Esophageal Replacement

4

Michaela Kollisch-Singule and Jennifer Stanger

Indications and Benefits

- Esophageal stricture (from caustic injury, reflux esophagitis, anastomotic scarring after esophageal atresia repair, achalasia)
- Congenital esophageal stenosis (if not amenable to resection with end-to-end anastomosis)
- Long-gap esophageal atresia
- Benefits: Continuity of gastrointestinal tract to optimize enteral nutrition

Risks and Alternatives

- Standard risks (bleeding, infection, need for additional procedures, risks of anesthesia)
- Injury to adjacent structures (azygous vein, vagus nerve, posterior membranous trachea)
- Vascular insufficiency with necrosis
- Anastomotic stricture/leak/ulcer
- Delayed gastric emptying, disordered peristalsis, ulcers
- Long term: Dilation and dysmotility of the conduit
- Alternatives: Serial dilations of strictures, delayed repair of atresia/stenosis, gastric/jejunal feeding tubes for enteral nutrition

Essential Steps

1. Abdominal incision
2. Mobilization of esophagus
3. Mediastinal dissection of esophagus
4. Neck dissection of esophagus
5. ***If {Colon interposition}***
   (a) Division of gastrocolic ligament
   (b) Mobilization of ascending and descending colon
   (c) Conduit assessment for perfusion
   (d) Ligation of left branch of the middle colic artery and the marginal artery (with preservation of the ascending branch of the left colic artery)
   (e) Transection of transverse colon
   (f) Mobilization of colon up mediastinum
   (g) Division of descending colon
   (h) Transection of stomach distal to gastroesophageal junction
   (i) Withdrawal of esophagogastric specimen from mediastinum through neck
   (j) Creation of colono-gastric anastomosis
   (k) Creation of colo-colonic anastomosis

M. Kollisch-Singule (✉)
SUNY Upstate Medical University, Department of General Surgery, Syracuse, NY, USA
e-mail: KolliscM@upstate.edu

J. Stanger
SUNY Upstate Medical Unversity, Department of Pediatric Surgery, Syracuse, NY, USA

D. J. Papandria et al. (eds.), *Operative Dictations in Pediatric Surgery*,
https://doi.org/10.1007/978-3-030-24212-1_4

6. ***If {Gastric tube}***
   (a) Gastrohepatic ligament divided down to pylorus
   (b) Mobilization of greater curvature of stomach
   (c) Ligation of left gastric artery
   (d) {Pyloroplasty}
   (e) Creation of gastric tube with sequential staple loads
   (f) Withdrawal of esophagogastric specimen from mediastinum through neck
7. Transection of cervical esophagus
8. Anastomosis between cervical esophagus and colon/gastric conduit
9. Penrose drain into neck
10. {Jejunostomy feeding tube}
11. Closure

Note These Variations

- Open, laparoscopic, robotic approach
- Conduit choice: Colonic interposition, gastric tube, gastric transposition, jejunal substitution
- Stapled/handsewn anastomoses
- Suture choices
- Placement of jejunostomy feeding tube

Template Operative Dictation (Open)

Preoperative Diagnosis Esophageal *stricture/stenosis/atresia*

Postoperative Diagnosis Same as preoperative diagnosis

Findings Same as postoperative diagnosis

Procedure(s) Performed Esophageal replacement

Anesthesia *General*

Specimen *Esophagus/esophagogastrectomy*

Drains Penrose in neck

Implants None

Estimated Blood Loss ___ mL

Indications This is a/an ___*-day/week/month/year*-old *male/female* with esophageal *stricture/stenosis/atresia*, which was causing *dysphagia/odynophagia/inability to maintain oral nutrition. He/she* was deemed to be a suitable candidate for esophageal replacement with a *colon transposition/gastric tube.*

Procedure in Detail Following satisfactory induction of anesthesia, the patient was placed in a supine position and appropriately padded. {A Foley catheter and nasogastric tube were placed.} Timeouts were performed using both pre-induction and pre-incision safety checklists with participation of all present in the operative suite. These confirmed the correct patient, procedure, operative site, and additional critical information prior to the start of the procedure. The abdomen and left neck were then prepped and draped in the usual sterile fashion. Prophylactic antibiotics were given.

An *upper midline/transverse/subcostal* incision was made into the abdomen and the peritoneal cavity entered. The pars flaccida was incised and dissected to the right crus of the diaphragm. The crural dissection was continued by coming across the anterior arch of the diaphragm. The left crus was similarly dissected as much as possible, which required ligation of the short gastric arteries, until the anterior aspect of the gastroesophageal junction was visualized. The esophagus was retracted laterally to expose the decussation of the crural fibers, and a retroesophageal window was developed until the esophagus was circumferentially mobilized. The esophageal hiatus was widened by incising it anteriorly. The phrenic vein was ligated in order to adequately expose the mediastinum.

The mediastinum was entered and the loose areolar tissue was bluntly dissected around the distal esophagus separating it from the surrounding mediastinal attachments and mobilization carried proximally toward the neck.

Attention was turned to the left neck. Just anterior to the sternocleidomastoid muscle and extending to just above the sternum, a small neck

incision was made and carried down along the medial aspect of the sternocleidomastoid muscle. The omohyoid and sternohyoid muscles were divided. The dissection was carried deeper until the vertebral bodies were palpable posteriorly. The esophagus was bluntly dissected free of the posterior membranous trachea anteriorly, and from the vertebral bodies posteriorly. The cervical esophagus was encircled with a/an __-inch Penrose drain and retracted gently caudally allowing for blunt dissection inferiorly toward the previous mediastinal dissection from the transhiatal approach.

[Choose one:]

If {colon interposition}: {The patient preoperatively received a colonic *mechanical/antibiotic* prep.} The gastrocolic ligament was incised, separating the transverse colon from the greater curvature of the stomach. The splenic and hepatic flexures were taken down. In a lateral-to-medial approach, the mobilization of the left colon was continued from the splenic flexure down the white line of Toldt, mobilizing the descending colon off the retroperitoneum to the level of the sigmoid colon. In a similar fashion, the ascending colon was mobilized to the level of the cecum dissecting down from the hepatic flexure sweeping the colon off the hepatorenal fossa and retroperitoneum, while protecting the ureter, duodenum, and kidney. The colon was grasped and elevated to identify the tenting of the mesentery to indicate the regions of the middle and left colic vascular pedicles. {Transillumination was used to identify the arteries.} The peritoneum was incised on either side of these vessels in order to isolate them. {The length of colon required for the conduit was estimated by measuring the distance from the angle of the mandible to the xiphoid process.} The conduit was assessed for adequate perfusion and viability by placing small bulldog clamps on the arteries to be ligated and reassessing for graft viability. After several minutes, the bowel appeared *healthy/dusky* {and flow was confirmed with fluorescein dye injection/mesenteric Doppler flow/inspected for venous congestion}. After demonstrating adequate perfusion, the left branch of the middle colic artery was ligated at its origin and the marginal artery was ligated. The remaining mesentery between the right colic artery and the right branch of the middle colic artery was divided, being cautious to leave the ascending branch of the left colic artery and arcades intact. Using the previously noted required length for guidance, the transverse colon was divided and brought up through the mediastinum and through the cervical neck incision in an isoperistaltic fashion, verifying that there were no twists in the mesentery. The distal colon was divided, verifying adequate conduit length to reach the stomach. An anastomosis was fashioned with a *handsewn/stapled* anastomosis to re-establish continuity of the colon. The stomach was stapled just distal to the gastroesophageal junction. A colono-gastric anastomosis was created with a *handsewn anastomosis/linear cutting staples* verifying no redundancy of the colon within the mediastinum.

If {gastric tube}: The division of the gastrohepatic ligament was continued along the lesser curvature of the stomach to the duodenum, exposing the lesser sac. {No accessory/replaced left hepatic artery was noted.} Attention was then directed to mobilizing the greater curvature of the stomach. The gastrocolic ligament was divided while the right gastroepiploic artery and arcade were carefully preserved. Retrogastric adhesions to the retroperitoneum and pancreas were taken down. Once the lesser sac was completely mobilized, the left gastric pedicle was ligated with a _____ before completely freeing the stomach. {A pyloroplasty was performed.} The nasogastric tube was withdrawn. The gastric conduit was created in an *isoperistaltic/retroperistaltic fashion* over a _____ French chest tube, using a stapler along the greater curvature of the stomach. The left gastroepiploic arcade was identified and preserved throughout this process. Sequential staple loads were used until adequate length of the tube was obtained to reach the cervical incision. {The suture line was oversewn with ___ suture.} The gastric conduit was withdrawn into the cervical neck wound and visualized directly from the abdomen to verify that the staple line remained lateral and the specimen did not twist.

The cervical esophagus was transected sharply and the esophagus and *colon/gastric*

conduit were lifted out of the mediastinum via the neck incision. The *colon/gastric* conduit was opened and a heel stitch secured between the cervical esophagus and *gastric/colonic* conduit. A *cutting stapler/handsewn anastomosis* was used to create a *side-to-side/end-to-end* anastomosis between the cervical esophagus and the conduit. The remaining defect was then closed with *interrupted __ sutures/TA stapler* and a nasogastric tube was then passed distally into the neo-esophagus. After completing the anastomosis, the conduit was grasped and pulled down into the abdomen until the cervical anastomosis seated down into the neck, ensuring a straight conduit. Hemostasis was verified. The nasogastric tube was secured at __cm at the level of the nares. {A jejunostomy feeding tube was placed.}

The abdomen was irrigated and hemostasis verified. The abdominal fascia was closed with __ suture. The wound was irrigated and closed with ___. A Penrose drain was placed in the cervical neck incision and secured. The neck incision was closed with interrupted _ suture and the skin was reapproximated with __ and dressed.

Upon completion of the procedure, a debriefing checklist was completed to share information critical to the postoperative care of the patient. The patient tolerated the procedure well, *was extubated in the operating room*, and was transported to the post-anesthesia care unit in stable condition thereafter.