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Operative Techniques

Thoracoscopic esophageal atresia repair made easy. An applicable trick

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Abstract Thoracoscopic repair of esophageal atresia is becoming more popular but technical difficulties in handsewn anastomosis still remain challenging. This article presents an easy and applicable maneuver by passing the trans-esophageal tube before starting to suture in order to minimize the gap, reduce the tension over primary sutures and provide a better visualization of posterolateral parts of the anastomosis in thoracoscopic esophageal atresia repair. Using this maneuver makes tying easier and minimizes grasping and crushing damages to the anastomotic site.

Minimally invasive surgery (MIS) is becoming more popular in all fields of surgery due to its advantages in cosmetic and functional results. The first thoracoscopic repair of esophageal atresia (EA) with thoracoesophageal fistula (TEF) was reported in the early 20th century [1,2]. Since then many technical innovations and instrumental advances have been introduced and made it easier and more applicable. Now it seems that the MIS approach to EA may be superior to conventional approaches, at least in cosmetic results and thoracic cage sequelae and deformities such as wing scapula and scoliosis [3].

Despite all these improvements, technical difficulties still remain, especially in hand-sewn anastomosis. This may prolong the operative time and some other post operative complications such as anastomotic leakage and stricture, even by a skilled pediatric endoscopic surgeon [4]. Backbreaking is more prominent in wide gap cases, so any maneuver that helps the surgeon to reduce the gap during suturing and permits a better visualization of the anastomotic edges for more effective and easier hand suturing, seems to be valuable.

In this report we present an easy and applicable maneuver by passing the trans-esophageal tube before starting to suture in order to minimize the gap, reduce tension over primary sutures and provide better visualization of posterolateral parts of the anastomosis, in thoracoscopic esophageal atresia repair.

1. Materials and methods

A two-day-old male neonate was referred to our pediatric surgical department with EA-TEF. His birth weight was 2450 g. He was prepared for thoracoscopic approach. Our

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routine surgical method for endoscopic esophageal atresia repair includes positioning in a 45° semi-prone position. The first 5 mm port was inserted by open technique for a 30° angled camera and the second and third ports (3 mm) for instruments. A grasper (the forth instrument) was inserted through a small stab incision in the 7th intercostal space at the midaxillary line in order to grasp and push down the upper lobe of the right lung. This maneuver provides faster and better exposure with less CO_2 positive pressure in the intrapleural space that may reduce the lag time to start the dissection, total operative time and total gas insufflation volume and finally minimize blood gas derangements. TEF was exposed, ligated and cut, leaving the azygos arch intact. After full mobilization of the proximal esophageal pouch, esophageal repair was performed by an ordinary handsewn suturing technique with 5-0 Vicryl. In this stage of operation we used an applicable and easy trick to facilitate suturing and provide a better posterolateral esophageal wall exposure during anastomosis.

2. Operative technique details

2.1. First maneuver

After ligation, cutting the TEF and mobilization of the proximal part of esophagus, blind end of the proximal pouch was cut over an 8 Fr Nelaton tube which was pushed down by the anterior through the mouth. The catheter was then passed through the cutting edge towards the distal pouch and sutured to the anterior wall of the distal esophagus by a horizontal 5-0 Vicryl suture (Fig. 1).

Then the catheter was pulled out slowly by the anaesthetist to minimize the gap between the two parts of the esophagus. Advantages of this trick include minimizing the gap and facilitating the first knot with minimal tissue manipulation. Reduction of the gap enables us to tie with shorter length of suture materials, especially in wide gap cases (6 cm strings instead of 8–9 cm strings), which is very helpful in small work spaces and reduces the suturing time.

This maneuver also leads to more secure primary sutures and decreases the incidence of esophageal tearing, especially in the distal part because of less tension and minimal tissue manipulation (Fig. 2).

2.2. Second maneuver

After two or three sutures in the medial wall, the suture between the tube and the distal esophageal part was cut. The tube was then passed into the distal esophagus and stomach. At that time, the tube was grasped from the middle part just near the anastomotic line and pulled out horizontally toward the sternum (Fig. 3).

This maneuver allowed visualization of the posterolateral parts of the anastomosis perfectly by the smooth curve of the tube and the surgeon was able to start suturing in this zone from outside to inside. This trick provides easy handling of the esophagus without grasping or crushing the anastomotic site. In this way, all the knots are placed outside of the esophagus. Finally, the anastomosis was completed in anterior wall.

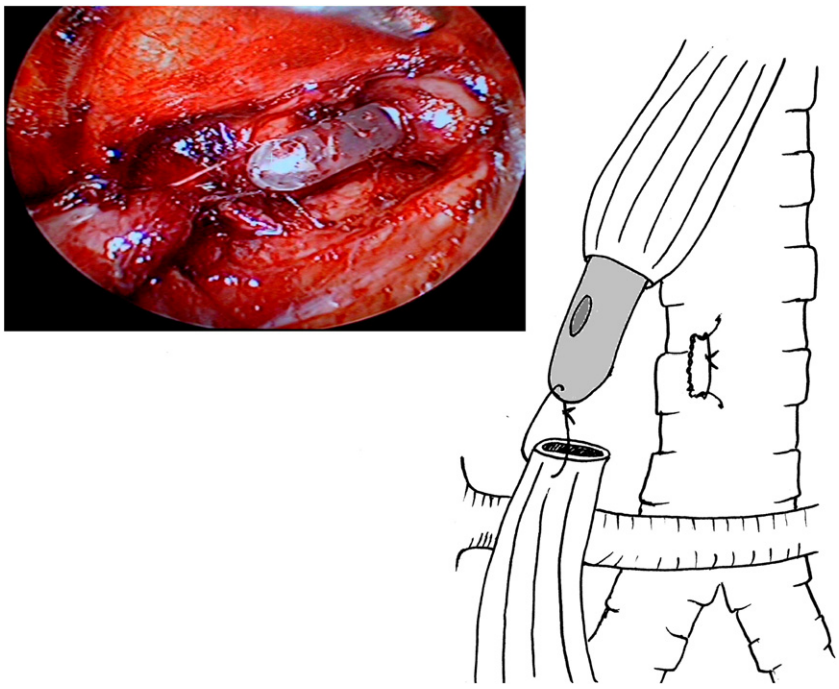

Fig. 1 Connecting the intra-esophageal tube to the distal pouch with a 5-0 hanging suture.