INDICATIONS

Gastroesophageal reflux (see Chapter 10), especially in patients in whom laparoscopic Nissen fundoplication is not applicable.

PREOPERATIVE PREPARATION

Esophagogastroduodenoscopy with brushing and biopsies of any abnormal mucosa
Esophageal manometry or pH studies in selected patients

PITFALLS AND DANGER POINTS

Inadequate mobilization of gastric fundus and abdominal esophagus
Injury to spleen or to vagus nerves
Fundoplication wrap too tight or too long
Inadequate fundoplication suturing
Undiagnosed esophageal motility disorders, such as achalasia, diffuse spasm, aperistalsis, or scleroderma
Hiatal closure too tight, causing esophageal obstruction
Hiatal closure too loose, permitting postoperative paraesophageal herniation
Injury to left hepatic vein or vena cava when incising triangular ligament to liberate left lobe of liver

OPERATIVE STRATEGY

Mobilizing the Gastric Fundus

To perform a hiatus hernia repair efficiently, the lower 5–7 cm of the esophagus and the entire gastric fundus from the gastroesophageal junction down to the upper short gastric vessel must be completely mobilized from all attachments to the diaphragm and the posterior abdominal wall. Identify the gastrophrenic ligament by passing the left hand behind the stomach so the fingertips can identify this avascular ligament, which attaches the greater curvature to the diaphragm. The ligament extends from the gastroesophageal junction down to the first short gastric vessel. It is simple to divide once it has been stretched by the surgeon’s left hand behind the stomach. Although in a few cases no short gastric vessels must be divided, there should be no hesitation to divide one to three proximal short gastric vessels to create a loose fundoplication.

On the lesser curvature aspect of the gastroesophageal junction, it is necessary to divide the proximal portion of the gastrohepatic ligament. This ligament often contains an accessory left hepatic artery arising from the left gastric artery and going to the left lobe of the liver and the hepatic branch of the left vagus nerve. Division of the accessory left hepatic artery has, in our experience, not proved harmful. Do not divide the left gastric artery itself. Preserving the left gastric artery and the hepatic branch of the vagus nerve helps prevent the fundoplication from slipping in a caudal direction. The lower esophagus is freed by incising the overlying peritoneum and phrenoesophageal ligaments; continue this incision in a semicircular fashion so the muscular margins of the diaphragmatic crura are exposed down to the median arcuate ligament. During all of this mobilization, look for the major branches of the anterior and posterior vagus nerves and preserve them.

Preventing Splenic Injury

Splenic trauma is a common but preventable complication of the Nissen operation. With use of the Thompson or Upper Hand retractor there is no reason for any retractor to come into contact with the spleen. The mechanism of splenic injury is usually traction on the body of the stomach toward the patient’s right, which avulses that portion of the splenic capsule attached to the omentum or to the gastroepiploic ligament. Early during the operation, make it a point to look at the anterior surface of the spleen.
spleen. Note where the omentum may be adherent to the splenic capsule. If necessary, divide these attachments under direct vision. Otherwise, simply apply a moist gauze pad over the spleen and avoid lateral traction on the stomach. Traction on the gastroesophageal junction in a caudal direction along the lesser curve of the stomach generally does not cause injury to the spleen.

If a portion of the splenic capsule has been avulsed, it can almost always be managed by applying topical hemostatic agents followed by 10 minutes of pressure. Other splenic injuries can be repaired by suturing with 2-0 chromic catgut (see Chapter 85). Extensive disruption of the spleen at its hilus may necessitate splenectomy.

**Avoiding Postoperative Dysphagia**

Probably secondary to local edema, transient mild dysphagia is common during the first 2-3 weeks following operation, although some patients have difficulty swallowing for many months after a hiatus hernia operation. There are several possible causes for this dysphagia. First, it is possible to make the fundoplication wrap so tight or so wide that permanent dysphagia ensues (see below). Second, the defect in the hiatus may be sutured so tightly that the hiatus impinges on the lumen of the esophagus and prevents passage of food. With an 18F nasogastric tube in place, after the crural sutures have been tied to repair the defect in the hiatus it should still be possible to insert an index finger without difficulty between the esophagus and the margins of the hiatus. There is no virtue in closing the hiatus snugly around the esophagus. A final cause of dysphagia in patients who have experienced this symptom as a preoperative complaint is the presence of an esophageal motility disorder such as achalasia or aperistalsis. Patients who present to the surgeon with reflux esophagitis and who also complain of dysphagia should undergo preoperative esophageal manometry to rule out motility disorders that may require surgery in addition to the antireflux procedure or instead of it.

**How Tight Should the Fundoplication Be?**

The Nissen operation produces a high pressure zone in the lower esophagus by transmitted gastric pressure in the wrap, rather than by the tightness of the wrap itself. An excessively tight wrap causes dysphagia and the gas bloat syndrome. Therefore the fundoplication should be made loose, rather than tight enough to constrict the esophagus. Many surgeons use an indwelling esophageal bougie to avoid creating a wrap that is too tight. Regardless of whether the indwelling bougie is used, it is possible to judge the tightness of the wrap by applying Babcock clamps to each side of the gastric fundus and tentatively bringing them together in front of the esophagus. This mimics the effect of the sutures. The surgeon should be able to pass one or two fingers between the wrap and the esophagus without difficulty with an 18F nasogastric tube in place. Otherwise readjust the fundoplication so it is loose enough for this maneuver to be accomplished.

**How Long Should the Fundoplication Be?**

Another cause of postoperative dysphagia is making the fundoplication wrap too long. For the usual Nissen operation, do not wrap more than 2-3 cm of esophagus. A shorter wrap may be appropriate when esophageal dysmotility and gastroesophageal reflux coexist (e.g., when a fundoplication is added to a myotomy).

**Avoiding Fundoplication Suture Line Disruption**

Polk and others have noted that an important cause of failure after Nissen fundoplication has been disruption of the plication because the sutures broke. For this reason, use 2-0 sutures. Generally, the sutures that were found to have broken were silk. We have used 2-0 Tevdek because it retains its tensile strength for many years, whereas silk gradually degrades in the tissues. It is also important not to pass the suture into the lumen of the stomach or esophagus. If this error is committed, tying the suture too tight causes strangulation and possibly leakage. Some insurance against the latter complication is to turn in the major fundoplication sutures with a layer of continuous 4-0 Prolene seromuscular Lembert sutures.

**Failure to Bring the Esophagogastric Junction into the Abdomen**

If it is not possible to mobilize the esophagogastric junction from the mediastinum and bring it into the abdomen while performing transabdominal repair of a hiatus hernia, it is likely that esophageal fibrosis has produced shortening. Such a situation can generally be suspected prior to operation when the...