Archives of Gastroenterology and Hepatology

Volume 1, Issue 1, 2018, PP: 16-18

Endoscopic Treatment: Choosing the Right Method for Bronchoesophageal Fistula Closure?

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Abstract

Bronchoesophageal fistulae (BEF) are difficult to manage conditions. Surgical management in the form of fistulectomy and closure is treatment of choice. Endoscopic treatment has been described as alternative management strategy. The endoscopic techniques are reported, either as case report or small case series. Here, we describe a case study and review the literature.

Keywords: *Bronchoesophageal fistula; Fibrin glue; Cyanoacrylate glue*

Introduction

Bronchoesophageal fistulae (BEF) are difficult to manage conditions. Surgical management is treatment of choice. Endoscopic treatment has been described as alternative management option. Here, we describe our experience of managing a case of BEF and review the literature.

Case Report

A 32 years old male of tuberculous bronchiectasis underwent left-sided pneumonectomy. One month later, he presented with empyema with sepsis and multiorgan dysfunction. Antibiotics, oxygen supplement and other supportive measure started along with chest tube drainage, from which food particles were discovered.

The contrast study showed dye immediately emptying into the chest tube placed to drain pus from left chest cavity. Evaluation revealed a bronchoesophageal fistula (BEF) at 28 cm from the incisors with 8 mm wide opening and normal mucosal covering. Patient was not fit for general anaesthesia and surgery. Fistula opening was identified with endoscope. A cannula was placed next to the fistula, flushed with normal saline and two mL of N-butyl-2-cyanoacrylate glue (Histoacryl®, B. Braun, Tuttlingen, Germany) was injected into the fistula. The contrast study done 24 hours later showed no improvement. Repeat endoscopy confirmed the dislodgement of glue (Fig 1a, 1b). Endoscopic management with cyanoacrylate glue injection failed because of immediate dislodgement of glue. Unfortunately, the patient did not survive because of septicemia.

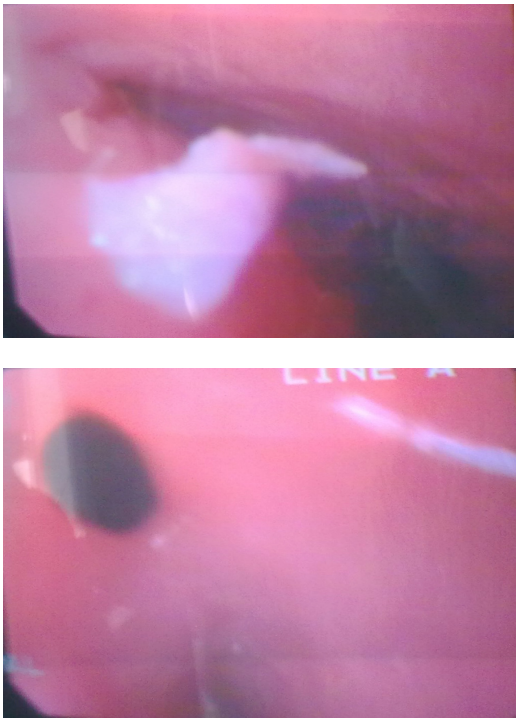

Figure 1. (a, b) *Oesophagoscopy showing bronchoesophageal fistula with normal mucosal covering and dislodged cyanoacrylate glue*

Discussion

Fistulae can develop rarely between esophagus and trachea (trachea-esophagal), bronchus (bronchoesophageal) and pleura (esophagopleural). Majority of cases are caused by malignant pathology. Benign causes are relatively rare, include prior esophageal surgery, infections like tuberculosis, other inflammatory conditions, prolonged endotracheal or tracheostomy tube placement, congenital malformation, caustic ingestion and idiopathic (1). These fistulas usually presents with recurrent episodes of cough associated with ingestion of food (Ohno's sign) and recurrent respiratory tract infections. It is usually diagnosed by barium study, bronchoscopy, esophagoscopy and computed tomography. Bronchoesophageal fistulae (BEF) are difficult to manage conditions. Surgical management in the form of fistulectomy and closure is treatment of choice. However, surgery is associated with high morbidity and mortality. Endoscopic treatment has been described as alternative management strategy.

The endoscopic techniques for the treatment of BEF are described, either as case report or small case series [1-11]. The endoscopic techniques, such as tissue adhesives, cautery, sclerosants, submucosal fibrin glue injection, clips and stent, either alone or in combination have been described with variable success. Tissue adhesive glue closes fistula by two phases. Initially acts as closing plug due to adhesive nature and in delayed phase causes formation of granulation tissue. Application of tissue adhesives such as fibrin glue has been shown to be useful for BEF of small diameter [4]. The combined use of absorbable Vicryl mesh and fibrin glue has been shown be successful in closure of post-operative BEF of size less than 1.5 cm [5]. Submucosal fibrin glue injection found successful for closure of recurrent tracheoesophageal fistula [6]. Yellapu RK et al. closed a benign BEF with cyanoacrylate glue injection [7]. In a report, Luca GD et al. described combined endoscopic approach of the use of fibrin glue on the bronchial side and metallic clips on the oesophageal side to close the benign BEF in patient with poor general condition [8]. The endoclips have been successfully applied to close a fistula of smaller diameter [9]. The endoclips combined with endoloop found to be useful in larger BEF of 2.5 cm size [10]. Placement of polyflex stent with drawback of high migration and removable fully covered self-expanding metal stent, also appear promising. The use of self expandable metal stents has been described in malignant BEF. Double stent insertion (ie, in the airway and in the oesophagus) has been reported as a promising method in closing such fistulas [11].

Endoscopic treatment of BEF is not always easy and successful. In a recent study of Ahn JY et al., the first endoscopy procedures to close fistulae failed in all seven adult patients of benign BEF but the second endoscopic attempt was successful in two out of four patients [1]. The successful outcome of endoscopic treatment depends on the length and width of the fistula tract, the degree of fistula tract maturation, etiology of fistula and technique of glue injection. A few points related to endoscopic treatment of BBF need to be addressed**.** First, dislodgement or aspiration of glue particularly in large diameter fistula is one of the important drawbacks of glue injection therapy. The fibrin glue is not an effective solution when treating complex fistulas with large cavities because it usually get coagulated before the mixed solutions fill the cavity [5, 12]. The glue dislodgement is more in the direct fistula [5]. Second, etiology of BBF may affect the outcome, as in study by Ahn JY et al. endoscopic treatment failed in a single case of post- operative BBF [1]. Third, presence of active infection around fistulous tract may also cause failure [2]. In our case immediate failure of endoscopic therapy was seen in post-pneumonectomy BBF. This patient also had empyema and sepsis. Forth, the early diagnosis of fistula may be associated with a higher success rate. Notably, the usual time required for complete epithelization of tract in weeks to months (5,13). Fifth, reports of successful attempts are published more frequently and failed attempts are underreported. Finally, adult BBF of benign etiology is relatively rare and there is variability in techniques of endoscopic therapy in different centers. Therefore, the establishing role of endoscopic therapy and comparison of various techniques is difficult.

Conclusions

In conclusion, because of relatively low success rate endoscopic closure of adult BBF of benign etiology may be considered in selected cases when the fistula is small without active infection and/or the patient is not fit for general anesthesia.

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Citation: **Ashish Kumar Jha, Arya Suchismita, Nishi Gupta.** *Endoscopic Treatment: Choosing the Right Method for Bronchoesophageal Fistula Closure?. Archives of Gastroenterology and Hepatology. 2018; 1(1):16-18.*