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Jejuno-Esophageal Interposition Graft as a Salvage Procedure, Report of Two Cases

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Abstract: Gastric and colon interposition are the commonly used in esophageal operations. In this report, Two jejunal esophageal interposition cases are presented. In the first patient, a free jejunal interposition graft was used to re-establish swallowing route in a patient who suffered severe esophageal and gastric chemical burn, and failure of colon interposition graft. The second patient had a leak of Roux-en-Y jejuno-esophageal anastomosis performed after resection of gastric adenocarcinoma. The patient developed subdiaphragmatic abscesses and empyema. The esophageal-intestinal continuity was re-established with a new Roux-en-Y jejuno-esophageal anastomosis through a right thoracotomy. Jejunal graft should be considered in salvage esophageal substitution.

Keywords: Esophageal Interposition Grafts, Jejunal Interposition, Esophageal Leak, Esophageal Replacement, Free Jejunal Graft

1. Introduction

Esophagectomy may be performed as part of the management plan of various esophageal conditions, such as carcinoma, Barrett's esophagus, severe chemical burn, or injury. The stomach or colon are usually preferred for esophageal substitution as interposition grafts. However, these complex and difficult operations are associated with serious complications, such as anastomosis leak, sepsis and ischemia of the interposition grafts [1].

Management of these complications requires wide knowledge of available options and techniques, and sound clinical judgment in their application. In this article, two complex cases are presented where jejunum was used to salvage gastrointestinal continuity.

2. Case Report 1

In a suicidal event, a 42-year-old man presented to the emergency room after swallowing a large amount of a strong alkaline solution (Oven Cleaner). After resuscitation and stabilization, evaluation esophagoscopy revealed severe esophageal and gastric burn. Nasogastric tube was placed, parenteral hyperalimentation was started, and a schedule of repeated esophageal dilation was planned. Unfortunately, two weeks later during a session of esophageal dilation, he developed gastric perforation and acute abdomen. Emergency exploratory laparotomy was performed, and the gastric perforation was repaired. Marked contracture and full thickness scarring was reported affecting most of the stomach except for a small part near the pylorus. Due to the marked scarring of the esophagus and stomach, esophagogastrectomy and retrosternal left colon interposition graft operation was performed. However, he developed a leak at the cervical esophagocolic anastomosis due to ischemic necrosis of the upper part of the colon graft. Arteriography showed impaired blood supply of the upper third of the colon graft. Resection of the ischemic colon graft segment was attempted through mid-sternotomy approach. Blood transfusion of two units was required during this operation, and it was decided to complete it in two stages to allow better recovery and stabilization. After 48 hours, the new mid-sternotomy incision was re-entered, and the ischemic segment of the colon was resected. The midsternotomy incision was

extended into the previous upper abdominal midline surgical incision allowing full inspection and testing of the colon graft integrity and blood supply. A suitable segment of jejunum was used as a free graft in the neck. It was difficult to dissect the small blood vessels in the neck due to the previous infection and scarring. The artery of the free jejunal graft was anastomosed to the left common carotid artery, and its vein to the left internal jugular vein using 7/0 Prolene continuous sutures and 2.5 magnification loops. The jejunal segment was cooled during the vascular anastomosis. The total cool ischemia time was 40 minutes. After re-establishing blood supply to the free jejunal graft, hemostasis was secured, the upper end of the jejunal graft was anastomosed end-to-end to the cut edge of the esophagus and the lower end of the graft was anastomosed end-to-end to the cut edge of the colon graft as interposition free graft using hand suture technique (Figure 1). The postoperative course was uncomplicated, Barium swallow performed one week later showed no leak, oral intake was gradually resumed, and the patient was discharged 2 weeks later after remaining in the hospital for a total of about 3 months.

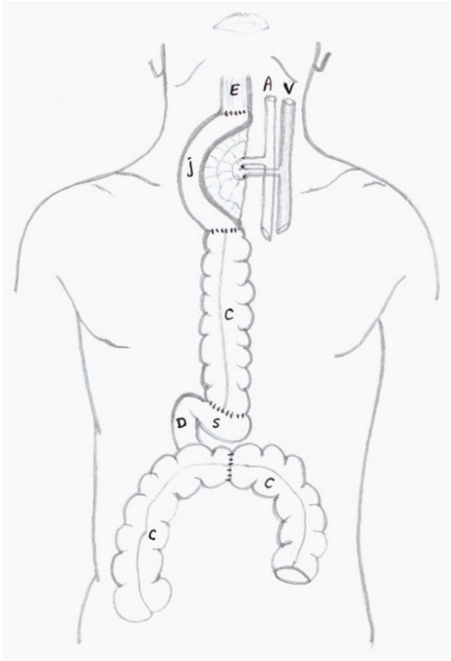

Figure 1. *Illustration of the final operation in case 1 showing the free jejunal interposition graft in the neck between the esophagus and the colonic graft.*

3. Case Report 2

Total gastrectomy and Roux-en-Y esophagojejunal anastomosis was performed for the treatment of a 40-year-old man suffering from adenocarcinoma of the stomach. Unfortunately, he developed a leak at the esophagojejunal anastomosis with left subdiaphragmatic abscess and empyema. Parenteral hyperalimentation was started, the subdiaphragmatic abscess was surgically drained on two occasions, and a left chest tube was placed to drain the empyema. The leak into the abdomen stopped, and the abdominal drains were removed. However, the patient remained septic, and the leak persisted into the left pleural cavity. One month later, a left thoracotomy was performed and the esophagus was divided in a healthy area above the esophagojejunal anastomosis. Both divided ends were closed to stop further contamination into the left pleura. The left empyema area was irrigated and drained using two chest tubes. Two naso-esophageal tubes were placed in the proximal closed esophagus, one for slow continuous diluted Betadine irrigation, and the other for continuous low suction to keep the esophagus empty from saliva and Betadine irrigation. The patient was kept on parenteral hyperalimentation and antibiotics. The patient became afebrile and improved. After one week, the esophageal irrigation was stopped. Three weeks later, right thoracotomy was performed along with re-entry of the previous midline abdominal incision. A new Roux-en-Y jejunal interposition pedicle graft was prepared, passed anterior to the colon and the liver to avoid severe adhesions in the region of the previous operations, and anastomosed end-to-end with the healthy distal esophagus (Figure 2). The postoperative course was uncomplicated, and the patient was discharged after a total hospital course that lasted about four months.

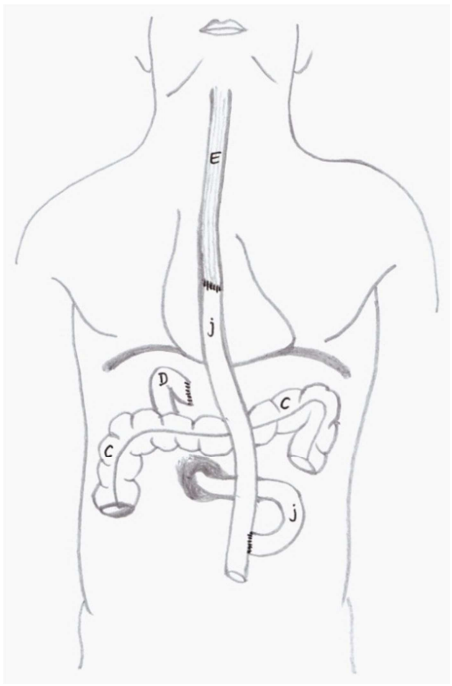

Figure 2. *Illustration of the final operation in case 2 showing the new Roux-en-Y jejunal graft to the distal esophagus in the chest.*

4. Discussion and Conclusion

The use of jejunal graft in esophageal substitution operations was reported as early as 1907 by the Swiss surgeon César Roux [2]. In 1947, Longmire and Ravitch reported the use of a long “supercharged” segment of jejunum as esophageal interposition graft using microvascular technique. The blood supply of the lower part of the jejunal graft is supplied by its original blood vessels, and the upper part by new arterial and venous anastomosis to

suitable blood vessels in the neck [2]. Ascioti et al. [3] suggested that the use of supercharged microvascular augmentation of a pedicled jejunal flap allows creation of a longer conduit, making it possible to replace the entire esophagus with jejunum. They reported total esophageal reconstruction with supercharged pedicled jejunum in 26 patients between 2000 and 2004. Twenty-four of 26 patients were ultimately discharged with an intact supercharged pedicled jejunum flap, for an overall success rate of 92.3%. Anastomotic leaks occurred in 27% of the patients.

In a good review by Blackmon et al [4], the use of this technique was reported in 60 patients between 2000 and 2010. Anastomosis leak occurred in 32%, and 50 patients (83%) were able to return to a regular diet. The 90-day mortality rate was 10%. Gaur and Blackmon noted that the jejunum is uniquely suitable for esophageal reconstruction because it is relatively abundant, does not require a formal bowel reparation, has similar luminal size compared to the esophagus, has intrinsic peristalsis, and may not undergo senescent lengthening to the extent that colon does. The mesenteric vasculature can easily be dissected and mobilized with adequate length to be used as a pedicled or free graft replacing virtually any or all segments of the esophagus [2]. However, the use of jejunum in esophageal substitution procedures is not commonly used except when gastric or colon interposition is not available, or complicated.

Identification of high risk patients, careful operative techniques to improve conduit vascularity, intraoperative and postoperative monitoring of vascular integrity in the used grafts, early detection and timely management of conduit ischemia and necrosis are key in achieving good outcome [5]. The two cases reported here demonstrate the possible use of the jejunum to successfully salvage esophageal-intestinal continuity in complex and difficult situations. Management of complicated esophageal interposition grafts requires wide knowledge of available options, and sound clinical judgment to apply these techniques in a way suitable to each individual patients.

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