EMR, ESD and Beyond

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Gastrointestinal Cancer Lesion that Can be Treated by Endoscopy

• Superficial
• No lymph node metastasis
All introduced in Japan!

- **1970s**: Polypectomy; Shinya H. 1969 (colon)
- **1980s**: Strip Biopsy; Tada et al., Gastroenterol Endosc, 1984
- **1990s**: EMR-C; Inoue et al., Gastrointest Endosc, 1993
- **2000s**: EMR-L; Akiyama et al., Gastrointest Endosc, 1997
- **2010s**: ESD; Ono H, Gotoda T et al. Gut, 2001
- **2019**:
Endoscopic Resection

• Advances in technique
• Advances in devices
• Refining indications
Underwater EMR
Underwater EMR
Working in retroflexion
Avulsion technique
Tip anchor technique
Coagulating Forceps and Caps
Use of Cap and Coag grasper for Brisk Bleeding
What is ESD?

Developed in Japan to treat early gastric cancer
ESD

- Ontologically sound procedure providing en bloc resection
- Lower recurrence rate/Higher curative rate
- Allows resection when EMR is not feasible
- Accurate histopathologic assessment of curative treatment
- Preserves organ integrity with higher quality of life
Recurrence

- EMR ≈ 15-20%
- ESD ≈ <1%

Fujiya M. Gastrointest Endosc. 2015;81(3):583
Colonic ESD Has Lower Recurrence and Higher Curative Rate Compare with EMR
ESD Allows Resection When EMR is not Feasible

LST-NG depressed center and tattoo
Piecemeal removal of T1 CRC can lead to unnecessary surgery:

- **En bloc w/ favorable histology**
  - Pedunculated ➔ **Observe**
  - Sessile ➔ **Observe**

- **Fragmented specimen, unfavorable histology** ➔ **Colectomy**

NCCN Guidelines Version 1.2019
Colonic ESD is Cost-effective

- 1723 colonic lesions from large Western cohort
- Three strategies were compared
  - Universal EMR
  - Universal ESD
  - Selective ESD
- Selective use of ESD was the preferred strategy!
- However, only 43 ESDs are required per 1000 lesions

Bahin FF. Gut. 2018;67(11):1965
Current Indications for Colorectal ESD

• Anticipated submucosal fibrosis
  – Prior EMR attempt
  – Tattoo underneath the lesion
  – Recurrent lesion

• Possible superficial submucosal invasion
  – Non-granular LST
  – Large Granular LST
    • Rectum
    • Large nodules
    • Depressed areas

Pimentel-Nunes, P. Endoscopy. 2015;47(9):829-54
The Role of Surgery?
The Role of Surgery for Benign Colonic Lesions

- It is expensive
- Lower QOL compare to endoscopic resection
- It not feasible in some cases
- It carries high complication rate
Endoscopic Resection versus Laparoscopic Surgery

Adverse events after surgery for nonmalignant colon polyps are common and associated with increased length of stay and costs

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Chicago, Illinois, USA

Outcome of EMR as an alternative to surgery in patients with complex colon polyps

Gottumukkala S. Raju, MD, FASGE, Phillip J. Lum, MS, William A. Ross, MD, MBA, FASGE, Selvi Thirumurthi, MD, Ethan Miller, MD, Patrick M. Lynch, MD, Jeffrey H. Lee, MD, MPH, FASGE, Manoop S. Bhutani, MD, FASGE, Mehnaz A. Shafi, MD, Brian R. Weston, MD, Mala Pande, MBBS, MPH, PhD, Robert S. Bresalier, MD, Asif Rashid, MD, PhD, Lopa Mishra, MD, Marta L. Davila, MD, FASGE, John R. Stroehlein, MD, FASGE
Quality of Life
ESD vs Laparoscopic Colonic Resection

Total Quality of Life Score Day 1 and Day 14

Quality of Life
ESD vs Laparoscopic Colonic Resection

HS health status, MeS mental status, MoS motor status, BP bodily painless, PAF passage and anorectal function, and ST stress for the treatment

Nakamura F. Dig Dis Sci 2017;62(12):3325
When is ESD is the preferred approach?
Large LST Extending to the Dentate Line
In some cases ESD is the option

- FAP with rectal cuff adenoma
ESD is feasible in cases where EMR or TEMS are not
Large LST extending to the dentate line
Laparoscopic Surgery for Benign Polyps?

- 25% of benign polyps in the US are treated with laparoscopic colonic resection
- High price to pay
  - Mortality – 0.7% (1 out of 142)
  - Colostomy or ileostomy – 2.2% (1 out of 45)
  - For rectal lesions - risk of colostomy 6 times higher
  - Second major surgery – 3.6% (1 out of 28)
  - Major complication – 14% (1 out of 7)

Peery AF. Gastroenterology. 2018 (E-pub)
Peery AF. Gastrointest Endosc. 2018;87(1):243
Retraction Devices

• Dental floss

• Lumendi

• ORISE Tissue Retractor System
ESD Technique Continues to Evolve
ESD Technique Continues to Evolve
Anything not worth doing is not worth doing well
Indications for Gastric ESD

Table 1. Indications for gastric ESD

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Mucosal</th>
<th>Submucosal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ulcer (-)</td>
<td>Ulcer (+)</td>
</tr>
<tr>
<td></td>
<td>≤2 cm</td>
<td>&gt;2 cm</td>
</tr>
<tr>
<td>Differentiated type</td>
<td>ESD/EMR</td>
<td>ESD</td>
</tr>
<tr>
<td>Undifferentiated type</td>
<td>ESD</td>
<td>Surgery</td>
</tr>
</tbody>
</table>

Absolute criteria

Expanded criteria

Gotoda T. Gastric Cancer 2007;10
Draganov PV. Clin Gastroenterol Hepatol. 2018: S1542
## Indications for ESD of esophageal SCCA

**Table 2. Japanese Esophageal Society Guidelines for esophageal endoscopic submucosal dissection (ESD)- Squamous dysplasia**

<table>
<thead>
<tr>
<th>Absolute indications</th>
<th>T1a esophageal cancer involving the epithelium or lamina propria</th>
<th>&lt;2/3 the circumference of the esophagus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative indications</td>
<td>Esophageal cancer involving the muscularis mucosa or &lt;200 μm invasion of the submucosa</td>
<td></td>
</tr>
</tbody>
</table>

**Absolute criteria**

**Expanded criteria**

Draganov PV. Clin Gastroenterol Hepatol. 2018: S1542
Current Indications for Colorectal ESD

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Pimentel-Nunes, P. Endoscopy. 2015;47(9):829-54
ESD in Barrett’s

- HGD
  - Irregularity more than 15 mm
  - Depressed area (Paris IIc or IIa+IIc)
  - Protruding lesions (Paris Is or Ip)
- Intramucosal Ca/superficial submucosal Ca/multifocal Ca
- Equivocal histology on biopsy
- EMR with positive margin
- Recurrent lesions after RFA and/or EMR

Yang, D, Othman M, Draganov PV. Clin Gastroenterol Hepatol. 2018: S1542
Yang D, Zou F, Xiong S, Forde JJ, Wang Y, Draganov PV. GIE
Barrett’s with HGD and extensive nodularity

- ESD: HGD, margins negative for dysplasia
ESD Allows Resection when EMR May Not be Feasible

- Barrett’s with nodule s/p EMR: At least intramucosal Ca with positive lateral and deep margins
- ESD specimen: Intramucosal Ca with negative margins
ESD Preserves Patient Quality of Life and Allows for *en bloc* Resection Regardless of Size

- Barrett’s intramucosal cancer, no obvious lesion
- ESD: intramucosal Ca with negative margins
Equivocal histology

- Biopsy: Cancer “depth of invasion cannot be determined”
- ESD: Intramucosal Ca, no lymphovascular invasion, (-) margins
Multifocal Cancer

- 10 cm long Barrett’s with multifocal intramucosal Ca with no visible abnormalities
- ESD: intramucosal cancer, no LV invasion
Endoscopic Resection

• Advances in technique
  – Underwater EMR
  – Avulsion technique
  – Tip anchor technique
  – Working in retroflexion
  – ESD

• Advances in devices
  – Coagulating forceps
  – Cap
  – Retraction devices

• Refining indications
  – Colon ESD
  – ESD for Barrett’s