Work in progress report - Esophagus

Modifications to Ivor Lewis esophagectomy

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Abstract

The surgical approach to esophagectomy is variable. A number of factors are considered when determining the optimal approach to esophagectomy: location and extent of disease, fibrosis, additional patient factors and surgeon preference. One of the disadvantages to some approaches is the need for a change in position, which increases operative time. Also, because typically the abdomen is initially explored, patients may later be deemed unresectable at thoracotomy. We describe time saving modifications to the standard Ivor Lewis esophagectomy that eliminate the need for repositioning and facilitate a stapled end-to-end anastomosis.

Keywords: Esophageal surgery; Thoracotomy; Esophageal cancer

1. Introduction

Esophagectomy can be performed through several approaches. Choice of approach lies in both patient related factors and surgeon preference. The transhiatal approach has the advantage of being performed through a single position, thus saving operative time. However, it has inherent limitations of exposure and inhibits the ability to perform a complete lymphadenectomy.

Advanced mid-thoracic esophageal cancers or radiation-induced fibrosis typically require a direct approach, as in the Ivor Lewis esophagectomy. The Ivor Lewis esophagectomy has traditionally been described as an upper midline laparotomy combined with a right posterolateral thoracotomy as a two-stage procedure. The change in patient positioning, midway during the operation, adds considerable operative time [1]. Also, patients who undergo an initial laparotomy as the first phase of the Ivor Lewis approach for gastric mobilization and feeding jejunostomy may be deemed unresectable at the time of subsequent thoracotomy, having undergone an unnecessary exploration and mobilization.

Rather than the standard supine and left-lateral decubitus positioning we describe a modified thoracoabdominal positioning for Ivor Lewis esophagectomy. In addition to this hybrid position, we also use a vertical mid-axillary thoracotomy for the thoracic approach. This technique is useful for a number of reasons. The thoracotomy can be performed first to evaluate extent of disease. A change of position is eliminated. The axillary incision is muscle sparing and low risk for wound infection as it is not subject to pressure necrosis in the postoperative period. This hybrid approach allows for simultaneous manipulation within both cavities for delivery of the conduit.

2. Technique

The patient is placed in a supine position on the operating room table on top of a vacuum-positioning device (Olympic Vac-Pac®, Size 31, Natus Medical Inc, San Carlos, CA, USA). After intubation with a double lumen endotracheal tube, the patient is positioned in a right thoracoabdominal position. The Vac-Pac® is fitted securely around the patient to allow for full use of the table rotation. The hips and shoulders are rotated approximately 30° and 45°, respectively (Fig. 1). The patient’s right arm is secured across the body with the axilla opened up. When the table is rotated to the right, the patient is almost supine and when fully rotated to the left a near left lateral decubitus position is achieved.

A vertical mid-axillary incision is made around the fourth intercostal space; the neurovascular bundles are identified and spared. We have used both the traditional intercostal division with rib spreading through the fourth intercostal space or more recently the modified French window thoracotomy [2]. The advantage of the modified French window thoracotomy in this setting is the excellent exposure provided with minimal postoperative pain because rib spreading is not required (Fig. 2). Once the esophagus is mobilized in the chest, the abdomen is addressed. Through an upper midline laparotomy, one performs complete mobilization of the stomach, the hiatal dissection, celiac lymphadenectomy, a pyloroplasty and feeding jejunostomy.
The esophagus is divided in the superior mediastinum and delivered into the abdomen. A thoracic lymphadenectomy is performed. The esophagus is sized for the end-to-end stapling device (EEA stapler) (DST series, EEA Staplers®, Size 25, United States Surgical, Norwalk, CT, USA). The gastric conduit is carefully tubularized. A gastrostomy is made above the pylorus and the stapling device is advanced through the gastrostomy up to the tip of the gastric tube. Bi-manual palpation is used to bring the gastric conduit and stapling device through the hiatus into the chest (Fig. 3). The anastomosis is created with the EEA stapler and the gastrostomy is closed. A feeding jejunostomy is placed (Fig. 4).

3. Discussion

The significant advantage offered by this technique is the elimination of the need to change the patient’s position. We also suggest that the combination of the modified thoracoabdominal position and use of the axillary thoracotomy significantly contributes to the efficiency of the operation, including the use of a mechanical stapler.

The vertical axillary thoracotomy incision has been well described for pulmonary and congenital cardiac surgery, but is not commonly used for esophageal disease [3, 4]. This incision allows one to perform a thoracotomy, providing excellent intraoperative exposure of the mediastinum and esophagus without the need to expose the posterolateral chest wall. Additionally, this incision is muscle sparing.
negating the need for muscular division and subsequent re-approximation during closure. As the skin incision is more anterior, it is possible to position the patient in a right thoracoabdominal position and perform both a vertical axillary thoracotomy and upper midline laparotomy for an ‘Ivor Lewis’ esophagectomy in a single position. Although the procedure has traditionally been described with gastric mobilization and dissection as the initial step, our approach allows for thoracic dissection and mobilization to be accomplished initially, preventing the dreaded finding of unresectable disease after gastric mobilization has been accomplished. We have been able to perform this procedure this way in obese patients as well as those with chronic obstructive pulmonary disease.

We suggest that this modified approach to the Ivor Lewis esophagectomy will allow for more efficient and safer operations, provide excellent oncologic benefit to patients, and eliminate unnecessary abdominal explorations.

References


