



Extracorporeal Membrane Oxygenation Support during Anesthesia for Broncho-Esophageal Fistula Closure Surgery

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Abstract

We present a rare case of left main broncho-esophageal fistula in an adult patient with severe bilateral pneumonia and respiratory failure. Due to the patient's extreme non resolving condition, fistula repair surgery was done successfully with the use of extracorporeal membrane oxygenation support during surgery.

Keywords: Bronchoscopy or bronchus; Esophageal congenital anomalies; Esophagus

Introduction

Benign Broncho-Esophageal Fistula (BEF) is rare in the adult patients and its pathogenesis is unclear. Most cases of BEF are congenital, present in infancy and related to esophageal atresia [1,2]. In the adult population BEF are usually acquired and relate to infections, malignancy, or trauma [3,4]. Congenital BEF in adult can be consider if there is no evidence for inflammation around the fistula, no adherent lymph nodes and if there is a mucosa and muscular is mucosa histologically [2]. Symptoms of BEF in adults consist mostly of coughing and recurrent respiratory infections [1,2]. Since in most cases symptoms are not specific and the diagnosis is complex many patients have long period before correct final diagnosis. The treatment of choice in most cases is surgical closure of the fistula and lung resection if needed [1,2,5].

Case Presentation

42 years old mentally retarded male with known Barrett esophagus and esophageal dilatation admitted to our center with productive cough and vomiting. Two weeks prior to admission the patient underwent cholecystectomy due to symptomatic biliary gallstones. Following his surgery, he was admitted several times to other hospital due to fever, coughing and severe vomiting. A diagnosis of aspiration pneumonia was made and empiric antibiotic treatment was started. A nasogastric tube was inserted due to continuous vomiting. Since the patient condition deteriorated he was transferred to our hospital. Due to respiratory distress mechanical ventilation was started. Shortly after intubation the present of large amount of gastric content in the endotracheal tube raised the concerned of tracheoesophageal fistula. A chest-abdomen computer tomography was performed following by endoscopy and bronchoscopy. A diagnosis of broncho-esophageal fistula with congenital features in the left main bronchus was made. Since the patient medical condition was very unstable with respiratory failure due to massive bilateral pneumonia and ongoing sepsis surgical intervention for definitive fistula closure was delayed (Figure 1). A broad-spectrum antibiotic was continued with inotropic agents support. Continuous low suction was added to his nasogastric tube to minimize reflux content. Furthermore a feeding jejunostomy and gastrostomy drainage were performed to facilitate fistula control. Planning a definitive fistula repair surgery, our main concern was as to how to approach the posterior mediastinum in a patient in severe respiratory failure with bilateral non resolving pneumonia. Therefore we decided that the safest anesthetic approach would be the use of Extra Corporeal Membrane Oxygenation (ECMO) as an anesthetic support. The patient was put on venous-venous ECMO in the operating room before surgery. We used Right side posterior-lateral thoracotomy over the fifth inter costal space as the surgical approach. After dissecting and exposing the area of the carina and the esophagus we define the fistula borders (Figure

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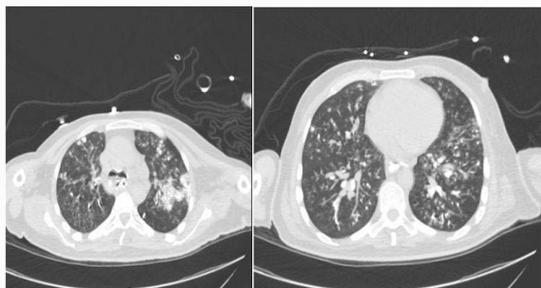


Figure 1: Massive bilateral pneumonia on computer tomography scan.

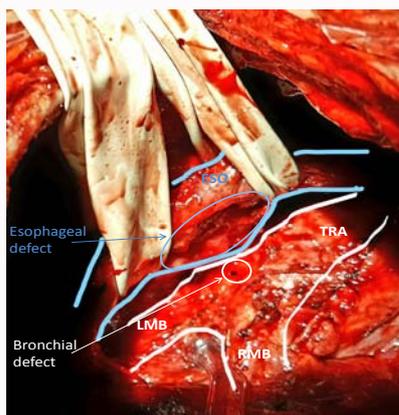


Figure 2: Intra operative view of the fistula. ESO- Esophagus, TRA- Trachea, LMB- Left main bronchus, RMB- Right main bronchus.

2), and then disconnect the left main bronchus from the esophagus. The bronchial defect was small and was repaired with interrupted 4-0 prolene sutures. The esophagus defect was much larger and was repaired with interrupted 3-0 vicryl sutures with the insertion of intra-esophageal T-tube drainage. An inter costal muscle flap was placed between the esophagus and the bronchus. No intraoperative complications were noted. The patient was weaned from ECMO on the first post-operative day. He had a long recovery course mainly due to Carbapenem-resistant *Enterobacteriaceae* sepsis and the need for tracheostomy for mechanical ventilation weaning. On post-operative day 47 he was transfer from the ICU to internal ward in good overall clinical condition.

Comment

Facing an active Tracheo/Broncho- Esophageal fistula in a patient with bilateral pneumonia is challenging. The first treatment goal should be controlling the fistula in order to stop the spillage of gastric content to the tracheobronchial tree. Our patient unfavorable initial status precludes us from early definitive fistula closure surgery; hence other means for fistula control were used. The use of stents either in

the esophagus or the trachea is well described in the literature [6]. In this case the dilated ill esophagus was not a suitable target for stenting. The bronchus on the other hand with its small defect seemed much more appropriate for endoscopic intervention. Unfortunately the most appropriate stent type in this situation is a silicon one which was not available in our center at that time. Metal stent is less suitable due to its tendency to invade the bronchus wall over time which makes its retrieval difficult. Conservative measures for fistula control that we used in our patient to eliminate reflux of gastric content to the tracheobronchial tree were only partially effective but help us to stabilize the patient's hemodynamic and septic condition. Then, a definitive treatment with fistula closure was considered. In order to surgically approach the fistula, the right lung should be deflate. This is usually done using selective one lung ventilation, either with a double lumen tube or bronchial blocker [5]. In this case placing a left side double lumen tube puts the tube's bronchial balloon on the fistula which might interfere with its repair; hence the use of right side double lumen or right bronchial blocker are more appropriate. Unfortunately, due to the patient's severe respiratory condition one lung ventilation was not an option. Therefore, we decided to use ECMO which allow us to deflate the lungs and maintain patient oxygenation during surgery. The use of ECMO as a respiratory support in complex surgical situations is mention sporadically in the literature [7,8]. It is a useful tool that is well worth considering as a mean of respiratory and or cardiovascular support during major surgery in the right clinical setting.

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