Esophagogastrectomy
Successful Palliation for Esophageal Carcinoma
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Although esophagogastrectomy offers the best chance for cure and alleviation of dysphagia in the treatment of esophageal carcinoma, the operative mortality and morbidity can be prohibitively high. To investigate means for reducing the rate of surgical complication, a study was made of a six-year series of 36 procedures involving 32 esophagogastrectomies and four colon interpositions. Patient survival rates were 60 percent at one year, 40 percent at two years, and 9 percent at five years with a mean survival of 22 months. Histology of the tumor did not significantly affect prognosis. The three operative mortalities were caused by pulmonary insufficiency in one overhydrated patient, and coagulopathy in two alcoholic patients with underlying liver disease. Anastomotic leakage, the precipitating factor for the majority of operative mortalities in the recent literature, occurred in one non-fatal case. This low incidence is linked to the implementation of steps to maximize blood supply and minimize tension on the anastomosis line. Anastomotic stricture was seen and easily dilated in three patients. The five cases of intra-esophageal tumor recurrence which occurred despite tumor-free margins may have been avoided by more extensive resection.

A patient with advanced esophageal carcinoma once explained that his main enjoyment in life prior to this illness had been eating oysters. He was reconciled to his eventual fate, but claimed that life was not worth living without the ability to swallow. Choosing appropriate treatment for such a patient is controversial, especially in light of the poor prognosis of the disease when dysphagia brings the patient to the physician.

The survival rate of untreated esophageal carcinoma is three to five months. Especially devastating are deaths from tracheoesophageal fistulas and complete esophageal obstruction with resulting aspiration and inability to eat. A number of treatments are advocated in the literature including esophageal intubation, x-ray therapy, chemotherapy, esophageal bypass, and esophagogastrectomy. Of these therapies, successful removal of the tumor mass with esophagogastrectomy offers the best palliation and is potentially curative. The frequent occurrence of morbidity and mortality with this procedure, however, argues against its use. Many conflicting reports have been published on the incidence of these complications. We describe measures taken to minimize the morbidity and mortality of esophagogastrectomy performed at our community hospital.

MATERIALS AND METHODS
From January, 1978 through December, 1983, 32 patients at the Wilmington Medical Center underwent 36 procedures involving esophagogastrectomy in 32 and right colon interposition in four. There were 28 men and four women with a mean age of 57. Presenting symptoms were dysphagia in 30, weight loss in 15, chest pain in eight, regurgitation in five and hoarseness in one.

All patients had radiographic findings consistent with carcinoma. Only two had negative results of biopsies at esophagoscopy. Twenty-two patients had squamous cell carcinoma and ten had adenocarcinoma. The squamous cell carcinomas were upper esophageal in two patients, middle in 15, and lower in five. The adenocarcinoma lesions were middle esophageal in three patients, lower in four, and at the gastroesophageal junction in three. Since our purpose was predominantly palliative and the presence of intra-abdominal and mediastinal metastases would not have dissuaded us from operating, we did not pursue extensive preoperative evaluation. Contraindicated for surgery were medically unfit patients with recent myocardial infarction or poor pulmonary function, and patients in whom extensive metastases rather than the primary esophageal lesion were the predominant problem.

Except for five cases treated by left thoracotomy and one by gastric pull through without a thoracotomy, all patients underwent a midline laparotomy followed by right thoracotomy. Pyloroplasty was performed in 18 patients. Esophagogastrectomy or esophagogastroduodenostomies were completed with sutures in two layers in 24 operations and by EEA auto suture in 12 operations.

RESULTS
Of the 36 operations, three resulted in death within 30 days, an operative mortality of 8 percent. Sixty percent of the patients survived more than one year and 40 percent of patients were alive at two years. Although only three patients (9 percent) survived past five years, six additional patients are alive at the time of this study (range, 18-45 months; median, 29 months). Mean survival for the adenocarcinoma patients was 26 months (median, 26 months) and for the squamous cell carcinoma patients was 21 months (median, 13 months) with an overall mean of 22 months (median, 17 months). Patients were further categorized according to operative findings and the American Joint Commit-
tee's cancer staging criteria. Nine patients (six with squamous cell carcinoma, three with adenocarcinoma) had an obstructive or greater than 5 cm tumor without evidence of extra-esophageal extension or metastases (stage 2) and they had a mean survival of 33 months (range, 2-69 months). Twenty-three patients (16 squamous cell carcinoma, seven adenocarcinoma) had metastatic disease, disease in regional lymph nodes, or extra-esophageal extension (stage 3) and their mean survival was 13 months (range, 0-38 months).

Postoperative complications included one anastomotic leak, one empyema, three arrhythmias, and three patients with respiratory difficulties. In all operated patients the ability to swallow was eventually restored. The average hospitalization was 16 days with four patients (11 percent) requiring stays greater than 22 days.

**COMMENT**

Many authors report that esophagogastrectomy provides excellent return of swallowing function. The arguments concerning the palliative success of this procedure revolve around the operative mortality and morbidity. Reviewing our experience identifies means of mitigating surgical complications.

The first of the three operative mortalities died of pulmonary insufficiency, probably secondary to volume overload. In postesophagogastrectomy patients, pulmonary compromise is common and should be avoided by preventing overhydration. The other two operative mortalities were in patients with cirrhosis of the liver who had normal clotting parameters preoperatively, but who continued to bleed after the procedure. Since a high percentage of individuals with esophageal carcinoma have a history of previous alcohol abuse, many of these patients are at risk for developing cirrhosis of the liver. This complicating factor should be identified and these patients' operative risks re-evaluated.

Of the 36 cases, one developed an anastomotic leak. A review of the literature since 1970 revealed that this complication was responsible for the majority of operative mortalities. The following steps can reduce the incidence of anastomotic leakage and should be implemented during surgery to maximize blood supply and minimize tension on the anastomotic line:

1. Leave a generous amount of attached omentum with which to wrap the anastomosis in the chest.
2. After bringing the stomach or colon into the thorax, transfix the organ to the diaphragmatic surface with two interrupted stitches before making a thoracotomy incision to prevent the organ from twisting or sagging back into the abdomen.
3. Avoid devascularizing the esophagus proximal to the anastomosis line.
4. The anastomosis, which may be made by suture or by EEA stapler, should be end-to-side on the anterior stomach wall, as the blood supply here is excellent and the anastomosis is technically easier. If using the EEA stapler, pick a spot on the proximal lesser curvature of the stomach to insert the instrument (Fig 1). After the anastomosis, the distal esophagus and the proximal lesser curvature together with the EEA instrument insertion hole can be removed with use of a TA stapler (Fig 2).
5. Perform a partial fundoplication to reinforce the anastomosis line and prevent acid regurgitation (Fig 2). Wrap the anterior anastomosis line with the aforementioned omentum.
6. Suspend the stomach to the chest wall with interrupted sutures to prevent anastomotic dragging (Fig 2).
7. Pull the chest tubes and the nasogastric tube after the anastomosis is checked for leakage by contrast medium (Gastrografin) swallow on the sixth postoperative day.

The sole anastomotic leak, which was later found to be secondary to ischemia at the suture line, became apparent on the seventh postoperative day. The patient had developed empyema of the right chest; therefore,
an anastomotic takedown with jejunalostomy and esophagostomy was performed. Seven weeks later, the patient underwent right colon interposition and continued to survive without dysphagia for 19 more months.

No stricture was reported in the 12 autosuture anastomoses. Among the 24 hand-sutured anastomoses, three cases of stricture were seen and these were treated successfully by antegrade dilation. Five patients developed dysphagia secondary to recurrent tumor, a complication which has been listed as a major problem in other studies as well. One of these patients needed revision of the anastomosis, two needed colon interposition, and two individuals required retrograde dilation during exploratory laparotomy. Tumor-free margins had been established in all five cases; however, recent studies have noted a high incidence of submucosal skip lesions and lesser curvature micrometastases in these patients. Since tumor-free margins fail to guarantee tumor-free anastomoses, we recommend extending resections as far proximally as possible and including a larger segment of the lesser curvature in the resection.

Palliation is difficult to evaluate in a ravaging disease such as esophageal carcinoma. The patients in this series experienced relief of dysphagia and a prolongation of life without significant surgical morbidity and mortality. Minimizing the operative complications by the aforementioned means enhances the ability of the surgeon to alter the devastating natural history of this disease.

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REFERENCES

Figure 2. Fundoplication of esophagogastrostomy. Note EEA insertion site on lesser curvative of stomach.