



Operative Technique

Gastric tube esophagoplasty for pediatric esophageal replacement



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ABSTRACT

Background: Esophageal replacement in children is indicated in cases of esophageal atresia with or without fistula, in case of long gap esophageal atresia or failed primary repair. Intractable post corrosive esophageal stricture is considered also a major indication for replacement.

Methods: This is a cohort retrospective study of esophageal replacement cases by gastric tube carried out at the pediatric surgery department at Cairo University between 2011 and 2015. We reported 50 patients (30 boys and 20 girls); the ages ranged from 7 months to 9 years. Esophageal atresia cases were 27 while caustic esophageal stricture cases were 23. Isoperistaltic gastric tube technique was done in 45 patients while antiperistaltic (reversed) gastric tube technique was done in 5 cases. Retrosternal route was chosen in 38 patients while transhiatal route was chosen in 12 patients.

Results: Leakage and stricture were the most common complications. We had 5 cases of mortality, which were caused mainly by chest related complications. We had excellent to good results during long term follow up in terms of weight gain, swallowing pattern, quality of life, and overall satisfaction

Conclusion: Gastric tube is a satisfactory surgical method for esophageal replacement in children.

Level of Evidence: III.

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Caustic ingestion remains a significant health concern with cases ranging from 1000 to 20,000 per year with subsequent post corrosive esophageal stricture (PCES) [1]. On the other hand, incidence of esophageal atresia (EA) in Africa probably corresponds to 1 per 3000–4500 [2].

These two conditions remain the main indications for esophageal replacement in the pediatric population [3]. Thus, it is important for the pediatric surgeon to be aware of the various options available for replacement but master only one technique [4].

So an efficient conduit from the mouth to the stomach needs to be created, to satisfy the nutritional needs of the child and should continue to grow with the child and function well into adult life [5].

In this study, we shall highlight the outcome of a single institution experience in gastric tube esophagoplasty (GTE) procedure for esophageal replacement.

1. Material and methods

1.1. Data collection

The study was performed at Cairo University Pediatric Hospital on cases operated upon between April 2011 and December 2015. Retrospective data were collected concerning original disease, perioperative details, postoperative complications, long-term symptoms and current

status of the patients. Data were collected using REDCap v 6.1 and analyzed using SAS software.

1.2. Criteria of selection

All patients with post corrosive esophageal stricture that failed endoscopic dilatation and long gap esophageal atresia, operated by the gastric tube esophagoplasty procedure were included in this study. Any inflammatory or malignant esophageal conditions were excluded from the study.

1.3. Preoperative assessment

All selected cases were subjected to full routine clinical and investigative studies preoperatively to assess fitness for surgery and detect any associated anomalies. Preoperative chest X-ray and contrast swallow & meal were performed to detect the site and extent of the stricture and to detect if there is any pathological stricture of the stomach at least one month after ingestion of the corrosive (Fig. 1). Preoperative endoscopic study was performed as a trial for dilatation for the post corrosive stricture group every 3 weeks and the failed cases were referred to the pediatric surgery department at Cairo University, where secondary dilatation was attempted. Cases that failed 2 attempts of surgical dilatation by Savary-Guillard were considered as a failure and prepared for esophageal replacement.

Cases were admitted one day before surgery. Preoperative gastrointestinal tract (GIT) preparation was not done.

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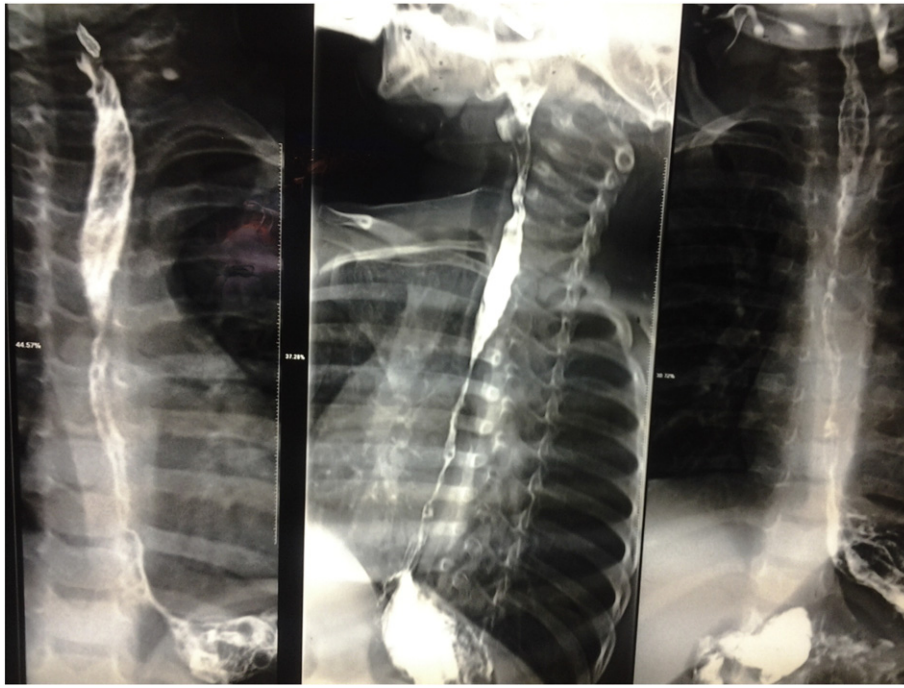


Fig. 1. Preoperative contrast swallow to assess esophageal stricture & any other pathology.

An informed consent was taken for all cases before surgery. Careful preoperative contingency surgical planning in case intra-operative abandoning of the procedure for esophageal replacement. All cases were done under general anesthesia & operated upon by single surgical team.

1.4. Operative technique for GTE procedure

The abdomen was opened through a midline incision, and the gastrocolic omentum was divided at a safe distance from the gastroepiploic vessels. The stomach was incised approximately 2 cm distal to the fundus, where a horizontal incision was made through the anterior and posterior walls of the stomach to create an Isoperistaltic tube pedicled on the right gastroepiploic artery. With an 18-French to 24-French chest tube placed in the stomach along the greater curvature to act as a guide to ensure the construction of an appropriately sized gastric tube, a 55 mm linear cutting gastrointestinal anastomosis (GIA) stapler was applied 1½ to 2 cm from the greater curvature, encompassing both anterior and posterior gastric walls to cut the stomach parallel to the greater curvature to form a tube (Fig. 2) that was reinforced with interrupted sutures of 4-0 nonabsorbable material. Two to three applications of the stapler were usually required (Fig. 3). The short gastric vessels were divided, and the spleen was protected during the construction of the tube (Fig. 4).

The neck incision was placed just above the suprasternal notch to the left side or at the site of esophagostomy (Fig. 5). The route to the neck was selected at this point, and a retrosternal tunnel was created using finger dissection from cervical and abdominal approaches (Fig. 6).

The gastric tube was drawn into the chest and passed in a cranial direction into the neck. The orientation of the pedicle was maintained to prevent twisting of the tube or kinking of the pedicle (Fig. 7). Anastomosis with the cervical esophagus was done with a single layer of 4/0 absorbable sutures. The abdomen and neck were drained (Fig. 8). A feeding Stamm gastrostomy was performed in some cases.

1.5. Postoperative care

All cases received postoperative antibiotics, nonsteroidal anti-inflammatory drugs and Vitamin K. Postoperative care of the wound was done by local antiseptic and topical antibiotic as instructed to the mother after discharge. Care & monitoring of the drains were done which were then removed by the fifth postoperative day.

Cases were followed up postoperatively in the surgical intensive care unit (SICU) for the first few days then at the ward. Intravenous fluids were used until return of bowel motion. Oral feeding was started later provided that no signs of leakage were noted clinically or by contrast swallows or substituted by gastrostomy feeding. Physiotherapy of the chest started from the second day postoperatively.

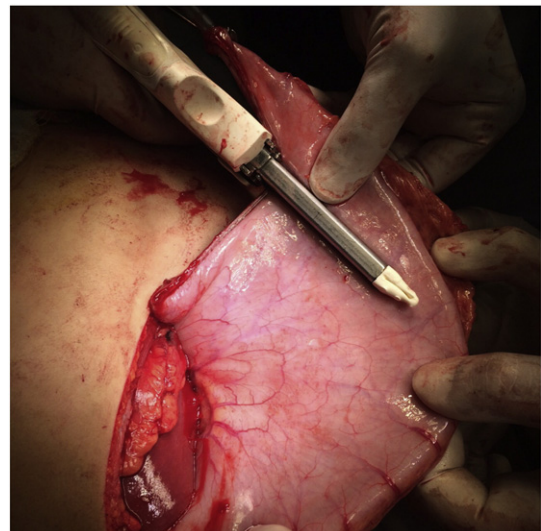


Fig. 2. A linear cutting gastrointestinal anastomosis (GIA) stapler was applied 1½ to 2 cm from the greater curvature.

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