Transthoracic Gastroplasty (Collis)
and Nissen Fundoplication

Indications

As discussed in the previous chapters (see esp. Chap. 10), this operation is indicated in patients with reflux esophagitis that has caused a significant degree of fibrosis, constriction, and shortening of the esophagus. In some patients without much esophageal shortening, advanced fibrosis itself will interfere with the antireflux efficiency of a fundoplication because the rigid esophageal walls will not be compressed by the fundoplication. For this reason, Pearson and Henderson; Urschel, Razzuk, Wood, Galbraith et al.; and Orringer and colleagues (see Chap. 10) believe that almost every esophageal stricture caused by reflux should be treated by a Collis gastroplasty and an antireflux procedure. A previous subtotal gastrectomy generally contraindicates a Collis gastroplasty. Most patients with recurrent reflux esophagitis after a previous operation will require a thoracoabdominal Collis–Nissen operation. This operation is indicated whenever the esophagogastric junction cannot without tension be brought down to the level of the median arcuate ligament.

Preoperative Care

Esophogram and upper gastrointestinal X-ray series
Esophagoscopy with biopsy of stricture
Esophageal manometric study
Dilate the esophageal stricture up to size 40F. This can generally be done with Maloney dilators.
Insert a nasogastric tube down to the stricture on the morning of the operation.
If the patient has severe fibrosis and an advanced stricture, he may be one of the rare cases whose stricture cannot be dilated and thus requires resection and possible colon interposition. In such a case, perform a preoperative barium colon enema and routine bowel preparation. Among those patients who should receive preoperative bowel preparation are those whose strictures cannot be dilated to the size of a 40F bougie. An angiogram of the colonic blood supply may also be helpful.
When esophagoscopy reveals severe acute ulcerative esophagitis with inflammation and bleeding, a 2–3 week period of preoperative treatment with cimetidine and/or omeperazole will reduce the inflammation and lessen the risk of intraoperative perforation of the esophagus.

Pitfalls and Danger Points

Esophageal perforation
Hemorrhage resulting from traumatizing or avulsing the accessory left hepatic artery, the inferior phrenic artery, the ascending branch of the left gastric artery, a short gastric vessel, or the inferior pulmonary vein
Laceration of spleen
Inadvertent vagotomy
Inadequate suturing, permitting the fundoplication to slip postoperatively

Operative Strategy

Performing an Adequate Gastroplasty

The object of performing a gastroplasty is to lengthen a shortened esophagus for an extent sufficient to prevent any tension whatever from being exerted on the antireflux operation and hernia repair. This newly constructed esophagus (“neoesophagus”) consists of a tube made from the lesser curvature of the stomach. The anesthesiologist passes a 56F Maloney dilator into the stomach and the tube is constructed by applying a GIA 80 stapling device with 4.8 mm staples precisely at the esophagogastric junction parallel to and snug up alongside the Maloney dilator. When the GIA device is fired, the esophageal tube will be lengthened by as much as 7 cm. If the GIA has been placed snug against the esophagogastric junction, there will be no irregularities or outpouching at this point. Rarely, it may be necessary to apply the GIA a second time to construct the neoesophagus.
Check to see that the staples have been shaped into the form of a proper “B.” Then oversew the GIA staple line on the stomach with a 4–0 continuous Prolene suture.
Mobilizing Esophagus and Stomach

Not only is it important to completely mobilize the distal esophagus, at least as far up as the inferior pulmonary vein, but the proximal stomach must be entirely free of attachments, just as is the case when a Nissen fundoplication is being performed through an abdominal approach. Only with full mobilization can this operation be accomplished without tension. This requires dividing the phrenoesophageal and the gastrophrenic ligaments, freeing the hiatus throughout is complete circumference from any attachments to the stomach or lower esophagus, as well as dividing an accessory left hepatic artery, which courses from the left gastric artery across the proximal gastrohepatic ligament to help supply the left lobe of the liver. After mobilization has been accomplished, the remaining maneuvers in the Collis–Nissen operation are not difficult.

If the esophagus is inadvertently perforated during the dissection, it will require careful judgment by the surgeon in deciding whether it is safe to suture the esophageal laceration or whether a resection and colon or jejunum interposition is necessary. If it is elected to suture the laceration, try to cover the suture line with a flap of parietal pleura (see Figs. 17–1 to 17–3).

Avoiding Hemorrhage

Avoiding unnecessary bleeding in any operation requires careful dissection and a knowledge of vascular anatomy. This is especially important when mobilizing the stomach through a thoracic approach, because losing control of the accessory left hepatic, a short gastric, or an inferior phrenic artery causes the proximal bleeding arterial stump to retract deep into the abdomen. Controlling these retracted vessels will be difficult and may require a laparotomy, or at least a peripheral incision in the diaphragm. Preventing this complication is not difficult if the dissection is orderly and the surgeon is aware of the anatomical location of these vessels.

Similarly, careful dissection and avoidance of traction along the greater curvature of the stomach will help prevent damaging the spleen.

Avoiding Esophageal Perforation

When the distal esophagus is baked into a fibrotic mediastinum, sharp scalpel dissection is safer than blunt dissection if injury to the esophagus and the vagus nerves is to be avoided. Sometimes the fibrosis terminates 8–9 cm above the diaphragm. If so, the esophagus and the vagus nerves can easily be encircled at this point. This will provide a plane for the subsequent dissection of the distal esophagus.

Operative Technique

Incision

With the patient under one-lung anesthesia in the lateral position, left side up, make a skin incision in the sixth intercostal space from the costal margin to the tip of the scapula (Fig. 13–1). Then identify the latissimus dorsi muscle and insert the index finger beneath it. Transect this muscle with the electrocoagulating device. Then divide the underlying anterior serratus muscle in similar fashion.