TECHNIQUE

Stomach As A Conduit For Esophagus - A Study Of 105 Cases

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Abstract

Background: The stomach is a well known esophageal substitute. To analyze the mortality and morbidity following total laryngopharyngoesophagectomy (TLPE) with pharyngogastric anastomosis done as a single-stage procedure.

Method: The technique employed was esophageal extraction by stripping method followed by gastric pull up. In 104 patients transposition of the stomach was done through posterior mediastinum and in one patient through preternal route.

Results: Significant post-operative complications included pharyngocutaneous fistula in 15 patients (14.3%) and pneumonitis in 20 patients (19%). Fifteen patients (14.3%) died due to the causes related to surgery. All patients who survived were able to swallow solid and liquid food, on an average of 14 days post-operatively.

Conclusion: The stomach as a conduit following TLPE is procedure which gives satisfying results when done in carefully selected patients.


Key words: Gastric pull up, hypopharyngeal carcinoma, laryngectomy, esophagectomy, pharyngectomy.

Introduction

Transposition of the entire stomach with intact blood supply through the posterior mediastinum into the neck with pharyngogastric anastomosis was first utilized by Ong and Lee in 1960. They described extraction of the esophagus by the transthoracic route, which required a thoracotomy. Le Quene and Ranger reported 10 cases of gastric transposition in which the esophagus was mobilized by a right thoracotomy in 3 cases and by extrapleural blunt finger dissection in 7 cases.

In our institution, we initially performed gastric pull-up by using the technique of extrapleural extraction of the esophagus by blunt finger dissection. Our first three patients had severe chest complications which included pneumothorax, chylothorax and pleural effusion. Hence we changed our technique to the one reported by Akiyama et al of extraction of the esophagus by the stripping method. Akiyama et al extracted the esophagus downwards. One of us modified this technique and extracted the esophagus upwards, thus permitting en bloc excision of the oropharyngeal carcinoma with larynx, pharynx and esophagus. The technique and its complications are now being reported.

Methods

Patients undergoing total laryngopharyngoesophagectomy (TLPE) followed by gastric transposition between 1985 and 1995 were included in this study. These included 68 men and 37 women aged. The youngest patient was 28 to 70 years peak age incidence between 50 and 69 years (40%) patients had hypopharyngeal carcinoma and 3 patients had carcinoma upper esophagus. Of the former, 60 were in the postcricoid region, 26 in the pyriform fossa, 6 in the posterior pharyngeal wall. There were 9 T1 lesions (8.57%), 6 T2 lesions (5.71%), 69 T3 lesions (65.71%), and 18 T4 lesions (20%); 37 were N0 (54.3%), 42 N1 (40%), 6 N2 (5.7%). No distant metastasis was found. All the patients had presented with dysphagia and had poor nutritional status. Thirty-five patients were irradiated preoperatively.

Technique

After operability was confirmed by the ENT surgeons in the neck, mobilization of the stomach was done through a laparotomy by general surgeons. All vessels of the stomach were divided except the right gastro-epiploic artery and vein and right gastroepiploic artery and vein. The abdominal esophagus was mobilized and the esophageal hiatus widened bluntly to admit 3 fingers. In the initial few patients the left fibers of the right crus of the diaphragm were incised for this purpose. The vagi were divided and pyloromyotomy was performed. A varicose vein strip (Myer's) was introduced into the esophagus through an incision made on the left side of the cervical esophagus. The gastroesophageal junction is transected; the stripper brought out through the cut lower end of the esophagus, and a medium sized stripper head fixed to the stripper. A stout silk suture was tied tightly around
the lower end of the esophagus, thereby securing the stripper. To the head of the stripper two long silk sutures were tied and their other end was fixed to the highest point (fundus) of the stomach. These two threads are used to pull the stomach after the esophagus is removed. The cut cardiac end of the stomach was closed in two layers. Pharyngogastric anastomosis was done by using inner continuous 2-0 nonabsorbable silk and outer interrupted 2-0 nonabsorbable silk sutures. To reduce the tension in the suture line, in all patients the neck was flexed in the post-operative period. In the post-operative period, nasogastric tube feeding was given for an average of 7 days and oral feeding was started after an average of 14 days.

Results
Our technique of esophageal extraction by stripping method and gastric pull-up through the posterior mediastinum failed in 2 patients (1.9%). One patient had massive bleeding from the posterior mediastinum. Immediate thoracotomy was done and the torn muscle coat of the esophagus which was left behind was removed, thereby securing hemostasis. In another patient esophageal extraction was not possible; we could feel an associated carcinoma of the midesophagus through the esophageal hiatus. The stomach was passed in the subcutaneous plane, brought to the neck and pharyngogastric anastomosis was done on the left side.

Two initial patients had pneumothorax (1.9%), probably caused by injury to the pleura while incising fibers of the right crus of the diaphragm to widen the esophageal hiatus. With blunt finger widening of the hiatus in subsequent cases there were no pneumothorax.

Two cases of thoracic duct injury were encountered. One patient who developed chylothorax underwent thoracotomy an attempt at ligation of the thoracic duct was unsuccessful. He died in the postoperative period. In the other patient the leak of lymph persisted in the neck for 20 days and stopped with conservative line of management.

There were 3 cases of hypoglossal nerve injury which occurred during radical block dissection of the neck which was done in 48 patients.

Five patients underwent splenectomy due to splenic tear while mobilizing the stomach.

One patient died on the table due to injury to the posterior wall of the trachea during excision of the specimen, leading to severe hypoxia, cyanosis, and tension pneumothorax.

 Fifteen patients (14.3%) died in the post-operative period. The causes of death included chronic obstructive pulmonary disease, pneumomitis and septicemia. One patient developed carotid blow-out after four weeks and died.

Pharyngocutaneous fistula was observed in 15 patients (14.3%) in the post-operative period; 10 of these healed with conservative treatment. During this time, nutrition was maintained by nasogastric tube feeding for a period ranging from 20 to 60 days, followed later by oral feeding. The remaining 5 patients died.

Neck wound infection was found in 20 patients (19%). Temporary dysphagia and regurgitation were seen in 23 patients (24%). All these patients underwent gastroscopy after 3 weeks; there was no mechanical obstruction. Nineteen days after TLPE, one patient had gastric outlet obstruction demonstrated by barium study; this patient underwent a gastrojejunostomy (in the chest) which relieved the obstruction.

Abdominal wound dehiscence was seen in one patient in whom secondary suturing was done later.

All patients who survived were able to eat by mouth on an average of 14 days postoperatively range (7-60) day. The delay in starting oral feeds was due to pharyngocutaneous fistula.

Discussion
The stomach is large and long enough to be brought up to the neck or even up to the hypopharynx, for pharyngogastric anastomosis. It has elasticity and good intramural blood supply and only one pharyngogastric anastomosis is required in the neck.

Extraction of the esophagus by blunt finger dissection in the mediastinum can produce complications like pleural effusion, pneumothorax and chylothorax. We adopted the method of stripping upwards to extract the esophagus without blunt finger dissection in the mediastinum and did not have any serious chest complications. After stripping the esophagus, we dilated the esophageal hiatus bluntly by fingers. If a hiatus can admit 3 fingers we feel it can easily admit the stomach for a posterior mediastinal transfer.

Goldberg et al reported 21% incidence of pharyngocutaneous fistula. In our series, it was seen in 15 patients (14.3%). The reasons for pharyngocutaneous fistula may be previous irradiation to the neck, as in 35 of our patients, poor nutritional status of the patient and technical error of suturing.

Moore et al used the technique of fixing the stomach with several sutures between its posterior wall and did anterior longitudinal spinal ligament to relieve tension on the anastomatic line. We not perform this.

It is our routine practice to start the nasogastric Ryle's tube feeding by about day 7 and oral feeding by
about 12-14 days. Bahadur et al\textsuperscript{8} reported oral feeding around 10-12 days. We did not perform feeding jejunostomy in any case. However when there was an anastomotic leak, oral feeding was delayed to a mean of 30 days.

In Orringer's series\textsuperscript{9} of 94 operative survivors out of 100 cases of transthiatal esophagectomy without thoracotomy, 42 patients underwent outpatient dilations for cervical dysphagia and six developed true fibrotic anastomotic strictures out of 96 cases of gastric pull-up. We had 23 cases who complained of dysphagia, none had stricture and none required dilation. It is a well-known fact that gastric pull-up results in lower rate of stricture and fistula but gives rise to higher rate of swallowing problems. It is preferable to perform fiber-optic gastrointestinal endoscopy before surgery to exclude associated esophageal and gastric pathology in patients in whom the scope can be passed. Otherwise a barium study should be performed.

Sixteen patients died due to this causes related to surgery (16.8\%) compares with 12.5\% deaths reported by Lau, et al. The mortality rate fell from 20\% in the initial 50 cases to 11\% in the next 55 cases, due to improvisation of the technique, expertise, reduction in operating time, and better post-operative management in the intensive care unit.

In conclusion, transposition of the entire stomach with intact blood supply through the posterior mediastinum to the neck has been found quite useful in selected patients. The operation done in one stage and required only one anastomosis. The excellent blood supply of the stomach affords great protection against necrosis and anastomotic disruption even in patients who receive heavy irradiation. The procedure provides extremely rapid and lasting restoration of the alimentary tract continuity following total laryngopharyngo esophagectomy for carcinoma of the cervical esophagus or hypopharynx.

References