Innovations in Endoscopic Interventions

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No Disclosures
Disclosure

- I have no financial relationships with commercial support to disclose
Objectives

- Endoscopic management of Barrett’s esophagus and early superficial esophageal neoplasia
- Endoscopic management of early colorectal neoplasia
- Advances in endoscopic management of hepatopancreaticobiliary disorders
New Technology

- Improvement in instruments
  - High definition
  - High magnification
  - High resolution WLE
  - Near focus
  - NBI, i-scan, FICE
  - Working channel
  - Dual channel
  - Variety of accessories
Barrett’s Esophagus
Barrett’s Esophagus (BE)

- Presence of intestinal metaplasia in a biopsy taken from visible columnar epithelium lined tubular esophagus
  - ~5-10% of adults in the population
- Rising incidence of Intestinal Metaplasia (IM)
- Rising incidence of early esophageal carcinoma (EAC)
Barrett’s Esophagus (BE)

Annual Incidence of Cancer
0.1-0.3 %
0.5-
8.8%
6 – 12 %
40% (mostly IMC)
0%
1-2 %
>20%

Rastogi et al. Gastrointest Endosc 2008
Wani S et al. Am J Gastroenterol 2009
Singh S. Gastrointest Endosc. 2014
Evolution of Therapy for BE

In Barrett’s esophagus patients with confirmed HGD/IMC, we recommend against surgery compared with EET

Strength of recommendation: **Strong**

Quality of evidence: **Very low**
Non Dysplastic Barrett’s WLE vs NBI
HGD: Near focus and NBI
Endoscopic Mucosal Resection (Band, Cap)

Wilson Cook Duette

Olympus EMR Cap
Endoscopic mucosal resection
DN-LGD
EMR-Duette technique
Radiofrequency Ablation (RFA)

HALO\(^{60}\)
HALO\(^{90}\)
HALO\(^{360+}\)
HALO\(^{ULTRA}\)
AIM – DYSPLASIA TRIAL

- 128 patients with BE and dysplasia (LGD/HGD)
- Mean BE length 5 cm; 12 month follow up

- At 5 yrs, CE-dysplasia 99%, CE-IM 90% (allowing interim RFA)
- Recurrence of IM in 22% (56% NDBE, 44% dysplastic – 3 HGD, 2 LGD, 2 IND)

Shaheen N et al. NEJM 2009, Wolf et al, DDW 2014
BE with HGD/EAC
- Multidisciplinary team approach

Flat HGD
- Local ablative therapy (preferable RFA)

Visible nodule
- Endoscopic resection for staging.
- EUS has limited role

T1a
- Endoscopic resection followed by RFA of BE and surveillance endoscopy

Low risk T1b (T1bsm1)
- Endoscopic resection if high risk for surgical resection followed by RFA of BE and surveillance endoscopy

High risk T1b (T1bsm1,sm2,sm3)
- Surgical resection in high volume centers

PPI therapy

Pros
- Suppresses acid
- Treat pain
- Heals and prevent esophagitis
- Improves QOL

Cons
- Increase risks of infections
  - C-difficile
  - Pneumonia
  - UTI
- Malabsorption of minerals
  - Mg, Ca, B12
- Drug-Drug interactions
  - Clopidogrel
- Doesn’t stop reflux
- GI side effects
Anti-reflux Surgery
Nissen Fundoplication

Pros
- Symptoms relief ~85%
- Improves QOL
- Withdrawal of PPI ~70%
- Normalizes 24-h pH test
- Regression of histologic changes ~70%

Cons
- Doesn’t prevent cancer
- Dysphagia 3.5%
- Bloating 43%
- Inability to belch
- ~30% back on PPI
- Costs
Transoral Incisionless Fundoplication (TIF)

- Laparoscopic nissen fundoplication is the surgical “golden standard”
- TIF is a new endoscopic technique that restores the valve at the GEJ via endoluminal fundoplication using EsophyX
- Creates esophagogastric plication
- Less invasive, approved by FDA 2009
- Eliminates daily PPI dependence
- Normalizes distal esophageal pH
Trans-oral Incisionless Fundoplication (TIF)
TIF and GERD

- HH < 2cm + GERD symptoms while on PPI therapy x 6months and had abnormal esophageal acid exposure (EAE)
- Randomization was to TF group (n = 40) or to PPI group (n = 23)
- Following evaluation at 6 months, all remaining PPI patients (n = 21) elected to undergo crossover to TF
- 52 patients were assessed at 3 years for GERD symptom resolution, healing of esophagitis, EAE using 48-h Bravo testing, and discontinuation of PPI use.

Colon Polyps
Basis of Endoscopic Therapy

<table>
<thead>
<tr>
<th>HGD</th>
<th>Intramucosal cancer</th>
<th>Submucosal cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of LN metastasis: 0%</td>
<td>Risk of LN metastasis: 0%-2%</td>
<td>Risk of LN metastasis: 0%-54%</td>
</tr>
<tr>
<td>Candidates for EET: yes</td>
<td>Candidates for EET: yes</td>
<td>Candidates for EET: no</td>
</tr>
</tbody>
</table>

Komanduri S, Muthusamy V, Wani S, Gastroenterology 2019
Principles of EMR

Soetikno, Gotoda, Nakanishi and Soehendra. GIE 2003
Large 25 mm cecal polyp Paris 0-IIa
Large Rectal TVA
Large symptomatic partially obstructing ascending colon lipoma
Large symptomatic partially obstructing ascending colon lipoma
Endoscopic submucosal resection (ESR) of rectal carcinoid
Endoscopic Submucosal Dissection (ESD)
Endo-Therapy Accessories for ESD

- IT knife
- Hook knife
- Flex knife
- TT knife
- Flush knife
- Dual knife
ESD of 20 mm Rectal IMC, Paris 0-IIa+IIc
Objective of ESD is to provide R0 Resection
Endoscopic Full Thickness Resection (EFTR)

- Potential applications:
  - Subepithelial tumors < 2cm (carcinoid, GIST)
  - Refractory/scarred adenomas (post resection)
  - Appendiceal adenomas
  - T1b/T2 <2cm cancers in non-operative candidates
Over the scope clip (OTSC)

Rajan et al. Gastroenterology 2018;154;1925-1937
Endoscopic Full Thickness resection (EFTR) of Sigmoid Adenocarcinoma
Closure of defect after gastric EFTR of GIST
Endoscopic Appendectomy

Endoscopic Full Thickness Resection of A Large Inverted Appendix Using A Colonoscope

Endoscopic Overstitch (Apollo)
Large EMR of rectal LST-G with closure of defect
Biliary Endoscopy
Balloon sweep of CBD
Choledocholithiasis
Cholangioscopy
What about large CBD stone?
Endoscopic approach to hepatopancreaticobiliary disorders
EUS Evaluation

- Characterization of pancreatic cystic lesion
- Define presence of absence of worrisome / high risk feature
- Obtain tissue sampling
- Evaluate parenchymal and ductal anatomy
- Fine needle injection (alcohol)
- Tumor marking with fiducial injection
- Celiac plexus block / neurolysis
- EUS-guided angiotherapy
EUS FNA of small L lobe liver Met
EUS FNA of Omental deposit
EUS-guided liver biopsy
EUS-guided Liver Biopsy
## EUS and Pancreas Cyst

### Worrisome Features

<table>
<thead>
<tr>
<th>Feature</th>
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<tbody>
<tr>
<td>Cyst $\geq 3$ cm</td>
</tr>
<tr>
<td>Thickened/enhancing cyst wall</td>
</tr>
<tr>
<td>Nonenhancing mural nodule</td>
</tr>
<tr>
<td>Main pancreatic duct caliber $\geq 7$ mm†</td>
</tr>
</tbody>
</table>

### High-Risk Stigmata

<table>
<thead>
<tr>
<th>Stigmata</th>
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<tbody>
<tr>
<td>Obstructive jaundice with cyst in head of pancreas</td>
</tr>
<tr>
<td>Enhancing solid component within cyst</td>
</tr>
<tr>
<td>Main pancreatic duct caliber $\geq 10$ mm in absence of obstruction</td>
</tr>
</tbody>
</table>
## EUS Pancreas cysts

<table>
<thead>
<tr>
<th>Group</th>
<th>Value w/Units</th>
</tr>
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<tbody>
<tr>
<td>BODY FLUIDS</td>
<td>Amylase 87 units/L</td>
</tr>
<tr>
<td></td>
<td>CEA 1.82 ng/mL</td>
</tr>
<tr>
<td></td>
<td>Amylase 346 units/L</td>
</tr>
<tr>
<td></td>
<td>CEA 470 ng/mL</td>
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</tbody>
</table>
Walled-off Pancreas Necrosis
Plastic stents vs Self-expanding metal stents (SEMS) for Benign and Malignant Biliary Stricture
Peroral Endoscopic Transgastric Cystgastrostomy
Peroral Endoscopic Transgastric Peripancreatic Necrosectomy
EUS-guided Gastrojejunostomy

<table>
<thead>
<tr>
<th>Stent</th>
<th>Diameter</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>AXIOS</td>
<td>10 mm</td>
<td><img src="AXIOS.png" alt="Image" /></td>
</tr>
<tr>
<td>(Boston Scientific, Marlborough, MA)</td>
<td>15 mm</td>
<td></td>
</tr>
<tr>
<td>· Cold (non-cautery enhanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Hot (cautery enhanced)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAXUS</td>
<td>8 mm</td>
<td><img src="SPAXUS.png" alt="Image" /></td>
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<tr>
<td>(Taewoong Medical, Gimpo, S. Korea)</td>
<td>10 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 mm</td>
<td></td>
</tr>
<tr>
<td>NAGi</td>
<td>10 mm</td>
<td><img src="NAGi.png" alt="Image" /></td>
</tr>
<tr>
<td>(Taewoong Medical, Gimpo, S. Korea)</td>
<td>12 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 mm</td>
<td></td>
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<tr>
<td></td>
<td>16 mm</td>
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Bariatric Endoscopy
Conventional Scope Designs
~50 years old!

Endoscopes will change
These Medical Devices Are Inserted Into 500,000 Patients Each Year — but Are Tough to Sterilize

Duodenoscopes have sickened hundreds of patients in hospital outbreaks. Now some experts are demanding the devices be redesigned or taken off the market.
Single-Use Endoscopy

Sterile Single-Use Endoscopy is Coming to GI

invendo medical is now part of Ambu – the global leader in single-use visualisation. With sterile single-use endoscopes, we will move GI endoscopy into the 21st century and address the concerns and challenges associated with the cleaning and reprocessing of reusable endoscopes.

Contact Us
The Endoscope Camera in a Pill

Popular Science
Robotic Surgery
Robot-Assisted Endoscopic Submucosal Dissection Is Effective in Treating Patients With Early-Stage Gastric Neoplasia

Thank you