Case Presentation

- 29 y/o male truck driver with intractable hiccups since 8/2008

- PMH: GERD

- PSH: lap chole 2003

- Meds: thorazine

- All: NKDA
Case Presentation

Physical Exam:
- Afebrile, hemodynamically normal, Ht: 5’, Wt: 86kg
- Within normal limits including
  - Breath sounds clear to auscultation
  - CVS S1S2, no R/M/G
  - Abd soft, no organomegaly, scars from lap chole

Labs: unremarkable
Case Presentation

- **CXR 8/08:**
  - WNL

- **EGD 2/09:**
  - 1 cm hiatal hernia

- **Esophageal Manometry 3/09:**
  - Hypotensive LES with good relaxation
  - Low amplitude peristaltic contractions
Case Presentation

- CT abd/pelvis 5/09
Case Presentation

- Barium Swallow
  6/09:
  - Delay in esophageal motility, GERD, hiatal hernia
Case Presentation

- 6/26/09: laparoscopic converted to open Nissen fundoplication & emergent tracheostomy
- POD #1: trach collar
- POD #3: trach downsized
- POD #4: trach capped
- POD #5: barium swallow: normal swallowing, normal motility, no delay, no reflux, no leak
  - Tolerated regular diet
- POD #6: pt decannulated & discharged home
Case Presentation

Postoperative barium swallow on POD #5
Questions ??
History

- Henry Ingersoll Bowditch
- 1846 hiatal hernias described at postmortem
- Technically first description of paraesophageal hernia.
- 1898 Walter Cannon & Albert Moser: anatomy & physiology of the cardia w/ contrast material
- 1904 Eppinger: hiatal hernia diagnosed in live pt

History

- 1955: Rudolph Nissen → Nissen Fundoplication
- 1957: J. Leigh Collis → gastroplasty
- 1970’s Nissen fundoplication widely accepted

Hiatal Hernias

- **Type I**: sliding
- **Type II**: paraesophageal ("rolling")
- **Type III**: combined I & II
  - classified according to the anatomic position of the GEJ in relationship to the diaphragmatic hiatus, the composition of the hernia sac, and the extent of herniated stomach
Type I

- Intrathoracic GEJ, Contains gastric cardia and fundus
  No true hernia sac

- Most common of the 3 hiatal hernias

- More common in women (4:1), 5th & 6th decades, obese

- Usually reducible but may become fixed above diaphragm

- Attenuation of phrenoesophageal membrane (i.e., the subdiaphragmatic continuation of the transversalis fascia)

- The phrenoesophageal membrane stretches cranially due to intra-abdominal pressure and the tug of esophageal shortening on swallowing

- Suggests acquired weakness of tissue secondary to aging and strain on diaphragm

Copyright © The McGraw-Hill Companies, Inc. All rights reserved.
Type II

- GEJ in normal intraabdominal position
- Fundus migrates superiorly along side the GEJ & esophagus into the mediastinum
- True hernia
- Giant: entire stomach in thorax
Symptoms

Type I:
- Heartburn
- Regurgitation
- (loss of antireflux mechanism; goal is to restore physiology of cardia)

Type II:
- Epigastric pain
- Postprandial fullness
- Dysphagia
- Abdominal bloating
- Respiratory symptoms
- Anemia (1/3 of pts)
- Borchardt’s triad: chest pain, retching w/ inability to vomit, inability to pass NGT
Work Up

- Physical Exam
- CXR
- EGD
  - See pathology
- Barium swallow
  - Evaluate dysphagia, short esophagus, guide endoscopist
- 24 hr pH monitoring
  - 60% paraesophageal, 71% sliding
- Manometry
  - Esophageal motility, LES function, LES position
- CT
  - Helps confirm extent of hernia
Indications for Surgery

- Failure of medications to control symptoms (however, pts with good response to medical Tx often have better surgical response)

- Complications while on medications (ulceration, Barrett’s, stricture)

- Noncompliance with medical treatment

- Preference for surgery over lifelong medications (cost, inconvenience, side effects)

- Severely incompetent LES

- Paraesophageal hernia

Goals of Surgery

- Return herniated content below diaphragm
- Resect hernia sac
- Establish adequate esophageal length
- Repair hernia defect
Laparoscopic Paraesophageal Hernia Repair

Positioning:
- Low lithotomy,
- Steep trendelenberg
- Hands tucked
- 5 ports
Laparoscopic Paraesophageal Hernia Repair

Dissection:
- Reduce hernia contents
- Divide short gastrics
- Dissect sac off of L. crus
- Identify esophagus & vagus
  - Use 52 Fr Bougie
- Open hepatogastric ligament
- Dissect sac off of R. crus
- Mediastinal dissection until 3cm intraabdominal esophagus w/o tension
- Resect sac
Crural repair
- Close crura post to esophagus
- At decussation of R. & L. crura
- Interrupted 2-0 nonabsorbable sutures
- 50 Fr bougie: assess tightness, prevent postop dysphagia
Laparoscopic Paraesophageal Hernia Repair

- **Fundoplication**
  - Pull fundus through retroesophageal window
  - Mirror image of the ant. & post. fundus
  - Ant & post fundus should meet at the 9 o’clock position
  - The divided vessels along the greater curvature should lie in apposition to the left crus
  - Sutured fundoplication should lie on the right side
  - 3-4 sutures for 2.5-3cm fundoplication
Transhiatal Hernia Repair

- Esophagoscopy: extent of path, confirm absence of malignancy
- L. posterolateral thoracotomy (6\textsuperscript{th} or 7\textsuperscript{th} intercostal space)
- Resect 1cm segment of rib below
Transhiatal Hernia Repair

- Mobilization of Esophagus & excision of hernia sac

  - Divide pulmonary ligament to inf pulmonary V
  - Incise mediastinal pleura to expose esophagus from carina to diaphragm
  - Watch out for vagus nerves
  - Encircle esophagus w/ vagus nerves w/ penrose drain
  - Elevate esophagus and mobilize circumferentially toward diaphragm
  - Separate sac from pericardium anteriorly & aorta posteriorly
  - Dissect left to right, ant to post
Transhiatal Hernia Repair

- Division of Phrenoesophageal Membrane & Gastrohepatic ligament
  - Retract esophagus anteriorly to expose phrenoesophageal membrane posteriorly
  - Divide membrane to allow entry into lesser sac
  - Divide esophageal branch of L. phrenic artery near the crus
  - Divide gastrohepatic ligament along undersurface of the R. crus & down to L. gastric A
  - Visualize caudate lobe of the liver beneath the R. crus

www.downstatesurgery.org
Transhiatal Hernia Repair

- Mobilization of the stomach
  - Ligate short gastrics (3-4)
  - Elevate GEJ into chest & release any organoaxial rotation

- Closure of crura
  - Place 3-5 stitches at 1cm intervals post to ant in staggered fashion
  - Avoid spleen on L. & aorta on R.
Transhiatal Hernia Repair

- Assessment of Esophageal length & removal of ant fat pad
  - If stomach does not reduce easily = short esophagus
  - → Collis gastroplasty
    - 54 Fr bougie for women, 56 for men into stomach past GEJ
    - Bougie held anteriorly against lesser curvature, fundus retracted away at a R. angle to the esophagus
    - 60mm GIA applied immediately alongside the bougie on the greater curvature
    - Oversew staple line w/ nonabsorbable 4-0 monofilament suture
Second bite completes the wedge gastroplasty
Transhiatal Hernia Repair

- Fundoplication & reduction of wrap into abdomen
  - Fundus is passed posteriorly behind esophagus
  - Approximate fundus to esophagus or gastroplasty tube w/ 2 interrupted 2-0 silk sutures
  - Wrap should accommodate a finger alongside esophagus
  - 2 clips placed at superior aspect of the wrap to confirm length & location of wrap on CXR
  - Remove bougie
  - Secure top of fundoplication to underside of diaphragm using 2 2-0 polypropylene mattress sutures
Types of Fundoplication

- **Nissen**:
  - 360 degrees
  - Increase LES muscle pressure
  - normal esophageal length and normal motility

- **Toupet**
  - 180 degrees
  - Normal esophageal length and decreased motility

- **Belsey Mark IV**
  - 270 degrees through the chest

- **Dor**
  - 180 degree anterior wrap used w/ myotomy for achalasia
Operative Management

- Open vs. Lap:
  - Minimal difference for experienced technicians
  - Benefits of Lap:
    - Improved visualization due to magnification
    - Shorter hospital stay
  - Lap sometimes more difficult in obese pts

- Indication for thoracic approach
  - Larger hernias w/ suspected esophageal shortening, allows maximal mobilization
  - Prior hiatal hernia repair, safer dissection
Operative Management

Outcomes:

- Symptomatic: 88% have resolution for up to 4 yrs, 92% have resolution of anemia
- Anatomic: 41% have recurrent hernia after 4 yrs
- Long term success depends on
  - 1. tension-free repair w/ 4cm intraabdominal esophagus
  - 2. durable approximation of diaphragmatic crura
  - 3. correct matching of fundoplication technique to the peristaltic function of the esophagus

Current Surgical Therapy 9th Edition Cameron 2008
Repair of 104 Failed Anti-Reflux Operations

Atif Iqbal, MD,* Ziad Awad, MD, FRCSI,† Jennifer Simkins, MD,* Ricky Shah, BS,‡ Mumnoon Haider, MD,* Vanessa Salinas, MD,* Kiran Turaga, MD,* Anouki Karu, MS,§ Sumeet K. Mittal, MD,* and Charles J. Filipi, MD, FACS

From the *Department of Surgery, Creighton University School of Medicine, Omaha, NE; †Department of Surgery, University of Missouri, Columbia, MO; and §Creighton University School of Medicine, Omaha, NE.

Objective: assess whether reoperative surgery for failed Nissen fundoplication is beneficial & classify mechanisms of failure

Study group: 104 pt’s w/ previous fundoplication for GERD who underwent reoperation

Failure Rate:
- Open fundoplication: 9% to 30%
- Laparoscopic: 2% to 17%

58 Laparoscopic, 12 open, 34 thoracotomy

Included Nissen, Toupet, & Dor fundoplications, and Collis gastrostomy when indicated (surgeon’s discretion)
Repair of 104 Failed Anti-Reflux Operations

Atif Iqbal, MD,* Ziad Awad, MD, FRCSI,† Jennifer Simkins, MD,* Ricky Shah, BS,‡ Mumnoon Haider, MD,* Vanessa Salinas, MD,* Kiran Turaga, MD,* Anouki Karu, MS,‡ Sumeet K. Mittal, MD,* and Charles J. Filipi, MD, FACS*

From the *Department of Surgery, Creighton University School of Medicine, Omaha, NE; †Department of Surgery, University of Missouri, Columbia, MO; and ‡Creighton University School of Medicine, Omaha, NE.

Mechanism of Failure

- Crus closure failure
- Hiatal stenosis
- Fundoplication disruption
- Loose or slipped fundoplication
- Short esophagus
- Gastroparesis
- Wrong primary diagnosis
Repair of 104 Failed Anti-Reflux Operations

Operative Approach for Failed Procedures

- **Open thoracotomy**
  - Recommended when > 2 cm of gastric tissue within thoracic cavity on esophagram
  - Short esophagus suspected

- **Laparotomy**
  - Multiple previous failed operations

- **Laparoscopy**
  - Patient did not meet above criteria

Atif Iqbal, MD,* Ziad Awad, MD, FRCSI,† Jennifer Simkins, MD,* Ricky Shah, BS,‡ Mumnoon Haider, MD,* Vanessa Salinas, MD,* Kiran Turaga, MD,* Anouki Karu, MS,‡ Sumeet K. Mittal, MD,* and Charles J. Filipi, MD, FACS* From the *Department of Surgery, Creighton University School of Medicine, Omaha, NE; †Department of Surgery, University of Missouri, Columbia, MO; and ‡Creighton University School of Medicine, Omaha, NE.
Repair of 104 Failed Anti-Reflux Operations

Atif Iqbal, MD,* Ziad Awad, MD, FRCSI,† Jennifer Simkins, MD,* Ricky Shah, BS,‡ Mumnoon Haider, MD,* Vanessa Salinas, MD,* Kiran Turaga, MD,* Anouki Karu, MS,‡ Sumeet K. Mittal, MD,§ and Charles J. Filipi, MD, FACS*

From the *Department of Surgery, Creighton University School of Medicine, Omaha, NE; †Department of Surgery, University of Missouri, Columbia, MO; and ‡Creighton University School of Medicine, Omaha, NE.

Pitfalls:

- Intraoperative perforations must be closed with sutures incorporating mucosa

- Must have intraoperative EGD during surgery

- Using a large bougie will allow a good assessment of the mobility of the fundic wrap and secure an adequate fundoplication

- Must ligate and divide short gastric vessels

- Do not hesitate to convert from laparoscopy to open
References

Comments
Which is true?

A) Type I hiatal hernia is a rolling hernia

B) Type II hiatal hernia is a sliding hernia

C) Type III hiatal hernia is a combined Type I sliding and Type II paraesophageal hernia

D) None of the above
Questions

The first to describe hiatal hernias in postmortem pt’s was

a) Moser

b) Bowditch

c) Nissen

d) Belsey
Borchardt’s triad includes the following except:

a) chest pain

b) retching w/ inability to vomit

c) inability to pass NGT

d) gastric distention
During hiatal hernia repair, all of the following are important except:

A) have intraoperative EGD

B) make the fundoplication as tight as possible

C) use a large bougie

D) dissect the short gastrics to obtain adequate intraabdominal esophageal length
Thank You