Transhiatal Esophagectomy

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There are no compelling data to support a disease-free or overall survival benefit for any one of the various surgical techniques over another for esophageal carcinoma. Each technique has advantages. Transhiatal esophagectomy has been shown to be safe, with fewer pulmonary complications than the transthoracic approach and a more benign clinical course in the event of an anastomotic leak from a cervical esophagogastrostomy, thereby resulting in reduced perioperative mortality.

15.1 Surgical Technique

15.1.1 Patient Positioning

The patient is positioned supine with the head extended and rotated to the right. The left arm is tucked, leaving the right arm for venous or arterial access. If a central venous catheter is required, it is placed in the right internal jugular vein. The patient's skin is prepped from the left ear superiorly to the pubis inferiorly and laterally to both midaxillary lines.

15.1.2 Abdominal and Lower Mediastinal Phase

Access to the abdomen is obtained through an upper midline incision (xiphoid to umbilicus). Costal margins are retracted with a table-fixed retractor. Division of the ligamentum teres and the falciform and triangular ligaments enables retraction of the left lateral segment of the liver. First, the adequacy of the gastric conduit is assessed—always handling the stomach gently and avoiding unnecessary traction. Next, the gastrocolic omentum is divided a safe distance from right gastroepiploic vessels, to avoid injury to the main blood supply of the conduit. The left gastroepiploic and short gastric vessels are ligated, followed by division of the gastrohepatic omentum after ensuring that a replaced left hepatic artery is not present. The dissection is then carried inferiorly along the lesser curve, with the right gastric artery preserved if at all possible. For adequate mobilization of the pylorus to the

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esophageal hiatus, the hepatic flexure is taken down, and an extensive Kocher maneuver is performed to expose the border of the superior mesenteric vessels. A pyloromyotomy or pyloroplasty is performed to help prevent delayed gastric emptying. The common hepatic, celiac, proximal splenic, and left gastric nodal basins are dissected en bloc with the specimen. While retracting the stomach anteriorly and superiorly, the left gastric artery and coronary vein are ligated; in patients with a replaced left hepatic artery, the left gastric artery should be ligated distal to its takeoff. Dissection of all the remaining nodal tissue around the crus of the diaphragm and aorta is then completed. After the diaphragmatic hiatus is opened, it is widened by ligating the inferior phrenic vein and dividing the crus anteriorly. The gastroesophageal junction is then encircled with umbilical tape to aid with traction during the mediastinal dissection. Dissection of the distal esophagus is carried out under direct vision to the level of the carina laterally between the pleura, anteriorly from the pericardium, and posteriorly from the aorta, using electrocautery and hemoclips. Hemostasis in the mediastinum is best achieved with surgical packing.

15.1.3 Cervical Phase

The neck is entered via an incision along the anterior border of the left sternocleidomastoid muscle, beginning just above the suprasternal notch. The platysma is incised and the sternocleidomastoid muscle is retracted laterally, followed by division of the central tendon of the omohyoid muscle and middle thyroid vein. A blunt, self-retaining retractor is used to retract the sternocleidomastoid muscle laterally and the trachea and thyroid medially, with care to avoid injury to the recurrent laryngeal nerve located in the tracheoesophageal groove (Fig. 15.1). A Penrose drain is used to encircle the cervical esophagus, which is bluntly dissected under direct vision to the level of the innominate artery (Fig. 15.2).

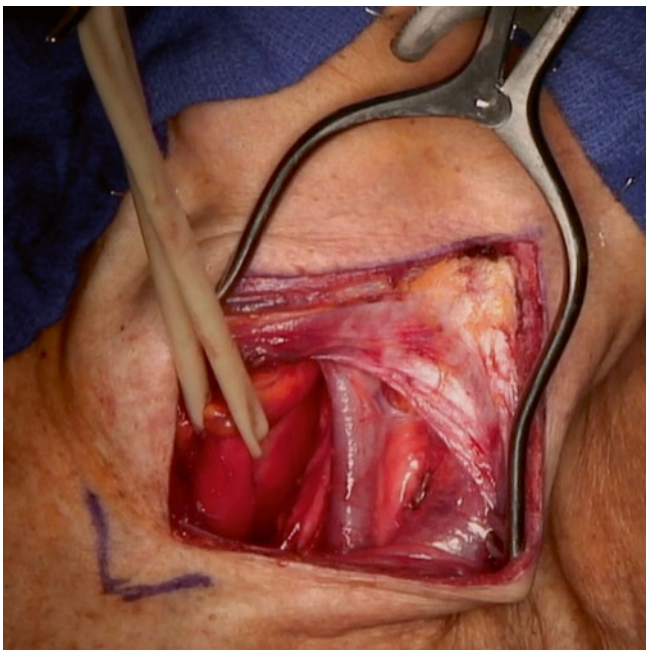

Fig. 15.1 Left cervical exposure with retraction of the sternocleidomastoid muscle, carotid artery, and internal jugular vein laterally and the trachea and thyroid medially

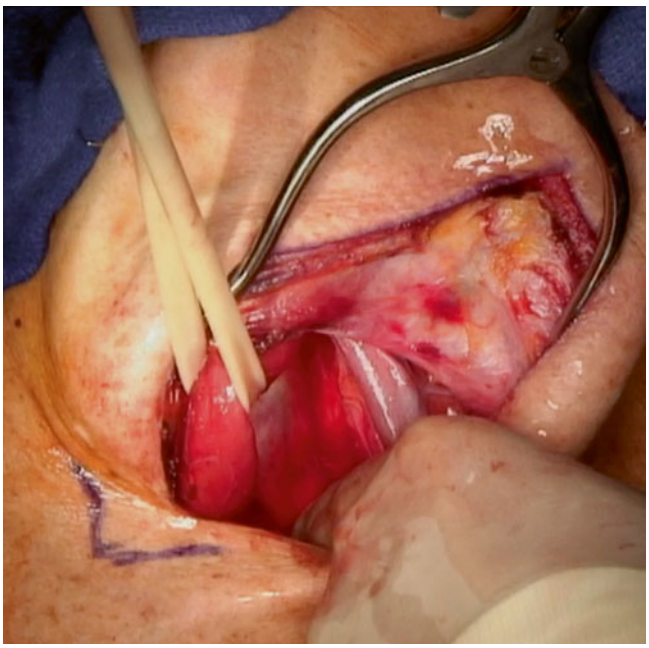

Fig. 15.2 Vessel loop encircling the cervical esophagus to aid in retraction during blunt dissection

15.1.4 Mid and Upper Mediastinal Phase

With downward retraction on the umbilical tape around the gastroesophageal junction, the posterior attachments of esophagus are dissected bluntly with a hand through the diaphragmatic hiatus to the level of the cervical dissection. Next, the anterior attachments are dissected manually, while staying directly on the anterior surface of the esophagus. Care must be taken to avoid injury to the membranous portion of the trachea and to avoid excessive pressure on the heart during dissection, which can cause hypotension. (This hypotension can be readily corrected with volume resuscitation.) Using a sweetheart retractor, the inferior lateral attachments are ligated and divided between large hemoclips. The cervical and upper mediastinal esophagus is brought out through the cervical incision, and after withdrawal of the nasogastric tube, the esophagus is divided with a GIA™ stapler (Covidien, Minneapolis, MN), securing a long Penrose drain marked to maintain its orientation during passage through the mediastinum (Fig. 15.3). With the stomach and mid/distal esophagus brought out through the abdominal incision, the gastric tube is carefully fashioned to a diameter of 4–5 cm with multiple firings of the GIA™ stapler, preserving the greater curvature and its blood supply (Fig. 15.4). The lesser curvature and a portion of the fundus and cardia are removed with the esophagus, nodal basins, and tumor (Fig. 15.5). The Penrose drain that traverses the mediastinum from the cervical to the abdominal incision is now sutured to the posterior aspect of the gastric conduit to maintain orientation during transposition to the neck.

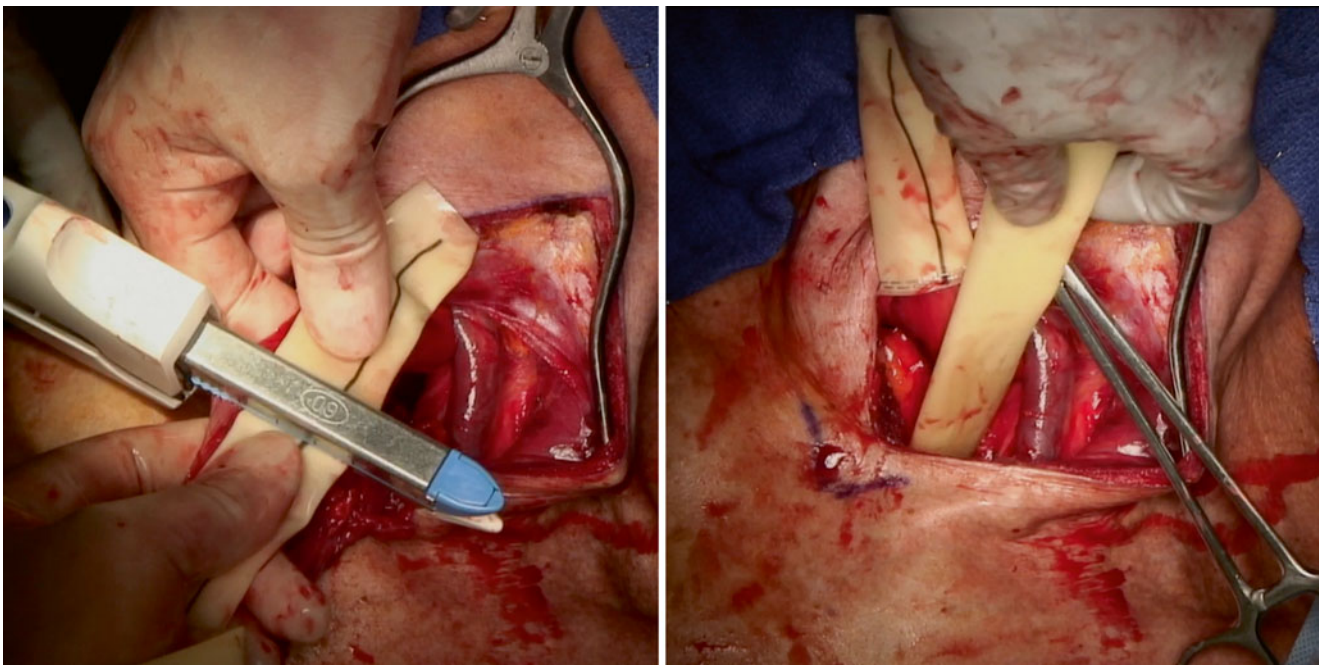

Fig. 15.3 The cervical esophagus is divided with a GIA™ stapler (Covidien, Minneapolis, MN), incorporating a marked Penrose drain to maintain orientation

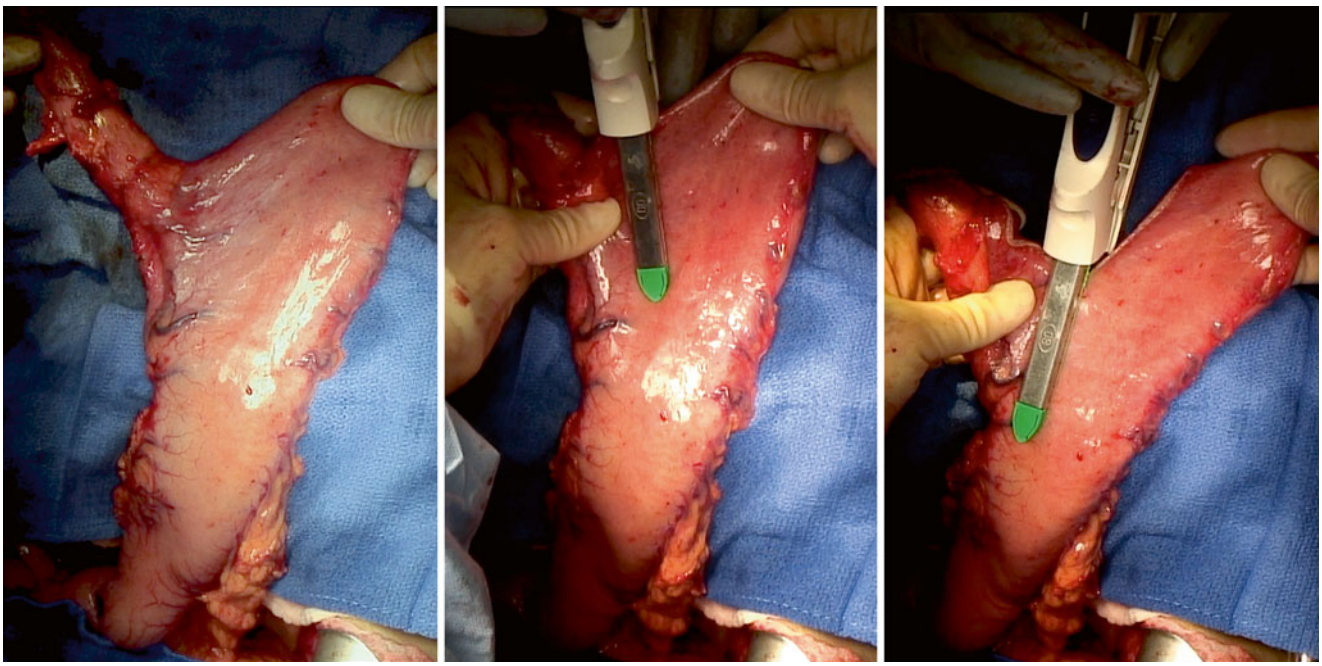

Fig. 15.4 The gastric tube is fashioned to a diameter of 4–5 cm with multiple firings of the GIA™ stapler, preserving the greater curvature and its blood supply

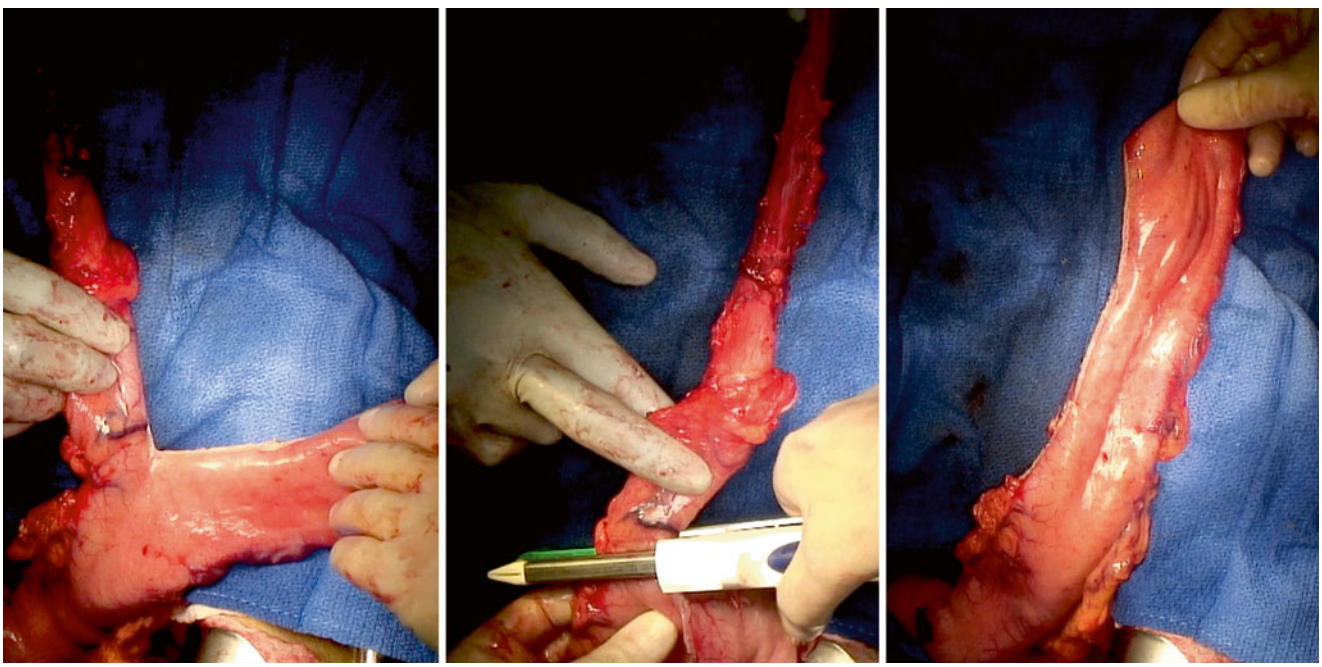

Fig. 15.5 The lesser curvature and a portion of the fundus and cardia are removed with the esophagus, nodal basins, and tumor

15.1.5 Gastric Transposition and Anastomosis

An automatic purse-string applier is used to place a nylon purse-string suture around the proximal cut end of the cervical esophagus. The anvil of a 25-mm EEA™ circular stapling device (Covidien, Minneapolis, MN) is passed into the cervical esophagus and the purse-string suture is secured (Fig. 15.6). The gastric conduit is gently pushed through the diaphragmatic hiatus while simultaneously gently pulling on the Penrose drain from the cervical incision until 6–8 cm of the stomach is mobilized into the cervical field (Fig. 15.7). Avoid excessive pulling of the gastric conduit during transposition, as the result may be trauma and ischemia that could compromise the anastomosis. Through an anterior gastrotomy, a 25-mm EEA™ circular stapling device is used to anastomose the cervical esophagus to the proximal posterior gastric wall (Figs. 15.8 and 15.9). After the nasogastric tube is replaced to the level of the gastric antrum, excess gastric tissue proximal to the anastomosis (including the anterior gastrotomy site) is excised with a TA™ 60-mm stapler (Covidien) (Fig. 15.10). The anastomosis is interrogated for an air leak and reinforced with silk sutures if necessary. The gastric tube is secured to surrounding tissue with care to avoid placing sutures in the prevertebral fascia, which could predispose to abscess formation. The platysma is reapproximated and the skin is closed with staples. Through the abdominal incision, the antrum of the stomach is secured to the hiatus and a needle catheter feeding jejunostomy tube is placed. Drains are unnecessary.

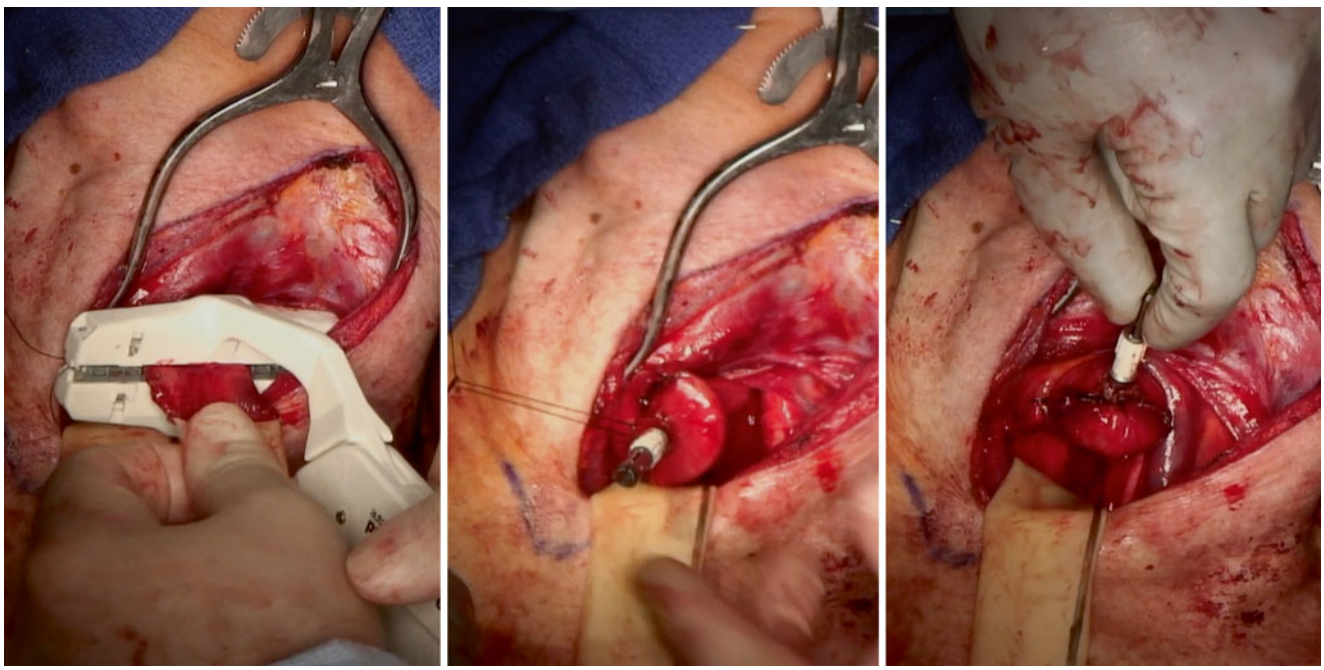

Fig. 15.6 Placement of a purse-string to anchor the anvil of the EEA™ stapling device (Covidien) to the proximal cervical esophagus

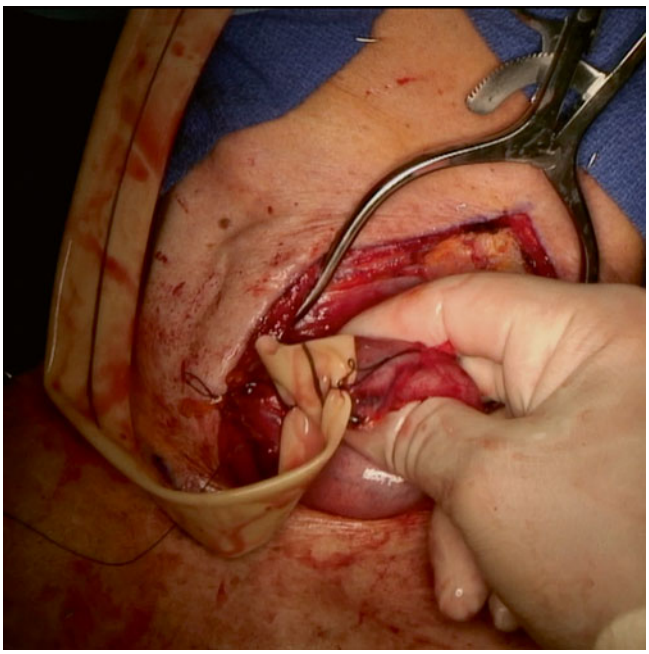

Fig. 15.7 Mobilization of the gastric conduit into the cervical field, with the marked Penrose drain to maintain orientation

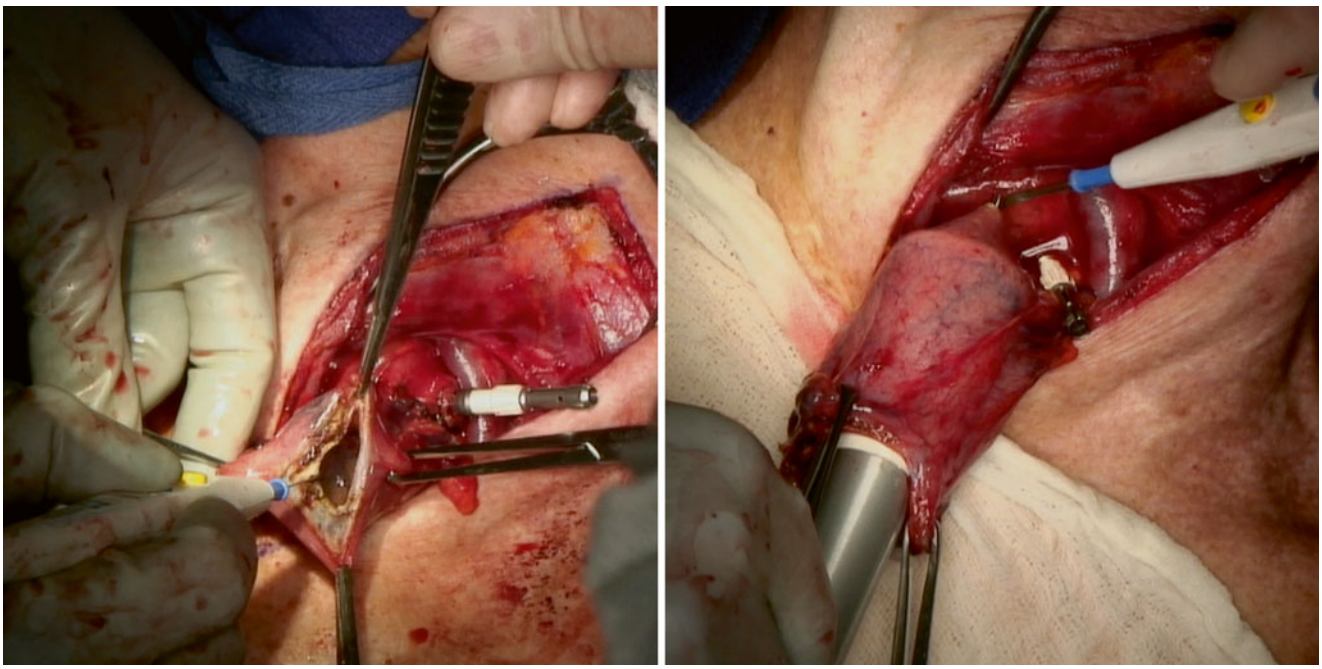

Fig. 15.8 Creation of the anterior gastrotomy and anastomosis to the cervical esophagus using an EEA™ stapling device

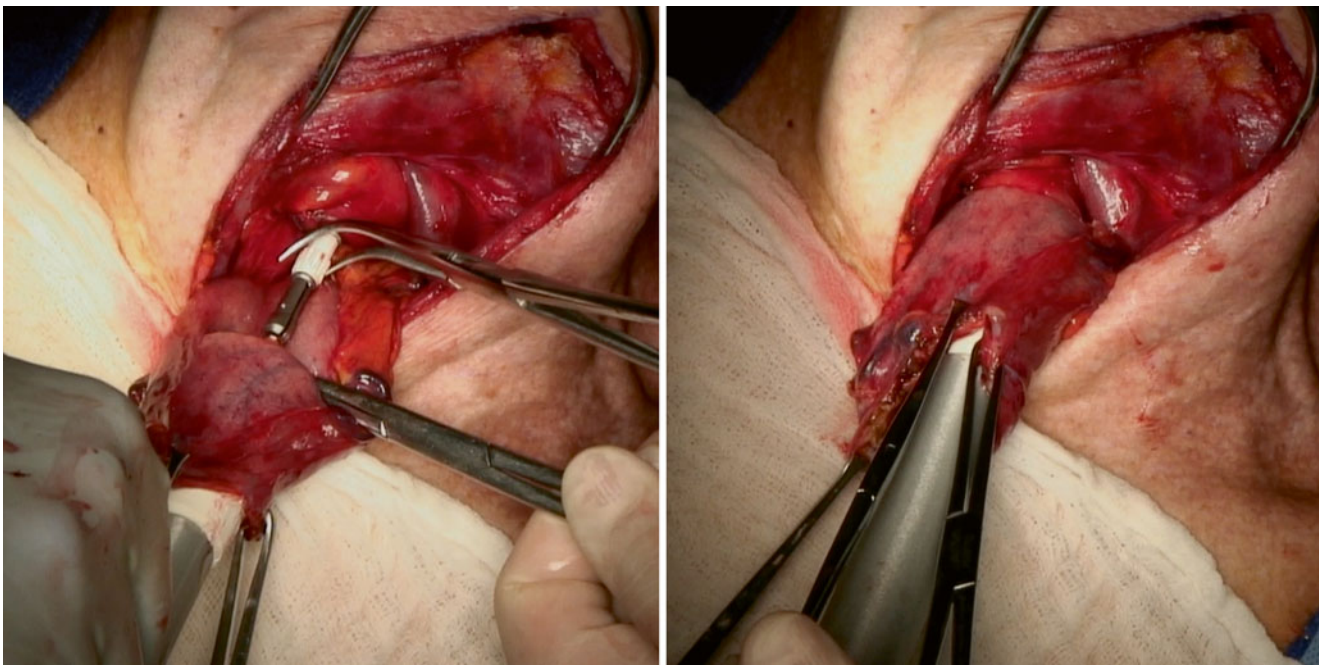

Fig. 15.9 Creation of the anterior gastrotomy and anastomosis to the cervical esophagus using an EEA™ stapling device

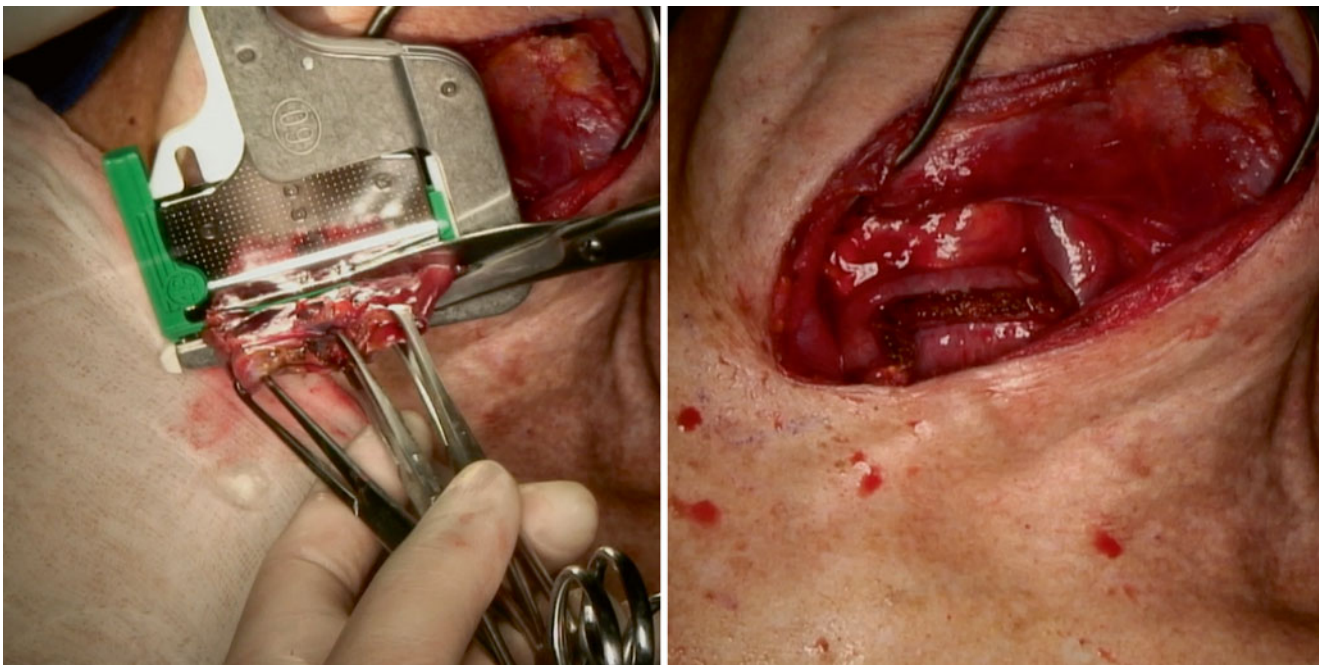

Fig. 15.10 Gastric tissue proximal to the anastomosis, including the gastrotomy site, is excised with a TA™ 60-mm stapling device (Covidien)

15.2 Contraindications

The only absolute contraindications for the transhiatal approach are tracheobronchial adherence or invasion by tumor of the upper or middle third of the esophagus, or severe adhesions of the esophagus to vital structures. Therefore, thoracotomy is rarely necessary for additional exposure to ensure a safe esophageal resection.

15.3 Postoperative Management

15.3.1 Pain Management

A thoracic epidural catheter aids in a more effective cough, allows vigorous physiotherapy, and facilitates early mobilization.

15.3.2 Recurrent Laryngeal Nerve Injury

Most injuries result in temporary hoarseness, but prevention is paramount, as dysphagia and aspiration can result in serious postoperative morbidity.

15.3.3 Anastomotic Leak

Leaks can be managed conservatively by opening the cervical incision and local wound care. Early endoscopy with dilation of the anastomosis may help decrease fistula output and promote fistula closure.

15.3.4 Gastric Tube Necrosis

This uncommon complication requires proximal diversion and delayed reconstruction with a colonic interposition or a jejunal free flap.

15.3.5 Anastomotic Stricture

Strictures are more common after anastomotic leaks and can be managed with dilations.

15.3.6 Chylothorax

Injury to the thoracic duct may occur in patients with locally advanced tumors. These injuries should be managed with early thoracoscopy and ligation.

Selected Reading

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