tract that was carried out under general anaesthesia. Aim of surgery was to perform complete excision of fistulous tract which became a shorter sinus tract after initial cauterization and this ease the surgery. One of the patients with recurrence underwent re-diathermy over the internal opening of the fistula. All three patients are well, and had no recurrence after six months post operation.

Table 1: Demographic and history of presenting illness of the patients

Num	Age	Sex	Age during first symptom	Symptoms	Previous I&D	Imaging
Case 1	5 months old	F	5 months old	Mucoid discharge from sinus opening	Nil	MRI – Left sinus opening from the neck, open at the anterior pillar – anterior to left tonsil at level of tip of epiglottis Right sinus opening tract up to a blind sac without any obvious opening

Case 2	8 years old	F	6 years old	Neck swelling, fever, pus discharge from sinus opening	Yes – 6 times	CT scan – Infrahyoid midline and left paramedian abscess collection extending into left SCM*
Case 3	4 years old	M	2 years old	Neck swelling, fever, pus discharge from sinus opening	Yes – 4 times	Ultrasound – Heterogeneous collection at left anterior triangle with air filled tract from overlying skin to left side of trachea – no communications with trachea
Case 4	11 months old	F	11 months old	Mucoid discharge from sinus opening	Nil	MRI – Right anterior neck opening, ends at lat pharyngeal wall below palatine tonsil. Left anterior neck opening directed superomedially and opens posterior to palatine tonsil
Case 5	16 years old	M	6 years old	Neck swelling, fever, pus discharge from sinus opening	Yes – 8 times	CT scan – Sinus tract leading to area deep to left SCM. Barium swallow – opening seen at left pyriform fossa

\*SCM – Sternocleidomastoid; F-Female; M-male

Table 2: Surgical management and follow up

Case	DL scopy and Intra op findings	Treatment	Recurrence	Treatment/Outcome
Case 1	Left branchial fistula tract from anterolateral neck between junction of superior 1/3 and inferior 2/3 SCM* to superior pole of left tonsillar fossa No internal opening over right side	Internal opening diathermised	Yes	Excision of left branchial fistula. Well and no recurrence until now.
Case 2	Blind tract noted at left pyriform fossa. Right pyriform normal	Tract and internal opening diathermised	Yes	Re-diathermised Patient is well until now
Case 3	Fistula seen at anterior part of pyriform fossa	Internal opening diathermised	No	Well
Case 4	Internal opening at right superior pole of palatine tonsil and left interior opening at middle part of palatine tonsil	Internal opening diathermised	Yes	Excision of right branchial fistula and re-diathermised the left internal opening. Patient is well until now.
Case 5	Opening of fistula seen at left pyriform fossa near the anterior aspect	Internal opening diathermised	No	Well until now

\*SCM - Sternocleidomastoid

### Discussion

Branchial fistulas and cysts, involving soft tissues of the head and neck, are uncommon anomalies of embryonic development. It may occur in any age group, but the first and second decades of life are the most common. Branchial cysts have been found to be more prevalent (80.8 %) than branchial fistulas (19.2 %) [1]. The presence of bilateral branchial anomalies has been reported in 1 % to 30 % of cases. [1] In this case series, we have encountered two cases of

bilateral branchial anomalies which were confirmed by MRI and examination under anaesthesia, one was confirmed by barium swallow and the others were confirmed by CT scan.

Second branchial arch and pouch anomalies are common anomalies of branchial apparatus, account for 90 % of the developmental abnormalities of the branchial apparatus. A study done in UKMMC between 1999-2009, 12 patients were diagnosed with branchial anomalies, in which 10 patients had second branchial cyst anomalies, 1 had third branchial fistula and 1 had bilateral branchial lesion [2]. Second arch anomalies may take several forms. There may be only a simple sinus opening that extends up the neck with a variable distance. Branchial fistulas commonly present clinically with persistent mucoid discharge from a skin opening in the neck as can be seen in the cases described in this case series.

Third and fourth branchial fistulae, also known as pyriform sinus fistulae, are epithelialized tracts connecting the skin of the neck to the foregut. Persistence of this duct results in a sinus tract that communicates with the pyriform fossa, representing persistence of both branchial cleft and corresponding pouch [1,3].

As with branchial anomalies of the second pharyngeal pouch, the external opening of both third and fourth pouch remnants arises at the same location in the skin overlying the anterior border of the sternocleidomastoid muscle, which is the location of the embryologic cervical sinus.

It is difficult to differentiate between fourth from third branchial arch anomalies as there are some overlapping features, and precise identification of anatomic relationships at the time of diagnosis and treatment is not always possible [1]. The differentiation between the two conditions lies in determining the relationship of the sinus to the superior laryngeal nerve, which can only be identified with surgical exploration. If the sinus passes below the superior laryngeal nerve, a fourth branchial pouch sinus is suggested, whereas if the sinus passes above the superior laryngeal nerve, a third branchial pouch sinus is suggested.

A combination of ultrasound, computed tomography (CT) with or without oral contrast, barium swallow study looking for the sinus tract, thyroid scan, or magnetic resonance imaging (MRI) may aid in the diagnosis [5]. However, direct laryngoscopy often allows visualization of the fistulous opening in the pyriform fossa and can be performed during acute episodes [6]. In our centre, these five cases, CT scan with oral contrast was performed, with combination of barium swallow study in two of the cases. Direct laryngoscopy was done in all cases as part of confirmation of diagnosis and also treatment. The cases that required barium swallow were referred after multiple incision and drainage for recurrent neck abscess. Fistulogram was difficult to delineate any tract due to fibrosis and barium swallow was able to show the tract prior to direct laryngoscopy.

Treatment should be preceded by the administration of appropriate antibiotics during acute infection and other methods of treatment should commence once inflammation has subsided [8]. Curative procedure should only be attempted in the absence of acute infection [1, 3 and 5].

Surgery is the definitive treatment but usually not indicated if the fistula is asymptomatic. However, most cases patients are symptomatic and the surgical excision is carried out to avoid the risk of recurrent infection and also for cosmetic reasons.

Several surgical approaches have been described for the management of branchial fistula. In general, a wide cervicotomy (hockey stick) incision remains the method of choice for excision of lesions of the second branchial clefts as it allows for adequate exposure of neck structures for accurate dissection. Other methods described include the stepladder approach and the stripping method. The skin incision in the stepladder approach is less extensive than the wide cervicotomy incision. Complications of the surgery include recurrence, which could be 3 % in fresh cases to up to 20 % in second surgical attempts. Other complications include secondary infection, injury to facial, hypoglossal, glossopharyngeal, spinal accessory nerves, injury to internal jugular vein, scarring and hematoma formation [11].

However, recently a less invasive treatment has evolved, namely, endoscopic cauterization limited to the sinus tract orifice [5, 8]. A number of endoscopic techniques have been reported in the literature. Verret et al. have described the introduction of a balloon catheter for the dilation of the sinus tract orifice to allow endoscopic cauterization. Electrocautery was also used by Jordan et al. with the aid of a diathermy probe. Sayadi et al. used a low-power diode laser, while two other groups used chemical cauterization with trichloroacetic acid. Kim et al. and Pereira and Smith performed chemical cauterization by introducing a stick of silver nitrate for 3-4 s into the sinus

tract and at the sinus tract orifice [6].

Endoscopic treatment represents a minimally invasive technique using cauterization to obliterate the internal opening of a pyriform sinus tract during a quiescent period. It can be done as a definitive management or along with the surgical excision of the branchial anomaly [4, 5 and 6].

Electrocauterization has been used as one of the treatment modalities for branchial fistula. Possible advantages of this technique over open neck surgery include a lower complication rate with similar rates of recurrence as open neck surgery [3].

In our case report we present five cases of branchial cleft sinus anomaly presented as recurrent neck abscess which two of the cases we successfully managed by a single endoscopic cauterization of sinus tract. In one of the cases there was recurrence after the first cauterization, a repeated cauterization done. All 3 patients are symptoms free for more than 6 months period of follow up.

### **Conclusion**

When compared to other surgical management, this minimally invasive technique offers several advantages over the open procedure. It allows less scarring, less morbidity, minimizes risk of injury to the neck structures and earlier hospital discharge. Endoscopic electrocautery is a safe method and appears to be an effective alternative to open excision. We would like to recommend it as an alternative part of the first line treatment for branchial fistula.

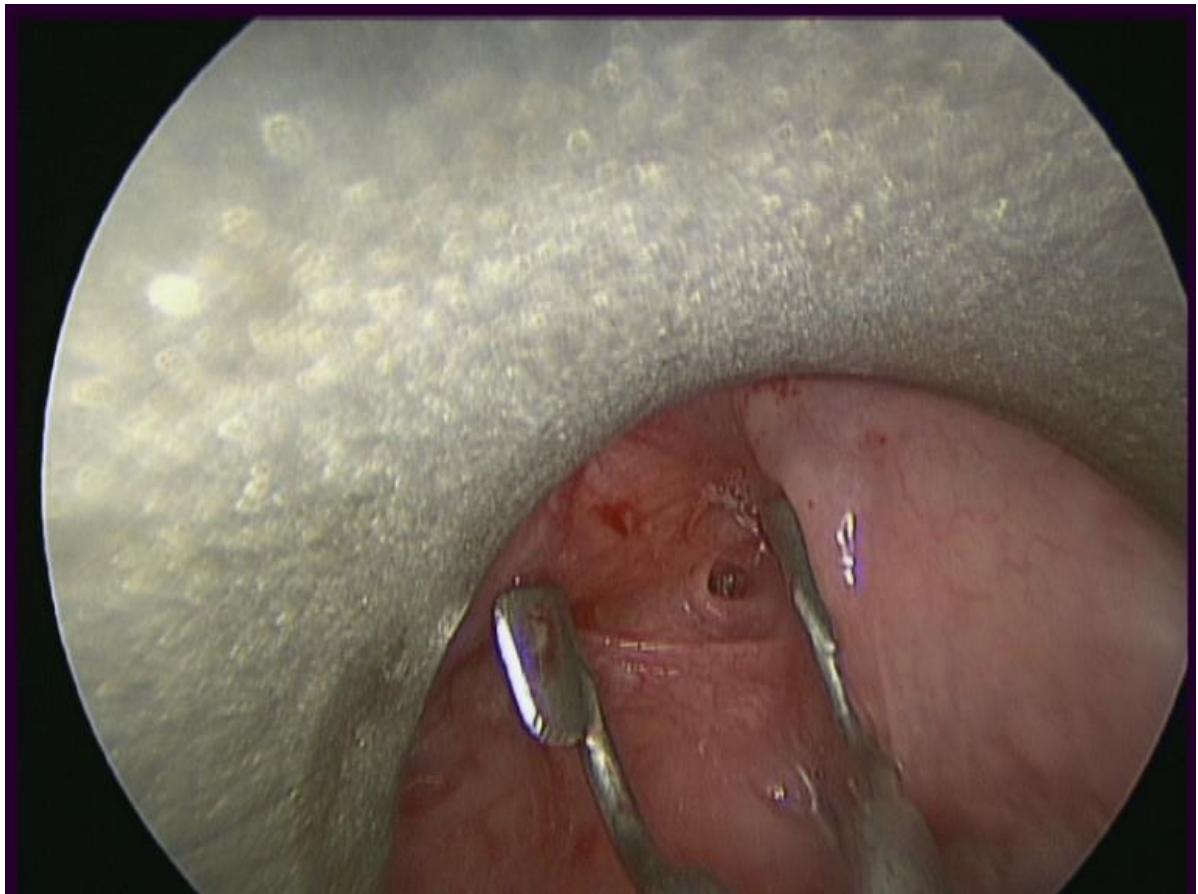


Figure 1: Internal opening seen at the left pyriform fossa. Laryngeal spreader was used to aid visualization.

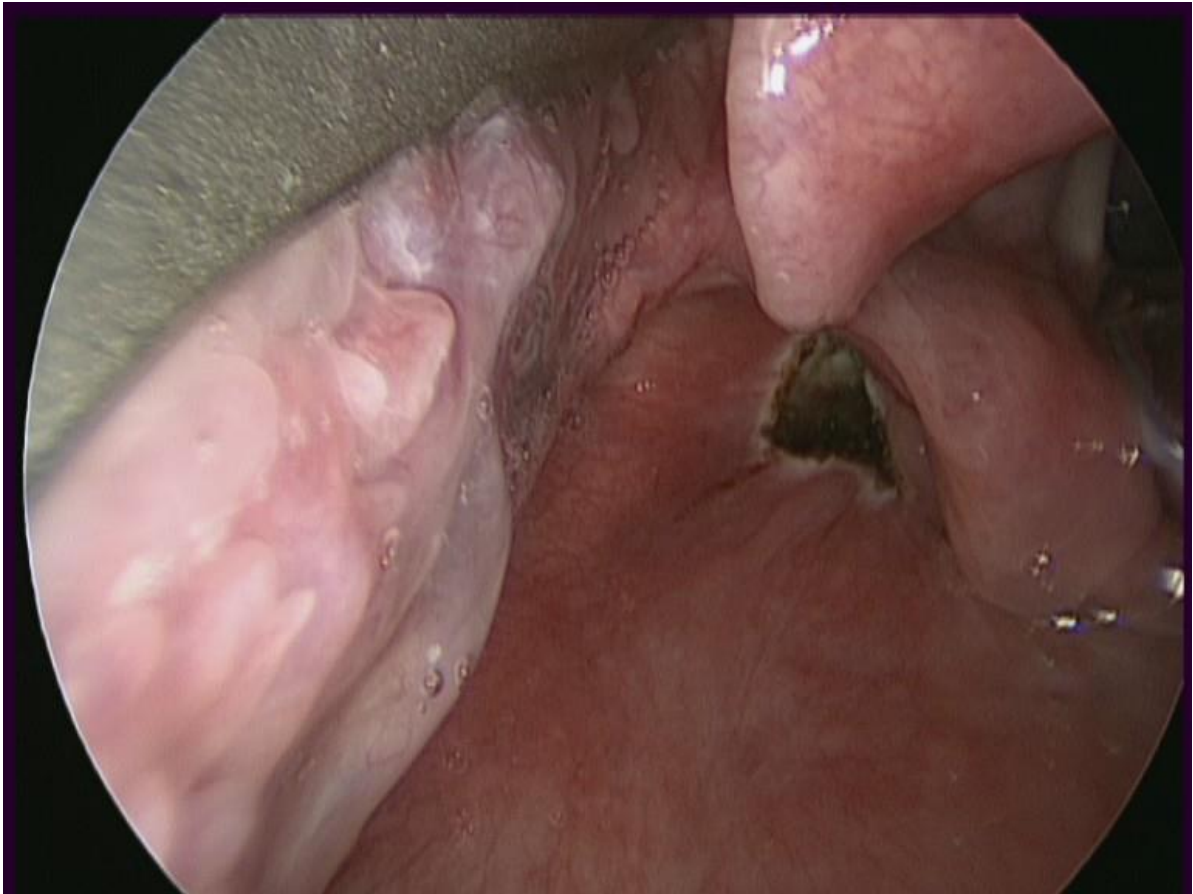


Figure 2: Internal opening over left pyriform fossa after diathermised

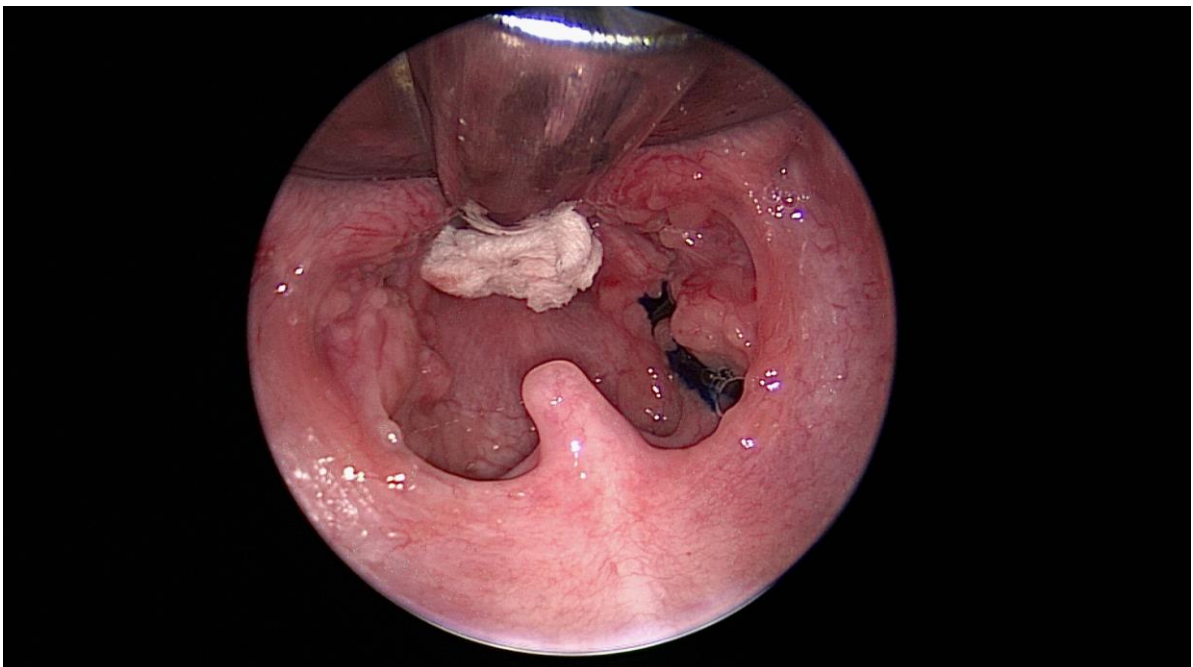


Figure 3: Methyllyne blue dye seen spilling out from the internal opening at the left tonsillar fossa.

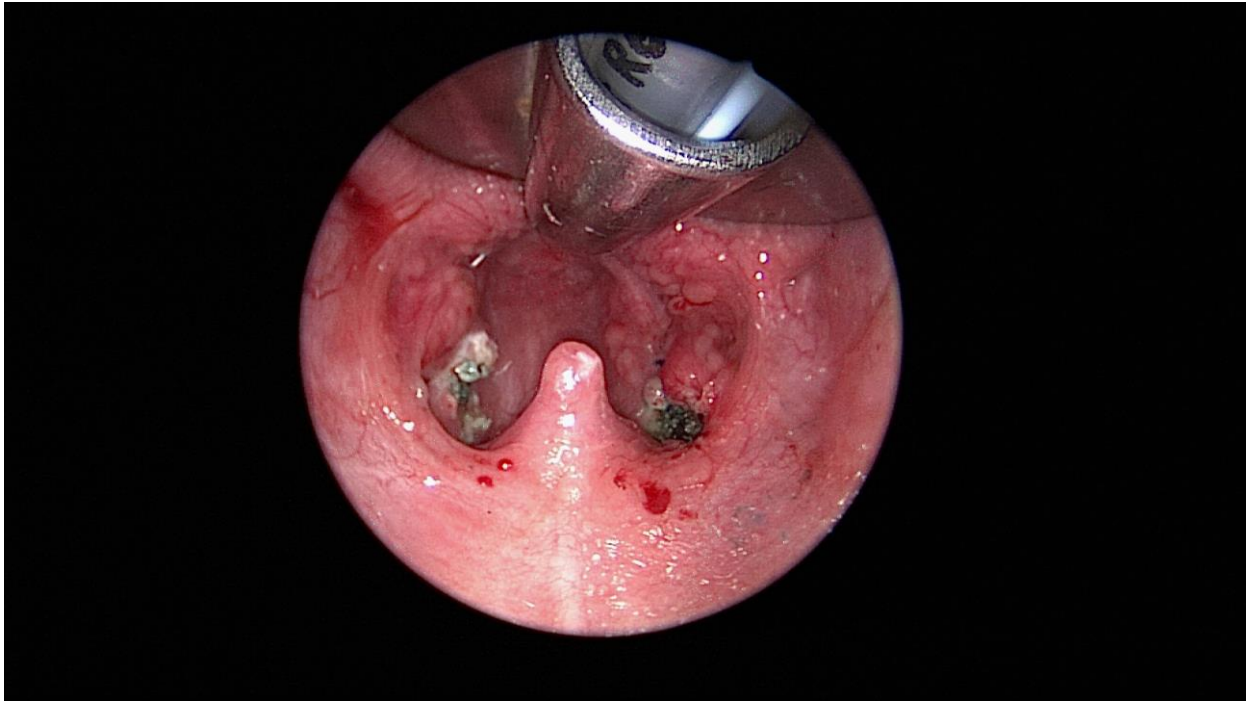


Figure 4: Internal opening over bilateral tonsillar fossa after being diathermised.

**References:**

1. Ford G.R., Balakrishnan A, Evans I.N., et al. Branchial cleft and pouch anomalies. *J Laryngol Otol* 1992, 106, P. 137.
2. Zaifullah S, Yunus MR, See GB. Diagnosis and treatment of branchial cleft anomalies in UKMMC: a 10-year retrospective study. *Eur Arch Otorhinolaryngol*. 2013 Mar, 270(4), 1501-1506. DOI: 10.1007/s00405-012-2200-7. Epub 2012 Oct 7.
3. De PR, Mikhail T. A combined approach excision of branchial fistula. *J Laryngol Otol* 1995, 109, pp. 999-1000.
4. Talaat M. Pull-through branchial fistulectomy: Technique for Üie otolaryngologist. *Ann Otol Rhino Laryngol* 1992, 101, pp. 501-502.
5. Ang A.H., Pang K.P., Tan L.K. Completebranchial fistula. Case report and review of the literature. *Ann Otol Rhinol Laryngol* 2001, 110, pp. 1077-1079.
6. Ismail Y, Ozean C, Nuri O, Fatih B, Beyhan D. Complete fistula of the second branchial cleft: Case report of catheter aided total excision. *Int J Ped Otorinolaryngol* 2004, 68, pp. 1109-1113.
7. Broadford G, John M, Mike B, Sugki C. Aberrant second branchial cleft fistula. *Int J Ped Otorinolaryngol* 1998, 46, pp. 103-107.
8. Burton M.G. Secondbranchialcleft cyst andfistula. *Am J Radiol* 1980 May, 134, pp. 1067-1069.
9. Kamal N.R., Simi R, Dheeraj P, Joginder S.G., Samar Pal Singh Y. Second branchial cleftfistula. Is fistulogram necessary for total excision. *Int J Ped Otorinolaryngol* 2006, 70, pp. 1027-1030.
10. Stephanie P, Aciemo, John H.T., Waldhausen. Congenital cervical cysts, sinuses and fistulae. *Otolaryngol Clin North Am* 2007, 40, pp. 161-176.
11. Francisco C, Agaton B, Cosmay G.E. Diagnosis and treatment of branchial cleft cysts and fistulae. A retrospective study of 183 patients. *Int J Oral Maxillofac Surg* 1996, 25, pp. 449-452.
12. Agaton-Bonilla F.C., Gay-Escoda C. Diagnosis and treatment of branchial cleft cysts and fistulae. A retrospective study of 183 patients. *Int J Oral Maxillofac Surg* 1996, 25, pp. 449-452.