Chapter 2
Esophagectomy: Right Thoracotomy and Laparotomy with Cervical Anastomosis

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INDICATIONS
- Carcinoma/high-grade dysplasia of the middle/lower third of the esophagus/gastric cardia.
- Rarely: benign stricture, severe neuromuscular dysfunction, or perforation.

ESSENTIAL STEPS

Thoracic Dissection
2. Right posterolateral thoracotomy through the fifth or sixth intercostal space.
3. Divide the azygous vein (if needed).
4. Incise the pleura and mobilize the esophagus.
5. Take care to avoid injury to the recurrent laryngeal nerves.
6. Close the chest with thoracostomy tube drainage.

Abdominal Dissection
1. Upper midline abdominal incision.
2. Divide the gastrocolic ligament, preserve the right gastroepiploic artery, and ligate the left gastroepiploic artery and short gastric arteries.
3. Dissect the lesser curvature via the lesser sac; preserve the right gastric and aberrant left hepatic artery if present.
4. Ligate the left gastric vessels.
5. Circumferentially free the esophagus at hiatus.
6. Perform a generous Kocher maneuver.
7. Gastric drainage procedure (pyloromyotomy or pyloroplasty) to prevent delayed emptying.
8. Feeding jejunostomy, if desired.

Cervical Dissection
1. Incision through the platysma.
2. Dissect anterior to the sternocleidomastoid.
3. Mobilize the esophagus.
4. Avoid traction injury or cautery injury to the recurrent laryngeal nerve.
6. Close wound with drainage.

NOTE THESE VARIATIONS
- Stapled/sutured anastomosis.
- Pyloromyotomy/pyloroplasty.
- Feeding jejunostomy.

COMPLICATIONS
- Injury to the tracheobronchial tree.
- Recurrent laryngeal nerve injury.
- Splenic injury.
- Gastric necrosis.
- Pneumothorax.
- Chyllothorax.
- Anastomotic leak.
- Empyema/mediastinitis.
- Delayed gastric emptying.
- Dumping syndrome.
- Herniation of the abdominal viscera through the diaphragmatic hiatus.
- Anastomotic stricture.
- Reflux esophagitis.

TEMPLATE OPERATIVE DICTATION
Preoperative diagnosis: Carcinoma/high-grade dysplasia of the lower/middle third of the esophagus/gastric cardia/other.
Procedure: Esophagectomy via right thoracotomy and laparotomy with cervical anastomosis.
Postoperative diagnosis: Same.

Indications: This ___-year-old male/female had developed dysphagia and on workup was found to have dysplasia/carcinoma of the esophagus extending from ___ to ___ cm/other. (If carcinoma, detail preoperative staging and any neoadjuvant chemotherapy and radiation therapy given.) Esophagectomy was indicated.

Description of procedure: Following smooth induction of general anesthesia, the patient was intubated with a double-lumen endotracheal tube, placed in a modified left decubitus position, and padded appropriately. The right chest was prepped and draped in the usual sterile fashion.

A time-out was completed verifying correct patient, procedure, site, positioning, and implant(s) and/or special equipment prior to beginning this procedure.

A standard right posterolateral thoracotomy was performed through the fifth intercostal space. Single lung ventilation was established, allowing for anterior retraction of the lung and exposure of the mediastinum. The chest was explored, confirming no evidence of metastatic disease. The azygous vein was identified, dissected, ligated, and divided. The pleura was then incised along the azygous vein and inferior pulmonary ligament divided, allowing the esophagus to be circumferentially mobilized from the level of the hiatus to the thoracic inlet. Esophageal artery branches were identified and ligated with vascular clips. Lymphatic tissues were mobilized en bloc with the esophagus. The vagus nerves were identified proximally, clipped, and divided to minimize risk of recurrent laryngeal nerve injury. The chest was then irrigated, hemostasis confirmed, and two thoracostomy tubes placed in the usual fashion. The chest was closed in layers and the skin approximated with surgical staples. Sterile dressings were applied and the patient turned to a supine position for the abdominal and cervical portions of the procedure.

Again, the patient was padded appropriately and positioned such that the left neck and abdomen could be accessed. The abdomen and left neck were prepped and draped in the usual sterile fashion. The abdomen was opened via a midline incision extending from the xiphoid to umbilicus. Abdominal exploration yielded no evidence of metastatic spread to the liver or other organs. The greater curvature of the stomach was identified with a palpable gastroepiploic vessel. The gastrocolic ligament was then divided by ligating and dividing the left gastroepiploic and short gastric vessels. The right gastroepiploic pedicle was carefully preserved. Attention was then turned to the lesser curvature via the lesser sac by gentle cephalad traction of the stomach. The right gastric artery
was preserved; the left gastric artery was similarly identified. No anomalous left hepatic artery was identifiable; therefore, the left gastric artery was ligated and divided. Next, having dissected the lesser curvature to the pylorus, the duodenum was mobilized with a Kocher maneuver. A pyloromyotomy/pyloroplasty was performed.

Attention was then turned to the hiatus. The phrenic vein was doubly ligated and the esophagus mobilized circumferentially. Moist laparotomy pads were placed on the abdominal incision and the retractors withdrawn.

The skin was incised obliquely along the medial border of the left sternocleidomastoid muscle extending from the level of the thyroid cartilage to the sternal notch. Dissection was then carried out dividing the platysma and omohyoid and ligating the middle thyroid vein. Blunt dissection was extended to the prevertebral fascia and tracheoesophageal groove. The sternocleidomastoid muscle and carotid artery were gently retracted laterally; care was taken to avoid medial retraction to the recurrent laryngeal nerve. The cervical esophagus was then bluntly freed with care taken to avoid injury to the trachea. All in-dwelling esophageal tubes were withdrawn.

With the esophagus now free of its distal attachments, a linear cutting stapler was fired, creating the distal margin. The abdominal field was again entered. A silk suture was placed in the proximal specimen and the entire esophagus was advanced into the abdomen. A linear cutting stapler was used to divide the stomach below the gastroesophageal junction, establishing a distal margin 8 cm distal to the tumor. The previously placed silk was tied to the inflation port of a 30-cc Foley catheter, allowing the catheter to be placed with the balloon end within the abdomen and the port end exiting the cervical incision. The balloon was then placed within an arthroscopy bag and affixed with a tie. Placing the stomach within the bag-vacuum device, a Yankauer suction catheter was applied to the Foley end. The entire apparatus was advanced, bringing the gastric fundus out through the cervical incision with care taken to avoid torsion of the stomach.

[Choose one:]

If stapled with linear stapler: The esophagus and gastric conduit were then aligned and a gastrotomy performed. Two sutures of 3-0 silk were placed to maintain alignment. A limb of a linear cutting stapler was placed down both the cervical esophagus and gastric fundus. The stapler was fired, creating a side-to-side functionally end anastomosis. A nasogastric tube was advanced through the
anastomosis with the end resting distal to the pylorus. The remaining enterotomy was closed with a linear stapler/in two layers with running 3-0 Vicryl and interrupted 3-0 silk.

If sutured: A two-layer anastomosis was constructed between the distal esophagus and the stomach using an inner layer of running 3-0 Vicryl and an outer layer of 3-0 silk. The nasogastric tube was advanced through the anastomosis and down through the pylorus.

The anastomosis was checked and found to be patent and intact. The stomach was tacked to the soft tissues in such a way as to avoid tension on the anastomosis. The cervical incision was irrigated, hemostasis was checked, and a closed suction/small Penrose drain was placed near the anastomosis. The incision was closed in layers with interrupted 3-0 Vicryl. The skin was closed with skin staples/a subcuticular suture of running 4-0 monocryl.

The pyloromyotomy site was reinforced with omentum in a patch fashion. The hiatus was closed around the stomach with interrupted sutures of 2-0 silk. A feeding jejunostomy was created approximately 20 cm from the ligament of Treitz in the usual fashion utilizing a Witzel tunnel and multiple abdominal wall tacking sutures.

The abdomen was then irrigated and hemostasis checked. (Optional: Multiple interrupted through-and-through retention sutures of ____ were placed). The fascia was closed with a running suture of ____/a Smead-Jones closure of interrupted _____. The skin was closed with skin staples/subcuticular sutures of ____/other.

The patient tolerated the procedure well and was taken to the postanesthesia care unit in stable condition.

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