Advances in diagnostic studies, perioperative management, and the techniques of esophageal surgery have greatly reduced mortality, morbidity, and length of hospital stay. Multidisciplinary approaches have even begun to improve the long-term results of treatment for esophageal malignancy. Long-term survival following resection of a carcinoma of the esophagus is usually limited to patients without regional spread whose tumors are confined to the wall of the esophagus. Successful esophageal surgery still requires knowledge of the anatomy and physiology of the esophagus and attention to the details of the operative technique.

CARCINOMA OF THE CARDIA REGION

Resection of lesions of the distal esophagus and gastric cardia with esophagogastric anastomosis is no longer an operation with high mortality, significant complications, and intractable reflux esophagitis. Resection with an overall mortality of 2% should be routine, and anastomotic leakage should be a rare event today. Operation without an intensive care unit stay, with early ambulation, return to oral intake within 48 hours, and hospitalizations of 1 week are achievable even for patients over age 70. Continuing epidural analgesia with patient control after surgery has been an important advance. Although return of normal appetite and meal volume is slow, most patients have no dietary restrictions after the early narrowing of the anastomosis due to edema has resolved.

Important concepts are resection with adequate margins of normal esophagus and stomach, resection of the fibroareolar tissue around the tumor to ensure local circumferential margins, and adequate lymphadenectomy for adequate staging. The stomach must be well mobilized with preserved vascularity and esophagogastric continuity restored with an end-to-side anastomosis. The gastroepiploic arcade must be carefully preserved and the esophageal hiatus widened to prevent a tourniquet effect with obstruction to venous outflow. Properly performed, esophagogastrectomy is a safe operation with good symptomatic and nutritional results.

If a tumor extends into the stomach a significant distance along the lesser curvature or into the fundus, a significant proximal gastrectomy is necessary for adequate tumor margin. If resection of more than 50% of the stomach is required for tumor margins or if the anastomosis is less than 10 cm from the pylorus, a total gastrectomy with Roux-en-Y esophagojejunostomy gives a much more satisfactory result. Intraabdominal esophagogastric anastomoses near the pylorus permit too small a gastric remnant to construct a satisfactory end-to-side anastomosis. Such end-to-end anastomoses have a higher leak rate and severe problems with uncontrolled bile reflux esophagitis.

Laparotomy with right thoracotomy can be used for lesions at any level of the thoracic esophagus, and transhiatal esophagectomy is an option for lesions in the distal 10 cm of the esophagus. I continue to prefer a left thoracoabdominal approach with the patient in the lateral position for tumors whose proximal extent on computed tomography (CT) are clearly below the carina. One-stage mobilization and anastomosis shortens the operating time, provides superb exposure to both esophagus and stomach, and decreases blood loss. Although the upper extent of the tumor should be known with accuracy with CT imaging, the need for additional proximal length can easily be addressed. The surgeon can simply mobilize the esophagus from under the aortic arch and make the anastomosis as high in the pleural space as necessary.

CARCINOMA OF THE MIDDLE AND UPPER ESOPHAGUS

The operation of choice for lesions in the mid-thoracic esophagus is subtotal resection by right thoracotomy following full mobilization of the stomach through a midline laparotomy. I routinely place a
feeding jejunostomy as part of the abdominal phase. The anastomosis should be constructed with an end-to-side technique at the apex of the right chest or in the neck. A stapled anastomosis at the apex of the chest usually provides at least as much esophageal margin as a cervical anastomosis. The same considerations of blood supply and lack of tension apply. Good vascularity ensured by preservation of the gastroepiploic arcade, enlargement of the hiatus to prevent compression, and wide mobilization of the stomach and duodenum to eliminate tension are essential to a satisfactory anastomosis. With appropriate preparation the laparotomy and subsequent right thoracotomy approach can be done safely with resultant good digestive function and little or no reflux problems. The tumor must be staged as completely as possible prior to operation to ensure resectability because the surgeon cannot assess local fixation until after completion of the abdominal mobilization if the thoracic phase is done second. Bronchoscopy and endoscopic ultrasonography are the most accurate studies to determine the extent of invasion for these tumors. Doing the thoracic mobilization first has the advantage of evaluating the local condition early in the operation but adds substantially to the operating time.

I prefer dissection under direct vision through a posterolateral thoracotomy for these lesions even though the same thing can be accomplished by the transhiatal approach. The use of video-assisted surgery may prove to be a good alternative. I use a transhiatal approach only for mid-esophageal lesions that were clearly confined to the wall of the esophagus to avoid injury to major vessels and the trachea. Wide resection around the esophagus is not as feasible in the mid and upper esophagus as it is in the lower third and cardia because of the adjacent respiratory and vascular structures.

My preference has been for a high intrathoracic anastomosis when the location of the tumor permits rather than using a cervical anastomosis on principle. Anastomosis in the neck has a higher leak rate than intrathoracic anastomosis. As the incidence of anastomotic failure in the intrathoracic anastomoses has been reduced to a rarity, the previous arguments about safety have lost their force. Cervical leaks do not necessarily remain localized. If it does not drain anteriorly, a cervical leak can track down and cause thoracic mediastinitis. Cervical leaks, however, often cause strictures that require dilation and can be difficult to manage. The amount of esophagus resected with an anastomosis in the neck is minimally (if any) longer than for an anastomosis at the apex of the thorax. Cervical anastomosis has improved neither local recurrence nor long-term survival.

UNRESECTABLE CARCINOMA

Patients whose lesions appear locally unresectable on initial evaluation by CT scan or ultrasonography should be treated with radiation and chemotherapy and then reevaluated for surgical treatment after completing the course of neoadjuvant therapy. For patients with significant invasion beyond the esophageal wall, a multimodality approach with radiation and chemotherapy has the potential to reduce significantly or even eliminate the tumor mass. Resection may be feasible for palliation or even with curative intent after such neoadjuvant treatment.

Tumors that invade the aorta or the tracheobronchial tree must be approached with extreme caution. It is doubtful that heroic measures can prove more beneficial than a palliative approach, and the chance of creating an unsalvageable situation is great.

Distant metastases are not a contraindication to palliative resection of a locally resectable tumor. The patient’s condition and the potential benefit must be carefully weighed when deciding whether to resect for palliation. A suitable patient is one whose tumor has caused obstruction or bleeding and who can easily withstand the operation. For such a patient, the ability to swallow can significantly enhance the quality of life. A palliative resection can be accomplished during a short hospitalization in appropriately selected patients.

Although it is feasible to interpose a colon segment between the proximal esophagus and the stomach for palliation of obstruction caused by an unresectable carcinoma, the operation has a high mortality rate and provides poor palliation for the short expected survival of such patients. The development of new techniques including endoscopic treatment with dilators, lasers, and stents provides a much more acceptable means of palliation.

CARCINOMA OF THE ESOPHAGUS: TRANSHIATAL OR TRANSTHORACIC APPROACH

Each approach to resection of esophageal cancers has had strong proponents. Each also has advantages and disadvantages, and no series has demonstrated a clear superiority of one over the others. Although the left-sided approach I favor for distal lesions has been widely accepted, some have reported excessive mortality and leak rates. We have not had this experience, and others have also noted exceedingly low mortality and complication rates. Akiyama [1], Ellis et al. [2], and Mathiesen et al. [3] have reported the same experience we have had with complications.