Reconstruction After Total Laryngectomy (Gastric Pull-Up)

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Gastric Pull-Up Reconstruction After Total Laryngopharyngectomy

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1. **GENERAL CONSIDERATIONS**
   a. Indications
      i. Oncologic
         1. Need for total laryngopharyngectomy
         2. Extensive hypopharyngeal cancers
         3. Extensive laryngeal cancers with hypopharyngeal extension
         4. Surgical treatment of stomal recurrence
         5. Tumor within the esophagus, total esophagectomy to resect skip areas
      ii. Severe hypopharyngeal injury or infection resulting in severe stricture or fistula(e)
   b. Contraindications
      i. Most gastric surgery (gastrostomy is an inconvenience and not necessarily a contraindication)
      ii. Mediastinal extraesophageal disease
      iii. Cephalad extension of cancer limited to the upper oropharynx level
   c. Reconstructive Options
      i. Resection of hypopharyngeal and laryngeal cancers with preservation of a continuous strip of posterior pharyngeal wall mucosa between the oropharynx and esophagus represents less than a total laryngopharyngectomy and does not require gastric pull-up for reconstruction. Maintenance of this posterior strip of mucosa permits reconstruction of the lateral and anterior pharyngeal walls with a tubed pectoralis major, latissimus dorsi, or inferior island trapezius myocutaneous flap. A tubed radial forearm flap may also be employed. Maintenance of the posterior strip of mucosa improves the chance that the patient will successfully swallow when cutaneous-lined flaps are employed.
      ii. Inability to preserve this posterior mucosal strip makes the alternatives to cutaneous pedicled flaps preferable. The underlying muscle bulk of myocutaneous flaps makes tubing of this tissue to effect a 360° closure problematic. Although good swallowing results are reported with use of a radial forearm free flap (RFFF) tubed 360°, normal swallowing is rarely achieved with similar tubing of a myocutaneous pedicled flap.
      iii. "Replacing like-tissue with like-tissue" is a reconstructive principle that supports the use of tissue designed to transport food in reconstructing the pharynx. Use of a segment of jejunum follows this reconstructive principle. For those situations where a jejunal free flap may be used at other institutions, we preferentially employ the RFFF because it is more reliable with less donor site morbidity.
      iv. In selected cases, the gastric pull-up for reconstruction of total laryngopharyngectomy defects offers several advantages.
         1. There is only one anastomosis performed employing a gastric pull-up.
         2. There may be difficulty in performing the RFFF skin-to-esophageal anastomosis due to limited access to the anastomotic site if a large segment of esophagus is resected for oncologic reasons.
         3. The inferior margin of resection is widely cleared in all gastric pull-up reconstructions because the esophagus is removed in its entirety. This clearance adds a certainty that skip lesions and second primary tumors of the esophagus have been adequately addressed.
      v. There are other considerations that favor reconstruction with a tubed
RFFF. Gastric pull-ups have their own associated morbidity, even in the absence of complications. Significant pharyngeal reflux is expected and may be so significant that to sleep, the patient may need to be in a semi-sitting position to prevent reflux of intestinal contents for the first several months postoperatively. Pharyngeal reflux is an uncommon problem for patients with RFFF reconstruction. Additionally, the donor site morbidity from harvesting a RFFF is markedly less than that required for transposition of the stomach to the neck.

vi. It is clear that the choice of reconstruction after total laryngopharyngectomy is dependent on many factors and therefore should be determined uniquely for each individual case.

2. PREOPERATIVE CONSIDERATIONS
   a. Evaluation (in addition to that required for extirpative surgery)
      i. See Total Laryngectomy protocol
      ii. CT scan of the neck through the mediastinum
      iii. Upper GI series with esophagram if possible
   b. Consultations
      i. Thoracic surgery to assist in creation of the gastric conduit and the mediastinal dissection
      ii. Tumor Board discussion (see Tumor Board protocol)
   c. Consent for Surgery
      i. Describe procedure including drains, NG tube, J-tube, Foley, SICU stay postoperatively.
      ii. Describe expected need for thyroid hormone replacement, high likelihood of permanent hypoparathyroidism requiring calcium, vitamin D analogues.
      iii. Complications
          1. Intraoperative death (some series in the past report up to 10%)
          2. Fistula(e), mediastinitis
          3. Pneumothorax
          4. Hematoma, bleeding, infection
          5. Dumping syndrome, gastric outlet obstruction, reflux
          6. Anesthesia complications (MI, CVA, pneumonia, etc)
          7. Reflux symptoms
   d. Type and Cross Match for Two Units of PRBCs
   e. Admit 24 hours prior to surgery for bowel prep and concomitant IV hydration. (Consult with thoracic or general surgery.) Use 4 liters of Go-Lytely at 2:00 pm to 5:00 pm; 1 gram of neomycin and 1 gram of erythromycin at 5 pm, 7:00 pm and 11:00 pm; 1 gram of ceftriaxone IV on call to the operating room; 1 gram of liquid Augmentin; and 60 cc mycostatin swish, gargle, and swallow.

3. NURSING CONSIDERATIONS (for laryngopharyngectomy)
   a. Room Setup
      i. See Basic Soft Tissue Room Setup
   b. Instrumentation and Equipment
      i. Standard
         1. Major Instrument Tray 1, Otolaryngology
         2. Major Instrument Tray 2, Otolaryngology
         3. Bipolar Forceps Trays
      ii. Special
         1. Cummings retractor, large and medium
         2. Dura/Derma elastic attach hook, 7.5 x .25 in
         3. Varidyne vacuum suction controller
         4. Rousch Laryngoflex 7 mm endotracheal tube
   c. Medications (specific to nursing)
      i. Antibiotic ointment
      ii. 1% lidocaine with 1:100,000 epinephrine
   d. Prep and Drape
      i. Standard prep, 10% providone iodine
      ii. Drape
         1. Head drape
         2. Ioban drape for the abdomen and chest
         3. Place towels outlining the chin, neck, and chest. Separately drape the abdominal incision up to chest.
         4. Split sheet
   e. Drains and Dressings
      i. Varidyne vacuum suction: 7 mm to 10 mm or Penrose drain
ii. Antibiotic ointment to suture lines
f. Special Considerations
   i. Separate setup for thoracic/general surgery team for harvesting and transferring of gastric pull-up for reconstruction following total laryngopharyngectomy

4. ANESTHESIA CONSIDERATIONS
   a. Antibiotics maintained throughout procedure given IV every 4 hours
   b. Table turned 180° from the anesthesia unit to permit access to the head and neck with simultaneous abdominal surgery.
   c. Anesthetic considerations for the transthoracic passage of the stomach to be established through interaction between thoracic/general surgery team and anesthesia team.

5. OPERATIVE CONSIDERATIONS
   a. Operative Preparation
      i. Instruments: major head and neck trays, abdominal setup
      ii. Foley, A-line, CVP
      iii. Prep pubis to lower lip; drape off the abdomen separately; Rousch laryngoflex endotracheal tube in trach site and anesthesia tubing prepped into the field
   b. Table Position
      i. 180° with anesthesia at the foot of the table
      ii. Shoulder roll and a Mayfield headrest with gel roll under occiput
   c. Operation (2 teams, simultaneous work if possible)
      i. Superior mediastinal dissection
         1. Resection of primary and neck disease done as described elsewhere (see Total Laryngectomy and Stomal Recurrence protocols).
         2. Specimen remains pedicled to the esophagus.
         3. Bluntly dissect the esophagus from the attachments at the thoracic inlet and from the attachments to the prevertebral fascia.
         4. Branches of the vagus and mediastinal veins may require clipping.
      ii. Abdomen and inferior mediastinal procedure
         1. Midline supraumbilical incision is made through the xiphoid; palpate liver and celiac nodes for evidence of disease.
         2. Stomach is mobilized, ligating the short gastric and left gastric vessels 1 cm from the gastric wall and preserving the right gastroepiploic artery.
         3. Gastroesophageal junction is freed and the vagus nerves are divided.
         4. Kocher maneuver is performed to mobilize the duodenum; the pylorus should reach the esophageal hiatus.
         5. Pyloroplasty or pyloromyotomy is performed at the surgeon's preference.
         6. The esophagus is mobilized from below to meet the team from above at the level of the aorta.
         7. A segment of proximal jejunum 20 to 30 cm from the ligament of Treitz is selected and used for jejunostomy.
      iii. The esophagus and stomach are gently pulled into the neck; the fundus reaches higher than the gastroesophageal junction.
      iv. The esophagus is resected at the gastroesophageal junction using a gastrointestinal stapler maintaining the bulk of the stomach, rather than creating a tubed conduit. This improves postoperative fixation.
      v. The fundus is incised parallel to the serosal vessels, and the mucosa examined for viability.
      vi. The serosa is pexed to the prevertebral fascia to remove all tension from the closure.
      vii. A two-layer closure is secured.
      viii. Suction drains are placed into the mediastinum through the neck and under the neck flaps.
      ix. Mature and treat tracheostoma as in Total Laryngectomy protocol.

6. POSTOPERATIVE CONSIDERATION
   a. Drains
      i. The mediastinal drains are set to 25 cm H2O and removed within 2 days.
ii. The neck drains are set to 125 cm H2O and removed when drainage is less than 30 cc over a 24-hour period.

iii. The J-tube is drained to gravity. D5W and 50 cc per hour is begun on postoperative day 1 if bowel sounds are present. Continuous tube feedings are advanced as tolerated, volume first then concentration of the feedings.

iv. The NG Salem sump is set to low continuous wall suction until the postoperative thin barium swallow is performed and shows no leak.

b. Begin PO feedings at 7 to 14 days dependent on whether the patient has been irradiated or is immunocompromised.

c. XRT is to begin after at least 2 weeks of healing.

7. **SUGGESTED READING**


