Outline

- Benign
  - GERD
  - Paraesophageal hernias
  - Diverticulae
  - Dysmotilities
  - Perforation
  - UGI bleed

- Malignant
  - Barrett’s
  - Cancer

Story

- A 45-year old attorney, smoker, comes to your office with a 9-month history of heartburn.
- He takes 20 “Tums®” per day with minimal relief.
- He wants you to “fix” him!

What do you do?
**UGI**
- Provides roadmap
- Identifies diverticulae
- Assess hiatal hernia
- Lost art
- Beware of over interpretation
  - “Free reflux into the esophagus”
  - “Apparent short esophagus”
  - “Hiatal hernia”

**EGD**
- Trust no one, Do it yourself!

Where is the:
- Hiatus at diaphragm (40 cm)
- SCJ = white to pink
- GEJ = rugae start
- Confirm Barrett’s
- Confirm esophagitis

**Manometry**
- Quantifies LES
- Assess contractions
- Rule out dysmotilities
  - esp. Achalasia.

**High resolution manometry**
- More sensors
- Improved accuracy
- Easier to perform
- More sensitive in detect focal transport abnormalities
- Expensive!

**Gold standard**
24 h pH

- **Gold standard**
- DeMeester score for pH < 4
  - Total time
  - Supine time
  - Upright time
  - # episodes
  - Longest episode
  - # episodes > 5 min
- Correlates the symptoms

Types of reflux

- 25% Alkaline
- 6% Mixed
- 18% Acid
- 51% No Reflux


Management of GERD

- Behavioral
  - 6 small meals
  - Reduce weight
  - Elevate HOB
  - Stop smoking
- Acid suppression
  - Proton pump inhibitors (all the same)
- Pro-kinetics
  - Nausea, bloating symptoms

Functional Gastro-Intestinal Disorders

- "the old days... a young anxious woman", "an exclusion diagnosis"
- "the present... a positive diagnosis"

ROME III

Drossman DA. Gastroenterology 2006;130:1377–80
**Story**

EGD:
- Type I hiatal hernia
- Non-dysplastic Barrett’s

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**Prague classification**


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**Story**

- 8 weeks later…
- Heartburn, indigestion persists despite double dose PPI
- He is NOT happy!

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**Endoscopic techniques**

- Endocinch
- Gatekeeper injector
- Stretta
- Enteryx injector
- Esophyx plicator
- Laparoscopic or Robotic Nissen

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**Before**

**After**
When to operate for GERD

- Objective evidence of GERD
  - Barrett’s, esophagitis, +ve 24 h pH
- Failed medical therapy.
- Complications
  - Esophagitis
  - Recurrent aspiration pneumonias
  - ? Stricture
  - NOT Barrett’s
    - Need surveillance
    - Does not reduce the incidence of cancer

Which operation?

- Nissen
- Toupet
- Dor
- Belsey
  - Too difficult, needs thoracotomy
  - Hill
  - No clear advantage


Nissen

- 360° wrap
- Laparoscopic = Robotic
- Loose > 56 Fr. bougie
- Short 1-2 cm
- Divide short gastrics
- Remove esophageal fad pad
- > 3 cm of abdominal esophagus
- No mesh needed

Dor

- 180 anterior wrap
- “Close the front door”

Toupet

- 180 posterior wrap
- “Toupet is on the back of the head”

Belsey

- Left thoracotomy
- 270 ink well wrap
- Replaced by short-loose Nissen

Hill
- Posterior fixation of GEJ
- Accentuate the angle of His
- Don’t need gastroplasty for short esophagus
- Rarely done

Which operation?
<table>
<thead>
<tr>
<th>Partial (Toupet/Dor)</th>
<th>vs. Total (Nissen)</th>
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</thead>
<tbody>
<tr>
<td>More regurgitation</td>
<td>More dysphagia</td>
</tr>
<tr>
<td>More dyspepsia</td>
<td>More bloating</td>
</tr>
<tr>
<td>No need to tailor operation based on dysmotility</td>
<td>More flatulence</td>
</tr>
<tr>
<td>Europe</td>
<td>Higher reoperation rate</td>
</tr>
<tr>
<td></td>
<td>Short-Floppy Nissen</td>
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<tr>
<td></td>
<td>North America</td>
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</tbody>
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Story
- 45 year old male crawls into your office with heartburn.
- Investigations confirm GERD.
- BMI = 42 kg/m²

Wrap or bypass?

Reference
- Adjustable Gastric Band (AGB)
- Roux-en-Y Gastric Bypass (RYGB)
- Vertical Sleeve Gastrectomy (VSG)

SAGES recommendations

• Laparoscopic Roux-en-Y gastric bypass is the most effective if BMI > 35 kg/m²
• Uncertain benefit if BMI > 30 kg/m²
• Fewer failure rates
• Addresses the co-morbidities

Ed’s tweet home message

• Obese patients with GERD should get a laparoscopic Roux-en-Y gastric bypass.

2 years later

• Intermittent heartburn, indigestion after robotic Nissen Fundoplication.
• Very unhappy.
• Says the operation didn’t work.

Postop dyspepsia

A. Wrap too loose
B. Wrap too tight/long
C. Slipped Nissen
D. Wrapped stomach
E. Paraesophageal hernia
F. Wrong diagnosis

Redo the work-up!!

Paraesophageal hernia

• Repair all symptomatic
  • Pain
  • Anemia
  • Bloating
• Risk with any hernia
  • Strangulation
  • Perforation
• Type I
  • Only fix if refractory GERD
• Asymptomatic
  • Observe

10 years later

- Intermittent heartburn, indigestion
- After his robotic Nissen and redo surgery for paraesophageal hernia.
- Very unhappy (again!!)
- Says the operation didn’t work…..again!!

Low grade dysplasia

- Flat Barrett’s
- No focal lesion

What would you do?

- Laparoscopic Nissen.
- EGD in 3 months.
- Radiofrequency ablation.
- Endomucosal resection.
- Esophagectomy.

Barrett’s esophagus

- Squamous epithelium replaced by metaplastic columnar epithelium on endoscopy ≥ 1 cm above GEJ and confirmed on path.
- Know the level of the biopsy.
- Intestinal metaplasia = Goblet cells:
  - Alcian blue stain.

Barrett’s to cancer

- 1-2% of population
- GERD
- Barrett’s
- LGD
- HGD
- Cancer


Shaheen NJ et al. Am J Gastroenterol 2015

Incidence of Adenocarcinoma among Patients with Barrett’s Esophagus


High grade dysplasia
- Nodule or ulcer
  - EMR
  - If >T1a (beyond muscularis mucosa) then esophagectomy
  - Increased incidence of N1 disease
- If ≤ T1a then EMR and close surveillance q 3 months
- If flat Barrett’s
  - Ablation vs. esophagectomy

Mucosal ablation
- Thermal
  - Argon plasma coagulation
  - Multi-polar coagulation
  - Radio-frequency ablation (RFA)
  - Lasers: Argon, Nd:YAG, KTP-YAG
- Photochemical
  - Photodynamic therapy

Pitfalls of ablation
- Difficult in tortuous esophagus
- Multiple treatments
- Cost
- Still need intensive surveillance
- Submucosal occult Barrett’s!
- NO pathology specimen
  - No assessment of nodes

Endoscopic Mucosal Resection

EMR Sample

Cancer

Endoscopic Mucosal Resection
Choses EMR

- Patient feels better after EMR.
- Back to work.
- His legal trial ends.
- He wants to go golfing with his client.

3 months later

- Food is sticking
- Vomits after meals
- No pain
- 10 kg weight loss

What do you do?

Peptic stricture

Barium Swallow

Endoscopy

No cancer on biopsies

What would you do?

a. Balloon dilation
b. Stent
c. Bougie dilation
d. Esophagectomy
e. RFA

Riley SA, Attwood SEA. Gut 2004;53(Suppl 1)i1-i6

Bougies

Balloon dilation
3 months later

What do you do for this patient?

a. Continue proton pump inhibitor
b. Endomucosal resection (EMR)
c. Esophagectomy
d. Photodynamic therapy
e. Anti reflux surgery
f. Use a robot

Patient loves & wants to golf. 3 months later...

- Better for a while
- Food is started sticking again
- Additional 15 kg weight loss

What do you do?

T2 cancer
Who gets Esophageal Cancer?

What other investigations?

- CT head
- Staging laparoscopy
- PET scan
- EUS
- None!

EUS

- Useful for early (T1) or advanced (T4)
- Not useful for T2/T3
- Pitfall
  - Difficult in patients with narrowing

PET

- Standard of care now for most cancers, including esophagus
- Detects occult metastases in 10%

Staging laparoscopy

- 30% of T3/4 have peritoneal mets not seen on PET
- GEJ tumours.
- Insert feeding J-tube
T3N1M0

a. Preop CT followed by surgery  
b. Surgery alone  
c. Preop CTRT followed by surgery  
d. Preop RT followed by surgery  
e. Surgery followed by CTRT

T3N1M0 GEJ cancer options

1. Esophago-gastrectomy (abdomen)
2. Ivor Lewis (abdomen + right chest)
3. Transhiatal esophagectomy (abdomen + left neck)
4. McKeowen (abdomen, right chest, left neck)

Franz Torek 1923

Trans hiatal dissection

Esophagus and stomach

Gastric resection
Gastric conduit

Preserve the gastroepiploic vessels

Preserve the right gastric vessels

Neck anastomosis

Left thoracoabdominal

Ivor Lewis
McKeowen

VATS / robotic esophagectomy

3 years later
- Can’t swallow his own saliva
- Weight loss returned
- New hip and lower back pain

What do you do?

Supportive care
- Dysphagia
- Nutrition
- Quality of life
Pleasures of life

1. Eating
2. Good bowel movement
3. Sex

Palliation of dysphagia

- Stent
- Radiation
- Brachytherapy
- Photodynamic therapy
- Laser
- Feeding tube
Achalasia
- Rare in North America
- Chagas disease in South America
  - T. cruzi
  - Aganglionosis
  - Aperistalsis
  - LES fails to relax
  - ? Cancer risk

Achalasia: Diagnosis
- Barium swallow
  - Dilated esophagus
  - Birds beak
- EGD
  - Normal mucosa early
  - Stasis esophagitis
- Manometry
  - No peristalsis in body
  - LES does not relax

Achalasia: Treatment
- Drugs
  - Diltiazem
- Endoscopic
  - Botulinum toxin
  - Balloon dilation
  - POEM
- Surgery
  - Heller myotomy
  - Esophagectomy

Heller
- Laparoscopic or Robot
- 5 cm on esophagus
- 2 cm on stomach
- Avoid anterior vagus
- Life time proton pump inhibitors
  - Everyone refluxes

Per Oral Endoscopic Myotomy (POEM)
**Diffuse esophageal spasm**
- Etiology unknown
- “Corkscrew” on barium
- Dx: manometry

**Diffuse esophageal spasm**
- 20% contractions are simultaneous
- Periods of normal peristalsis
- High amplitude and long duration
- Repetitive and multi-peaked

**Diffuse esophageal spasm**
- Dilate as needed
- ? Extended myotomy
  - Right VATS
  - Thoracotomy

**Story**
- 80 year male with dysphagia
- Regurgitation
- Halitosis

**What investigations?**
- UGI
  - Do first to give you the road map
- EGD
  - Be careful…easy to perforate!

**Zenker’s**
- Killians’ triangle
- Spasm of cricopharyngeal muscle
- Need to remove the distal obstruction
**Zenker’s treatment**
- Clear liquids x 48 hr
- EGD to clear pouch
- RSI to prevent aspiration
- Bougie
- Left cervical myotomy

**Epiphrenic diverticulae**
- All associated with dysmotility
- Resect
- Esophageal myotomy
  - Laparoscopic
  - Right VATS
  - Right thoracotomy

**Mid esophageal diverticulae**
- Mediastinal inflammation
- Traction
- Histoplasmosis
- Do *not* operate

**Story**
- 40 year old nurse underwent an esophageal pneumatic dilation for achalasia 6 hours ago.
- Now has chest pain.

What do you do?
**What do you do?**

a. NPO + antibiotics and operate if worse
b. EGD + stent
c. Thoracotomy, myotomy, and repair
d. Thoracotomy and repair
e. Esophagectomy

Surgery is always best!!
Repair on one side. Myotomy on the other.

**Perforation principles**

- Antibiotics for anaerobes
- Nutrition
- Drain, drain, drain
- Extend the myotomy
- Resect necrotic tissue
- Expose the mucosa
- Repair in 2 layers
- Cover and buttress
- Diversion rarely needed
- Damage control
- Get In. Get Out

**When to divert?**

- Damage control
- Unstable patient
- Unfixable perforation
  - Caustic injury, severe trauma, severe bleeding

**Story**

A 56-year old male “rolls” into the ER vomiting blood. He has fainted 3 times in 2 hours. He is a regular patron at the Beef. He is diaphoretic and pale. BP 90 / 60 and HR is 120.

What do you do?
Upper GI bleed
What you MUST know

• Peptic ulcer
• Varices
• Gastritis

Upper GI bleed
What you SHOULD know

• Gastric carcinoma
• Mallory-Weiss tear
• Peptic esophagitis
• Esophageal cancer
• Aorto-duodenal fistula
• Osler-Weber-Rendu

Peptic ulcer
Indications for Surgery

• Failure of medical management
• Complications
  • Bleeding
  • Perforation
  • Obstruction

Surgical Techniques
Peptic Ulcer

• Truncal vagotomy + pyloroplasty
• Truncal vagotomy + antrectomy
  • Billroth I = gastroduodenostomy
  • Billroth II = gastrojejunostomy
• Selective vagotomy + drainage
• Highly selective vagotomy
Esophageal Cancer

- Dysphagia and weight loss is **Cancer** until proven otherwise
- Resectable vs. Palliate
- Surgery vs. Stent

Esophageal Carcinoma

**What you MUST know**

- Premalignant conditions
  - Columnar-lined esophagus (Barrett’s)
  - Lye
  - Plummer-Vinson syndrome
  - Radiation
- Treatment
  - Surgery
**Gastroesophageal Reflux**  
*Indications for Surgery*
- Failure of medical management
- Complications
  - severe esophagitis
  - bleeding
  - perforation
  - stricture
  - aspiration
  - ?? Barrett’s

**Dysphagia**  
*Investigation*
- Barium swallow
- Esophagastroduodenoscopy
- Special tests
  - Manometry
  - 24-hour pH

**Upper GI Bleed**  
*Etiology*
- Peptic ulcer
- Varices
- Gastritis

**Peptic Ulcer**  
*Indications for Surgery*
- Failure of medical management
- Complications
  - Bleeding
  - Perforation
  - Obstruction