Re-operative anti-reflux surgery - technical pearls

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Anti-reflux procedures reliably, successfully and durably treat gastro-esophageal reflux disease (GERD). Essential elements of an effective fundoplication include repair of Hiatus Hernia and a tension free infra-diaphragmatic fundoplication around the distal esophagus. Advent of laparoscopic anti-reflux surgery has increased patient and physician acceptance. Excellent long term results have been reported from centers of expertise with greater than 90% patient satisfaction at 5-10 Yr follow-up.

Recurrent symptoms or new disabling symptoms are not uncommon and are considered surgical failures. Common mechanisms of failure are dislocation of the fundoplication, tight or loose wrap, hiatal herniation and others that present with recurrence of reflux, dysphagia, chest or abdominal discomfort and pain. Re-operative intervention is technically challenging. Hollow viscous perforation, short esophagus, delayed gastric emptying; scarred tissues and vagal nerve injury make re-operative surgery more challenging and less attractive.

**Indications for Re-operative surgery:**

1. Intractable symptoms not controlled with medication
   - Reflux
   - Respiratory
   - PNA
2. Too tight fundoplication
   - Hiatus too tight
   - Tight fundoplication/ non-relaxing
   - Twisted fundoplication
3. Symptomatic PEH
   - Bleeding
   - Chest pain
4. Mesh erosion
5. Intractable gas-bloat
Approach to re-operative anti-reflux surgery:

1. **Indication for first procedure:**
   
   To assess baseline problem

2. **Work-up done prior to first surgery:** Motility, pH, Ba, EGD

   To assess baseline esophageal function and extent of disease

3. **Previous Procedure/s Operative details**
   
   a. previous mediastinal dissection
   b. position of vagus nerves in relation to fundoplication
   c. Crus closure? mesh used
   d. presence of an aberrant left hepatic artery
   e. type of fundoplication: any cruz tacking stitches
   f. Division of short gastric vessels

4. **Symptom relief : even briefly, duration of relief**

   Very unlikely that primary GERD symptom (especially Hb/Regur.) do not get significantly better even if only for a few months regardless of how technically inept the first procedure might be. This scenario should raise concern for relation of symptoms to “failure of fundoplication” as opposed to some other reason.

5. **Immediate undesirable symptoms:**

   Dysphagia: immediate, unrelenting: worry about anatomical issues either with wrap-twisted/slipped, hiatus closure (very unusual), missed profound dysmotility (only if pre-op work-up incomplete)

   Bloating: r/o delayed GES.

6. **Current symptoms:**

   As compared to pre-op symptoms/symptoms: similar or different

   Insidious or abrupt inciting event e.g. vomiting.

7. **Work-up**


Relaxation within fundoplication, adequate pressure.

pH: sp. If recurrent GERD.  ? Impedance: select group

Barium Swallow: Road map, also motility, esophageal emptying

GES: primary or secondary profound delayed gastric emptying- sure to result in failure if not addressed, caution: 2 Hr. GES is not very reliable and reproducible.

8. Operative planning: Symptoms explained by findings?

Esophageal clearance: dysmotility, undilatable stricture.

Gastric clearance

Patient factors: previous laparotomy

h/o compulsive vomiting

Size of recurrent Hernia and any penetrating ulcers

Mesh erosion
STEPS OF REOPERATIVE INTERVENTION FOR FAILED FUNDOPPLICATION

1. Take down previous fundoplication
2. Repair recurrent HH
3. Re-do fundoplication or RNY GJ

Steps of laparoscopic takedown of fundoplication

1. Place initial trocar in left upper quadrant if extensive previous surgery or in lower quadrant – place second trocar in RUQ and use to divide adhesions then place other trocars
2. Divide adhesions to liver sharply – start low and stay on capsule of liver – error on side of liver especially when there are dense adhesions – assistant needs to use traumatic grasper and needs to be experienced with camera
3. If previous aberrant artery dissect with hook cautery if easy adhesions otherwise start on the left side and dissect to the right until it is found
4. Dissect sharply on the medial side of the right crus and continue anteriorly on the arch of the crus rather on the edge – if cannot define the edge of the arch start on the left and come up so that the edge can be followed to avoid the anterior vagus nerve
5. Go down on the left crus as far as possible unless the short gastrics have not been divided – if not divide the short gastrics first as best possible then dissect the posterior left crus with the scissors staying right on the crus – do extensive dissection there
6. Then divide crus anteriorly with the Harmonic scalpel and dissect extensively up into the mediastinum – identify both vagus nerves and preserve t
7. Dismantle the Nissen fundoplication
8. Dissect left limb free and get the fat pad off of the angle of HIS
9. Dissect the right limb free.
10. The right limb should be pulled vigorously to the patients right to get as many adhesions as possible before reducing it behind the esophagus
11. Rotate the stomach as far as possible to the right to get the final attachments of the right wing posteriorly
12. Retract the right limb on the left side to the patients left anterior to the esophagus and divide all remaining attachments – stay exactly on the fundus to avoid the posterior vagus nerve
13. If either nerve is obviously cut place a PEG using the standard technique without a pneumoperitoneum at the end of the procedure
14. Do endoscopy to check for length of the esophagus, air leaks and to determine if the fundoplication is completely dismantled
15. If too short do type III mediastinal dissection
16. If not dismantled look for which wing (it will almost certainly be the posterior wing – if so place penrose drain bring right wing back through the window and divide more adhesions then do the left sided maneuver until dismantled.
17. Sometimes helps to dissect fat pad off from right to left rather than the opposite
18. Repeat endoscopy
19. If still not dismantled but almost accept it if patient is elderly and needs laparoscopic approach but must be able to do 3 cm overlap fundoplication without difficulty and drop test must be satisfactory – if dismantling is not done in 2½ hours convert

20. **Inflate the stomach with** air to be sure there is no perforation
21. Do crus closure with 0 Ethibond
22. Mesh if tearing – biological preferred.

Planes to achieve for dismantling the fundoplication

1. liver plane – always start caudad on liver and work up
2. right crus plane
3. fundoplication division plane
4. esophageal right posterior wing plane
5. right lateral posterior wing plane
6. posterior aspect of posterior wing plane off left posterior limb of right crus.
7. posterior left aspect of inside posterior wing plane

**After complete dismantling of previous fundoplication and cruz closure anti-reflux procedure is performed.**
CONCEPTS IN TREATMENT OF Re-GERD

GERD is due to reflux of contents from a reservoir (stomach) into the esophagus across an incompetent barrier (Lower esophageal sphincter Complex). Anti-reflux surgery aims to restore this barrier- re-operative fundoplication. An alternative approach would be to remove or redirect the reservoir: RNY gastro-jejunostomy.

❖ Indications for Redo Nissen fundoplication
  ▪ GERD primary recurrent symptom
  ▪ Normal esophageal motility

❖ Indications for Toupet fundoplication
  ▪ Dysphagia was primary symptom for re-operative procedure
  ▪ Esophageal dysmotility
  ▪ Significant gas-bloat pre-op

❖ Indications for no fundoplication / Heller: very unusual or for missed achalasia.

❖ Indications for thoracic approach
  ▪ Hostile abdomen
  ▪ Giant recurrences especially if they have penetrating ulcers.
  ▪ ? high risk for short esophagus

❖ Indications for Pyloroplasty
  ▪ Moderately delayed GES
  ▪ Inadvertent injury to vagus nerve/s

❖ Indications for RNYGJ (with or with out leaving distal stomach in situ)
  ▪ Obesity
  ▪ Short Esophagus – as Collis-gastroplasty with fundoplication have poorer results than a straight forward fundoplication., specially in a setting of decreased motility
  ▪ Profound Delayed gastric emptying
  ▪ History of multiple failed fundoplications.
- Injured or scarred fundus
- Very poor esophageal motility—a fundoplication might result in disabling dysphagia.

If undilatable peptic stricture or mesh erosion then this would need at least a distal esophagectomy with reconstruction. Also if during dismantling the fundoplication there is extensive full thickness damage to the GEJ.

- Indication for laparotomy
  - If technically difficult to do with minimal access surgery. Often even with previous open fundoplication we start minimally invasive and are pleasantly surprised to find no significant adhesions to the anterior abdominal wall other we convert.
  - Hollow viscous injury either extensive or not satisfactorily repaired laparoscopically.
  - Bleeding.
My experience with Re-operative anti-reflux surgery @ CUMC

Figure 1. Steady increase in number of re-operative procedures. Total now more than 160 in 5 ½ years. N= 326(Primary), 159 (Re-do)

Figure 2. Steady increase in use of RNY re-construction for treatment of failed anti-reflux surgery.

N= 107 (redo- fundoplication), 52 (RNY for failed fundoplication)
Figure 3. A greater percentage of redo fundoplications are being performed laparoscopically, as compared to thoracotomy in the earlier period.