End-stage reflux disease is a catch-all phrase used to describe the situation that exists when there is substantial foregut dysfunction in the setting of long-standing reflux disease. It can occur in association with a variety of conditions including scleroderma or other connective tissue disorders, treated achalasia, prior gastric resection or morbid obesity procedures, prior esophagectomy particularly in association with a low intrathoracic esophagogastric anastomosis, repair of congenital tracheoesophageal fistula, or in patients with a history of caustic ingestion. Often patients with end-stage reflux disease have had one or more surgical interventions in an attempt to correct the problem, and many have at least one but more often several of the following abnormalities: severe esophageal body motility dysfunction, stricture, long-segment Barrett’s, delayed gastric emptying, large hiatal hernia, or significant esophageal foreshortening.1

Management of these patients is complicated and often requires resection rather than attempts at reconstruction, but the treatment in all cases must be individualized. Once the decision has been made that a resection will be necessary to improve the patient’s quality of life, the next critical decision is whether to remove the esophagus or the stomach. This decision is based primarily on the severity of injury to the esophagus. In the setting of Barrett’s or a severe stricture, generally the best option is esophagectomy, whereas if the esophagus has been relatively spared but profound gastric dysfunction is present, then consideration should be given to some type of gastric resection. Many of these patients have had one or more previous surgical procedures on the stomach, esophagus, or both, and the nature of the previous procedure can influence both the choice of resection and the options for reconstruction.

One of the most difficult situations is to recommend resection as the first surgical intervention in a patient. There is a strong temptation to attempt reconstruction in these patients first to see if it gets them by, but often this just sentences the patient to two procedures and two recoveries, and delays their ultimate return to an acceptable quality of life.2 This is not to imply that resection is always the correct choice, but the decision regarding reconstruction versus resection is complicated, and many factors need to be considered. In some situations, particularly where there has been prior surgery, the final decision regarding resection versus attempted reconstruction can only be made in the operating room after the previous failed procedure has been undone and the amount and condition of residual stomach assessed. Furthermore, initial resection followed by staged reconstruction may be the safest option in some situations, such as in the setting of a redo esophagectomy after a previous limited distal esophagectomy.
Evaluation

The first critical step after meeting a patient with a complex benign foregut problem is a careful evaluation. Upper endoscopy done by the surgeon or at a minimum viewed by the surgeon as it is being done is indispensable for assessing the situation and developing a strategy. Often a motility study is helpful if the status of the esophageal body is in question, and a video esophagram provides invaluable information in these patients about the presence or absence of a stricture, esophageal bolus transport, and the presence and reducibility of a hiatal hernia. Selectively used tests include gastric emptying scans, 24-hour pH monitoring, impedance testing, barium small-bowel follow-through, and abdominal ultrasound or computed tomography scan. A cardiopulmonary evaluation is also advisable in this patient population before embarking on complex foregut surgery.

If esophageal resection is likely to be necessary then the method of reconstruction needs to be determined, and when considering a colon interposition then evaluation with colonoscopy and potentially a visceral arteriogram is recommended. Colonoscopy or an air-contrast barium radiographic study should be performed before use of the colon as an esophageal substitute to rule out polyps, malignancy, or evidence of either inflammatory disease or significant diverticulosis in the area of the colon to be used. Careful consideration should be given before using a colon graft in the presence of any of these abnormalities with the exception of a polyp that has been completely excised. Routine angiography, although not essential, does provide information about anatomic variations that may be present, but most importantly confirms patency of the colonic vessels and the marginal arcade. Most surgeons prefer to use the transverse colon based on the ascending branch of the left colic artery. A stenosis at the origin of the inferior mesenteric artery alters the choice, and either a different graft or use of the ascending colon based on the middle colic vessels would be advisable under such circumstances. Although intraoperative examination of the vascular integrity of the graft can in most circumstances determine the suitability of the graft, it is time-saving to know preoperatively if there are problems so that a suitable strategy can be prepared.

Operative intervention is undertaken only after a complete assessment of the problem and a frank discussion with the patient about the issues, options, and pros and cons of various therapies have been completed. It is imperative that the surgeon and patient are aligned on the goals of the procedure and the anticipated outcome. Often it is helpful to review all of the patient’s symptoms and clarify whether or not that symptom is likely to change or be relieved with the therapy because commonly some symptoms in these complex patients are unrelated to the foregut process. Unrealistic expectations by the patient may lead to dissatisfaction despite what is otherwise a complete success from a surgical standpoint. Furthermore, great caution should be used in regard to promises of pain relief unless there is a clear anatomic or physiologic explanation for the pain which will be corrected by the surgical procedure. Upper abdominal pain seems to be a particularly prominent component of the collection of symptoms often encountered in middle-aged females with a complex foregut problem, and frank discussions before reoperation about the necessity of weaning off narcotics is a critical aspect of the evaluation and care of these patients.

Indications for Vagal-sparing Esophagectomy

A vagal-sparing procedure should be considered in any patient with a benign process that is to undergo esophagectomy. Ideal conditions include achalasia, end-stage reflux disease, and Barrett’s with high-grade dysplasia or perhaps intramucosal cancer. Absolute contraindications for a vagal-sparing esophagectomy are the need for a lymphadenectomy because sparing the vagus nerves precludes a lymph node dissection, and prior vagal transection or evidence of gastric dysfunction, particularly a gastric bezoar. Because of the potential for gastric emptying problems, diabetes should be considered a relative contraindication for a vagal-sparing procedure. Other relative contraindications include strictures or a history of caustic injury to the esophagus. In these circumstances, medi-