HIATUS HERNIA

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Review

The management of hiatal hernia: an update on diagnosis and treatment

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Abstract

Background and aim. Hiatal hernia (HH) occurs quite frequently in the general population and is characterized by a wide range of non-specific symptoms, most of them related to gastroesophageal reflux disease. Treatment can be challenging at times, depending on the existence of complications. The most recent guideline regarding the management of hiatal hernia was released by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) in the year 2013. This review aims to present the most recent updates on the diagnosis and management of hiatal hernia for clinical practitioners.

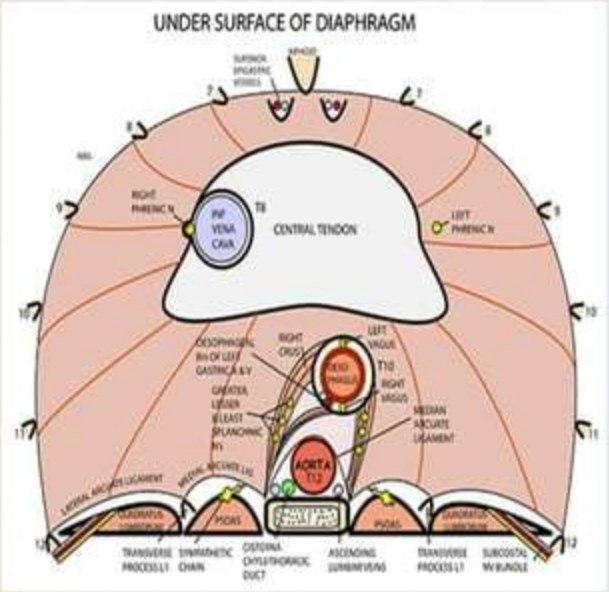
Hiatus hernia

Hiatus hernias: occur when there is herniation abdominal contents through the esophageal hiatus of the diaphragm into the thoracic cavity.

Anatomy

- The diaphragm has three major openings: the esophageal hiatus, caval hiatus, and the aortic hiatus.
- The diaphragmatic crura tether the diaphragm to the vertebral column. These "legs" of the diaphragm split from the central tendon and extend around the esophagus to create the hiatus. The area where the legs cross inferiorly to the esophagus and across the aorta is known as the crural decussation and median arcuate ligament.

Anatomy



Origin

- **vertebral:** 2 crura & 5 arcuate ligaments

2 Crura;

1. right crus from front of the upper L 1,2,3.
2. left crus from front of the upper L 1,2.

5 Arcuate ligaments

2 lateral over the quadrates lumborum muscle.

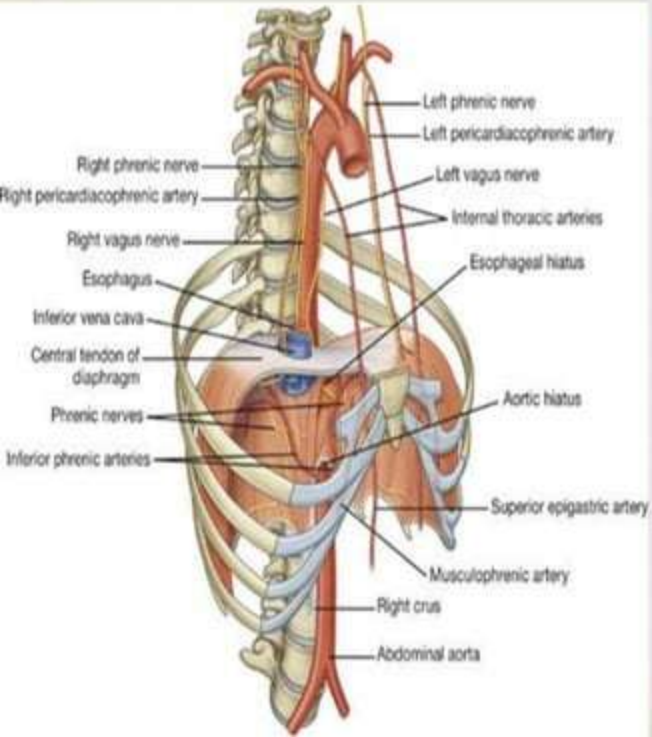
2 medial over the psoas major muscle.

1 Median

- **Sternal** – xiphoid
- **Costal** ; 7-12

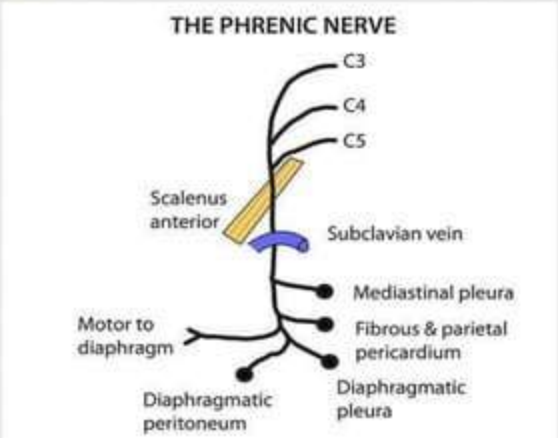
Insertion ; central tendon.

Blood supply



- Superiorly, **the musculophrenic** and **pericardiacophrenic arteries** both branches of the internal thoracic artery, and **the superior phrenic artery**, a branch of the thoracic aorta, supply the diaphragm.
- inferiorly, **the inferior phrenic arteries** , branches of the abdominal aorta, supply the diaphragm.
- **venous drainage** is through companion veins to these arteries.
- Innervation **by phrenic nerve** !!

Nerve supply



Notes:

- Phrenic nerve is the only motor supply to diaphragm
- A third of its fibres are sensory (as above)
- In the neck it lies on scalenus anterior
- It passes into the thorax with the large veins anterior to it & the large arteries posterior to it
- Pain detected by the phrenic nerve from the diaphragmatic peritoneum from an inflammed gall bladder is referred to C4 nerve distribution to the right shoulder tip via the supraclavicular nerves. There is no autonomic component to this type of referred pain

✓ **Motor nerve supply:**

Right and Left phrenic nerves (C3, 4, 5).

✓ **Sensory nerve supply:**

Central part- phrenic,

Peripheral part- lower 6 intercostal nerves

- **Action and functions of the Diaphragm:**

On contraction, diaphragm pulls down its central tendon and increases vertical diameter of thorax.

Therefore, functions of the diaphragm are:

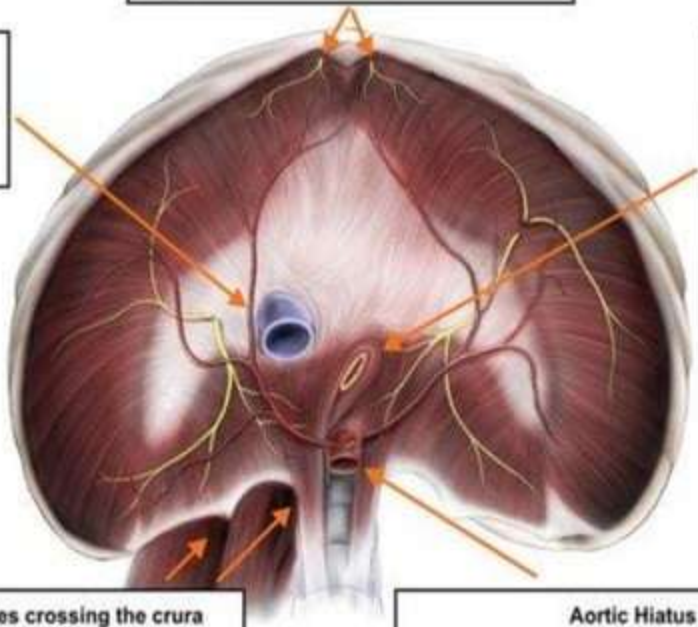
1. Muscle of inspiration. 2. Muscle of abdominal straining. 3. Weight-lifting muscle. 4. Thoracoabdominal pump for blood & lymph.

Foramen of Morgagni (Right) And Larrey (Left)

- Internal thoracic artery and veins (turning into superior epigastric a. and vv.)

Vena Cava hiatus

- Inferior Vena Cava
- R. phrenic nerve (or branches)



Esophageal hiatus

- Esophagus
- Anterior and posterior vagal trunks
- Phrenicoabdominal (sensory) branch of the left phrenic nerve
- Esophageal branch of left gastric artery
- Esophageal tributaries of left gastric vein

Minor apertures crossing the crura

- Greater splanchnic nerve/s
- Lesser splanchnic nerve/s
- Least splanchnic nerves/s
- Azygos and hemiazygos veins (variable)

Aortic Hiatus

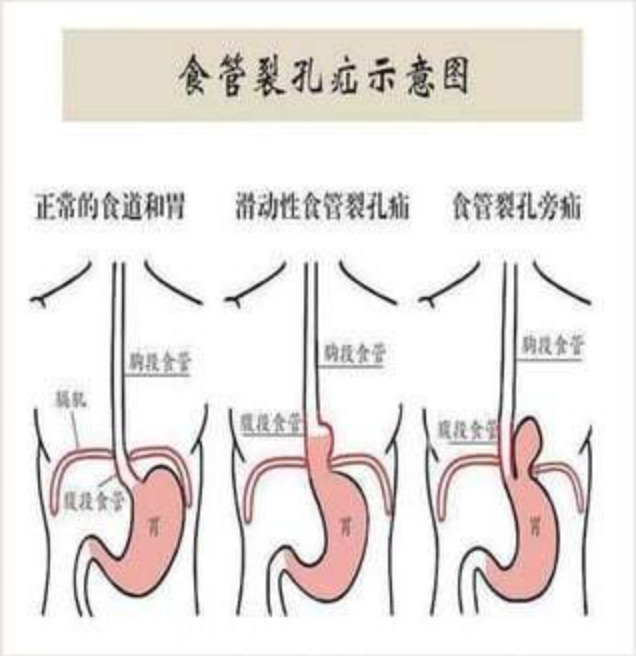
- Aorta
- Azygos and Hemiazygos veins (variable)
- Thoracic duct
- Aortic plexus and additional lymphatic vessels descending to the cisterna chyli

Causes and risk factors

- increased intra-abdominal pressure.
- Trauma
- Post-gastric operation
- Congenital causes; esophageal hiatus wide relaxation, partial or total absence of the diaphragm.(agenesis).
- Being overweight and elderly are the key risk factors.
- Other known risk factors include: multiple pregnancies, history of esophageal surgery, partial or full gastrectomy and certain disorders of the skeletal system.

Type of hiatus hernia

- **Type I** — sliding hernias >90% .
- **Type II** — pure paraesophageal hernias (PEH)<10%.
- **Type III** — a combination of types I and II.
- **Type IV** — Giant esophageal hiatus hernia. (Rare)



Type of hiatus hernia

Types II–IV are referred to as paraesophageal hernias (PEH); their main clinical importance is due to their potential for ischemia, obstruction or volvulus

Clinical features

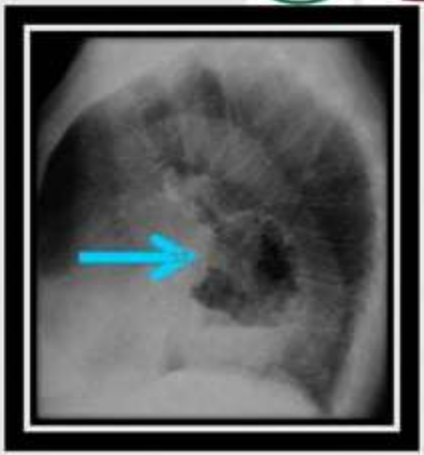
Slid hernia	PEH
1. Majority are asymptomatic 2. GERD; heart burn , regurgitation and less commonly dysphagia. **Complication** ; Esophagitis(dysphagia, heart burn) Peptic stricture, Barrett's esophagus, esophageal carcinoma. Pneumonia	1. Asymptomatic 2. Pressure sensation in lower chest, dysphagia. 3. Nausea and vomiting. **complication** ; Hemorrhage Strangulation Obstruction Gastric stasis ulcer (Cameron lesion, cause iron deficiency anemia)

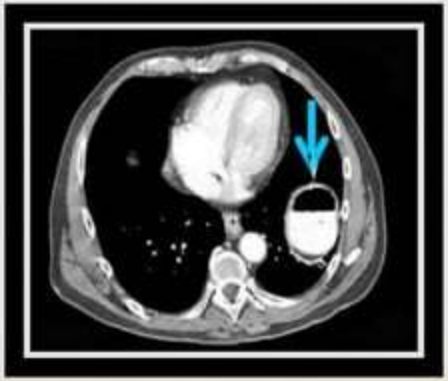
Diagnostic methods

Table I. Current diagnostic methods for hiatal hernia.

Diagnostic technique	Evaluation	Warnings
Barium swallow X-ray [1,3,5,6,13,14,16,17]	size, location of hernia, motility dysfunction, stenosis, stricture related to GERD, short esophagus diagnosis	contraindicated in pregnancy, barium or iodine hypersensitivity, exposure to radiation
Endoscopy [1,3,5,6,13,14,16,17]	analysis of esophageal mucosa, erosive esophagitis, Barrett's esophagus, malignancy, Cameron's ulcers, swallowing difficulty	air insufflation of the stomach may exaggerate hernia size, difficulty to assess massive hernias accurately
Manometry [1,3,5,6,13,14,16,17]	integrity of esophageal peristaltis, motility disorders, achalasia	difficulty in placing manometry catheter
pH testing [1,5,13,16,17]	quantitative analysis of reflux episodes	
CT [3,13,16,17]	gastric volvulus, perforation, pneumoperitoneum, pneumomediastinum	unable to exactly define the configuration of the hernia, exposure to radiation


AP
ERECT
L





Treatment of HH.

Medical treatment

Surgical treatment

Medical approach

The aim is to reduce the symptoms of gastroesophageal reflux disease (GERD) by addressing gastric acid secretion.

Lifestyle modifications are the first line of management;

1. weight loss.
2. elevating the head of the bed by 8 inches during sleep.
3. avoidance of meals 2-3 hours before bedtime.
4. elimination of "trigger" foods such as chocolate, alcohol, caffeine, spicy foods, citrus, carbonated drinks.

Medical approach

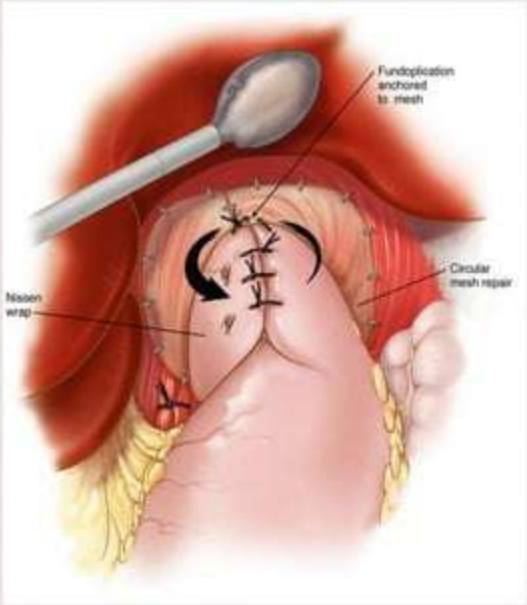
- ✓According to the American College of Gastroenterology, **an 8-week course of PPI is the therapy of choice for symptom relief in GERD**, with no major differences in the efficacy between the different types of PPIs.
- ✓Twice-daily PPI therapy can be recommended for patients with an inadequate symptom response to once-daily PPI
- ✓The current recommendation is to use the minimal dose of PPI that is sufficient to control symptoms

Medical approach

✓Other alternatives include **histamine 2 receptor antagonists and antacids**. Patients presenting with moderate symptoms can use these treatments on demand, **while** those with persistent symptoms despite PPI treatment should use them as an add-on treatment.

✓Prokinetic drugs are not recommended in guidelines neither as monotherapy nor as add-on treatment as there is no evidence supporting their efficacy in the treatment of hiatal hernia associated with GERD

Surgical approach



Indications for surgery

1. Symptomatic patients, especially those with obstructive symptoms and gastric volvulus, which require urgent surgery.
2. Symptomatic or asymptomatic type II, type III, and type IV hiatal hernia
3. Sliding hernia and symptoms of GERD are present, surgical approach might be considered, especially in cases where regurgitation persists despite medical treatment with PPI
4. Andolfi et al. have suggested in their study that even asymptomatic patients younger than 50 should be considered for surgery

Preparation for the Procedure

- Investigations
- Actively treat dehydration
- Nasogastric tube or immediate preoperative endoscopy
- prophylactic antibiotic

Surgery technical approach

Open

- *thoracotomy*
- *Laparotomy*

Minimal invasive

- *laparoscopic*
- *Transthoracic*

Anti-reflex procedure

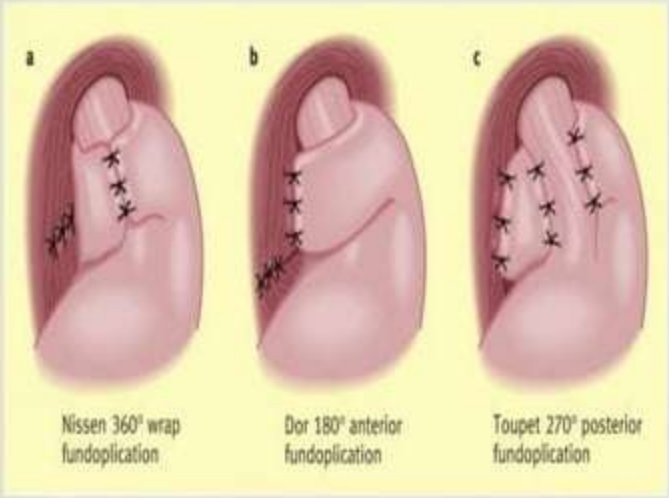
- **Nissen fundoplication (360°)**
- **Toupet fundoplication (270°)**

CRURAPLASTY

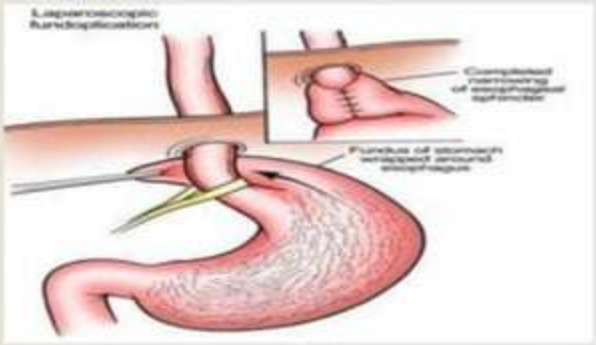
MESH
REINFORCEMENT

Fundoplication

Fundoplication

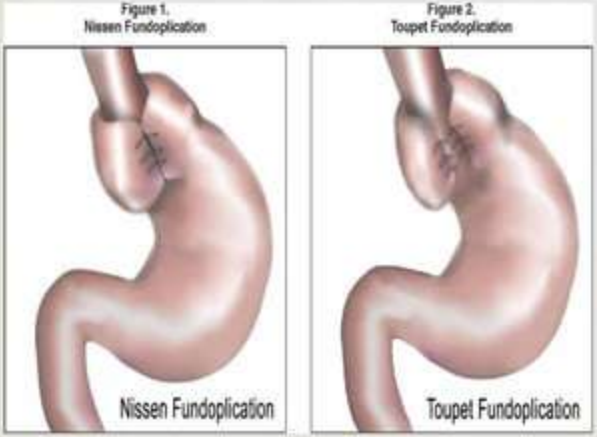


1. **Complete** : **Nissen fundoplication**
2. **Partial**:
   a) Ant. Partial Fundoplication **Dor procedure**
   b) Post. Partial Fundoplication **Toupt Fundoplication.**

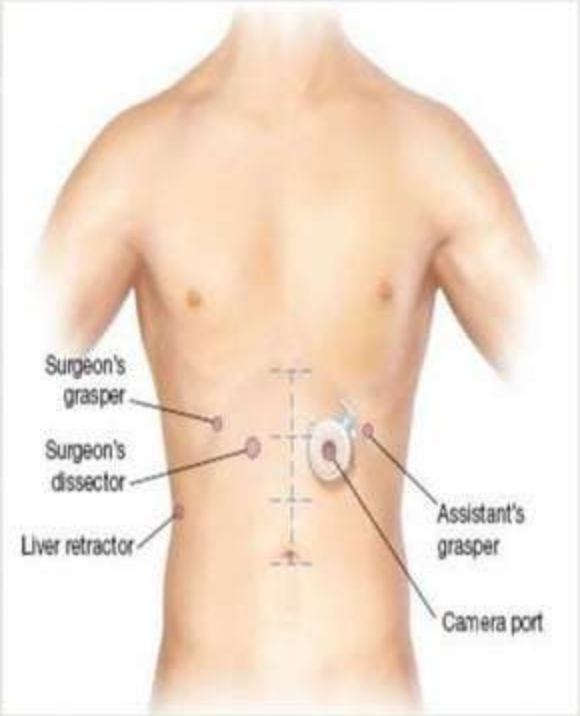


Laparoscopic fundoplication

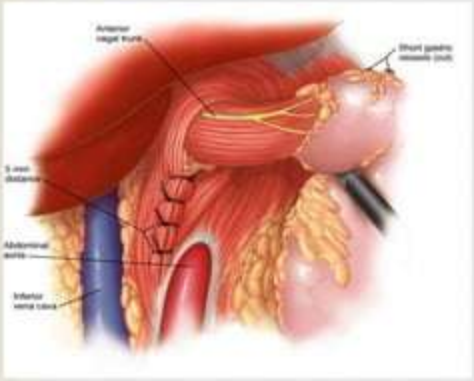
Nissen fundoplication (360°) is performed after most hiatal hernia repairs, unless there is a preexisting esophageal dysmotility, in which case the Toupet fundoplication (270°) is preferred



port position

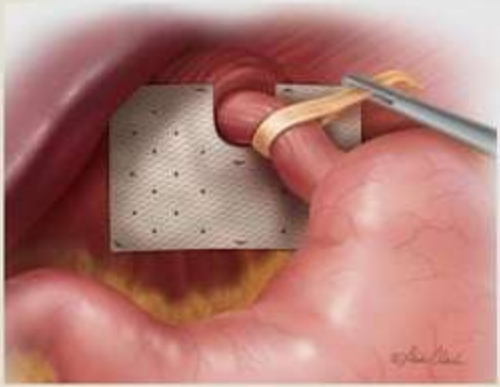


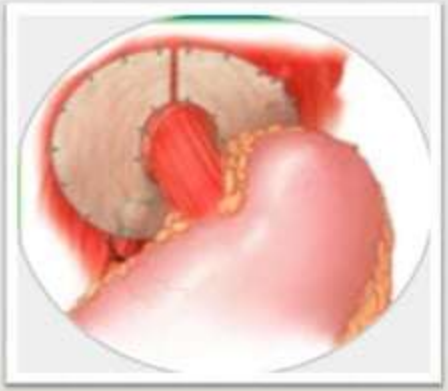
The laparoscopic approach has become the "gold standard" of paraesophageal hernia repair



mesh reinforcement

Zhang et al., Huddy et al. and Tam et al. have all found a reduced rate of hernia recurrence after mesh reinforcement compared to primary suture repair at short term follow-up (up to 12 months)





Robotic approach

- Vasudevan et al. have found in their study that the robotic approach to paraesophageal repair is effective and safe, with low complication rates, even in patients of older age and risk of complications.

Complications

- **Intraoperative:**

1. Bleeding.
2. Esophagogastric perforation.
3. Vagus nerve injury (anterior and posterior bundles)

- **Acute postoperative:**

1. Acute gastric distension.
2. Esophagogastric leak.
3. Acute Dysphagia.

- **Long-term postoperative:**

1. Gas-bloat syndrome
2. Dysphagia: If dysphagia persists beyond 6 weeks, an endoscopy with dilation may be needed.

Summary

Type of hiatal hernia	First line	Second line
Type I (sliding) hernia	PPI-once daily, 8 week course treatment. Inadequate symptoms control: PPI- twice daily, 8 week course treatment.	Laparoscopic fundoplication (Nissen or Toupet) –especially in case of symptom persistence.
Type II, III, IV (paraesophageal) hernias	Laparoscopic fundoplication (Nissen or Toupet)- definite treatment	PPI, histamine receptors antagonists antacids- for symptom relief

SAGES

GUIDELINES FOR THE MANAGEMENT OF HIATAL HERNIA in Apr 2013.

1. Hiatal hernia can be diagnosed by various modalities. Only investigations which will alter the clinical management of the patient should be performed (+++, strong)
2. Repair of a type I hernia in the absence of reflux disease is not necessary (+++, strong)
3. All symptomatic paraesophageal hiatal hernias should be repaired (++++, strong), particularly those with acute obstructive symptoms or which have undergone volvulus.
4. Acute gastric volvulus requires reduction of the stomach with limited resection if needed. (++++, strong)
5. Postoperative nausea and vomiting should be treated aggressively to minimize poor outcomes (++, strong)
6. Hiatal hernias can effectively be repaired by a transabdominal or transthoracic approach (++++, strong). The morbidity of a laparoscopic approach is markedly less than that of an open approach (++, strong)

7. The use of mesh for reinforcement of large hiatal hernia repairs leads to decreased short term recurrence rates (+++, strong)
8. Gastropexy may safely be used in addition to hiatal repair (++++, strong)
9. Gastrostomy tube insertion may facilitate postoperative care in selected patients (++, strong)
10. Routine postoperative contrast studies are not necessary in asymptomatic patients (+++, strong)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Natick
Grazie
Danke
Ευχαριστίες
Dalu
Obrigado
Thank You
Köszönöm
Tack
Спасибо
Dank
Gracias
谢谢
Merci
Seé
ありがとう