

## Endoscopic Management of Recurrent Third Branchial Fistula using Histoacryl Glue

Naveed MZ,\*<sup>1</sup> Naveed A,<sup>2</sup> Irfanullah A<sup>1</sup>

<sup>1</sup> Department of Diagnostic and Interventional Radiology, Indus Hospital, Karachi, Pakistan

<sup>2</sup> Department of Head and Neck Surgery, Indus Hospital, Karachi, Pakistan

### ABSTRACT

Third branchial cleft anomalies are rare accounting for 2-8% of all branchial abnormalities. We report a case of a 9 year old boy who presented with discharging sinus on the left side of neck. A sinogram revealed third branchial arch fistula. The tract was surgically removed, however, on follow up the fistula was recurred. He was later taken for endoscopic cauterization and injection of Histoacryl (n-Butyl cyanoacrylate ) glue into the tract, after which his wound healed swiftly. Historically, surgical excision of the fistulous tract has been the mainstay of treatment. Recently, minimally invasive methods are gaining wider acclaim and may potentially become the treatment of choice in the future.

**Key words:** Third branchial fistula; Endoscopic; Cauterization; Histoacryl glue; n-Butyl cyanoacrylate; Recurrence

**Correspondence\*:** Mujtaba Zaki Naveed, Department of Diagnostic and Interventional Radiology, Indus Hospital, Karachi, Pakistan

E-mail: naveed.mzaki@gmail.com © 2018, Naveed et al.

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### INTRODUCTION

Branchial cleft fistula occur as a result of abnormal embryonic development of the branchial apparatus resulting in congenital anomalies of the head and neck.[1] There is a lack of general consensus on the management of third and fourth branchial anomalies.[2]

Traditionally, surgical fistulectomy has been the treatment of choice. However, a more minimally invasive approach of cauterizing the fistula tract using a variety of methods, is gaining wider acceptance especially in younger patients and those with previous recurrences after surgery. We describe the case of a 9 year old boy who presented with a third branchial cleft fistula, successfully treated endoscopically by electrocauterization followed by injection of the synthetic glue Histoacryl (n-Butyl cyanoacrylate ) into the fistula tract.

### CASE REPORT

A 9-year-old boy, with a history of intermittent discharging sinus from the left side of the neck since eight years, presented to our outpatient clinic. According the parents, he developed an abscess at the age of seven months on the left side of the neck. He was given a course of antibiotics at that time after which the abscess resolved. However the patient subsequently developed discharge from that area which included contents the child used to ingest. On physical exam he was noted to have a discharging sinus in lower part of the neck, anterior to the left sternocleidomastoid muscle. His vitals and complete blood count were unremarkable. Sinogram was performed which showed third branchial arch fistula (Fig.1). He was operated and tract was removed as much as possible. The next morning he developed fever which resolved with a course of anti-

otics and he was discharged on postoperative day (POD) three.



Figure 1: Sinogram demonstrating 3rd branchial fistula.

Biopsy of the tract revealed fibrovascular tissue partly covered by keratinized squamous epithelium with the tract cavity lined by stratified squamous epithelium and its cavity filled with keratinous material. On follow up, he presented with a small abscess at the site of the wound. This was drained and he was given a new course of antibiotics. However there was no improvement and the patient came back with wound dehiscence four days later. He was admitted and intravenous antibiotics were initiated. Computed tomography showed a focus of gas in the left side of the neck communicating externally with the skin (Fig.2). A nasogastric tube was passed and the patient underwent direct laryngoscopy. The internal opening was identified at the apex of the left pyriform fossa. Methylene blue was injected into the tract and dye came out through the neck confirming the presence of fistula.



Figure 2: Arrows shows the external opening of the fistula with foci of gas at the left anterolateral neck

The wound was washed out and expectant treatment continued but symptoms persisted. A decision was taken to intervene using endoscopic approach. In operating room the tract was electrocauterized with monopolar diathermy through the internal opening.

With the help of interventional radiology team Histoacryl was injected into the fistula using a 5 French cobra catheter and the tract was sealed with gel foam that had been soaked in Histoacryl. Postoperatively, the wound discharge stopped, on POD two an esophagogram revealed no leakage from the wound. Nasogastric tube was removed and patient was discharged on POD three. His neck wound completely healed within a week. Patient was last seen on follow up three months after surgery; he was asymptomatic and with a healed wound.

## DISCUSSION

Third and fourth branchial abnormalities are rare accounting for 2-8% and 1-4% respectively.[1,2] Classically, the origin of these fistulae is a result of persistence of the pharyngobranchial duct which connects the third and fourth pharyngeal pouches to the pharynx and normally degenerates during the 7th week of embryonic development.[3]Our patient presented with history of recurrent left sided neck abscess and discharge since childhood. Suppurative thyroiditis or rarely retropharyngeal abscess may present like this.[3]

Diagnosis can be established by computed tomography, magnetic resonance imaging, sinogram, barium swallow or direct laryngoscopy. The latter two have been proven to be the most useful in diagnosis of 3rd and 4th branchial sinus.[4]The diagnostic accuracy of barium swallow can be improved by using thin contrast material and by performing the test when the fistula is not infected, thereby aiding the contrast to easily enter a non edematous tract.[5]

In our case, a sinogram before the initial surgery confirmed the third branchial fistula and a barium swallow after the endoscopic cauterization showed its absence. The presence of keratinizing and/or non-keratinizing squamous epithelial cells within neck tissue is considered to be the cytological standard for diagnosing branchial fistulas as noted in our case. Definitive management of third and fourth branchial arch fistulae is complete surgical excision of the fistulas tract. But the presence of important anatomical structures adjacent to the tract make surgical intervention a difficult task.

Other modes of treatment such as cauterization are thus increasingly used for these anomalies. Various cauterization methods include chemocauterization with trichloroacetic acid, electrocauterization with monopolar diathermy, low power diode, CO2 laser, application of silver nitrate or fibrin glue.[2,4] A systematic review conducted by Derks et al, suggested that the treatment outcomes of cauterization was comparable to surgical management.[4] In our patient we used Histoacryl (n-Butyl cyanoacrylate ), a synthetic glue that has been used for wound closure and as an embolic agent in vascular interventions. It works by rapidly polymerizing once in contact with tissue, resulting in its immobilization and adhesion.[6] In conclusion, endoscopic management of third branchial fistula is viable option and should be considered as first line treatment.

**Consent:** Authors have submitted signed consent form from legal guardian of the patient and available with editorial office.

**Authors' Contribution:** All authors were involved in manuscript writing, literature review, and final approval of the manuscript.

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