

EMR, ESD and Beyond

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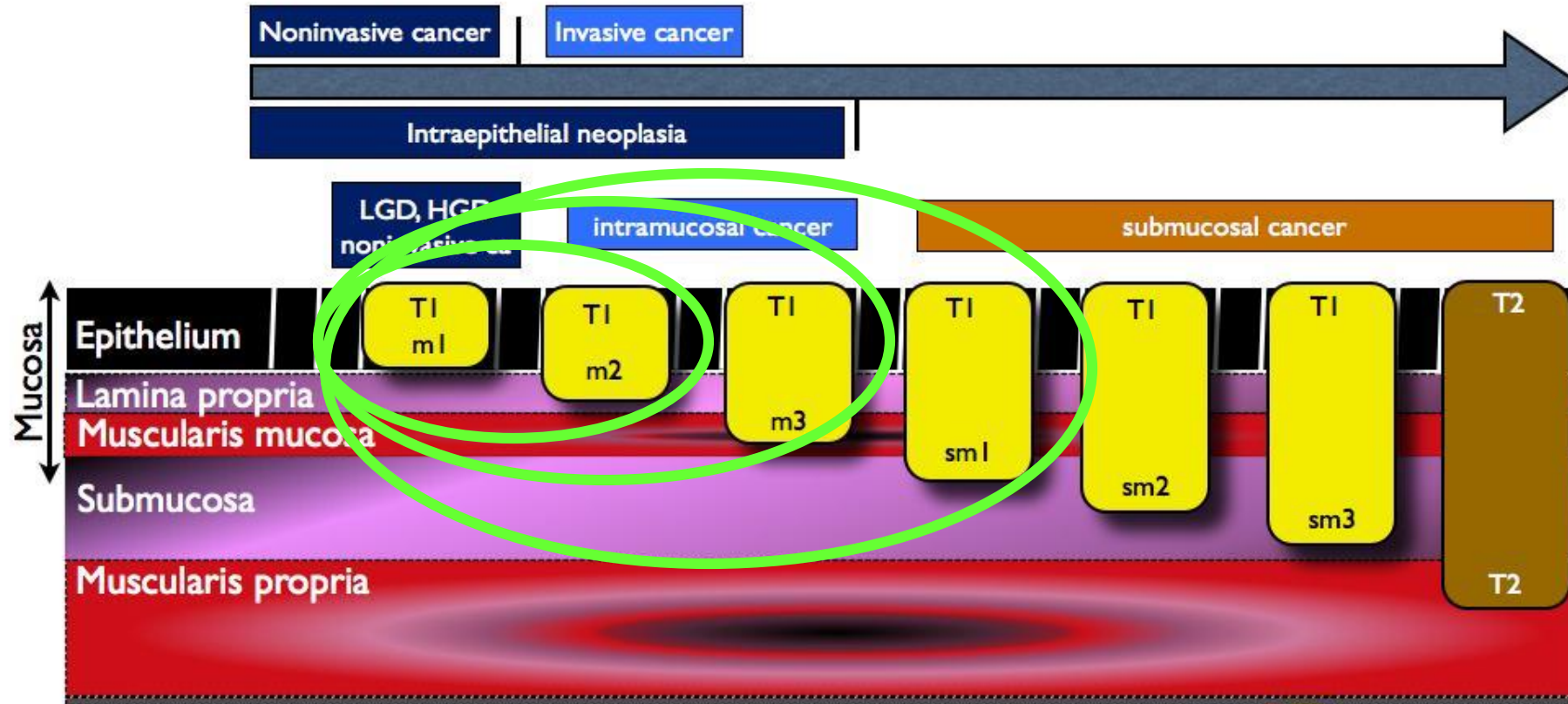
University of Florida

Gastrointestinal Cancer Lesion that Can be Treated by Endoscopy

- Superficial
- No lymph node metastasis

EMR / ESD

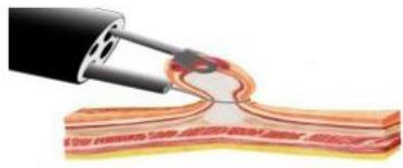
Superficial Neoplastic Lesions



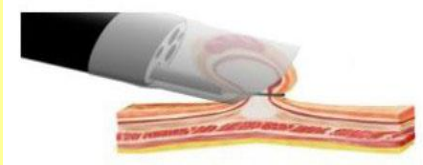
Paris Workshop GIE 2002

LN spread +/-

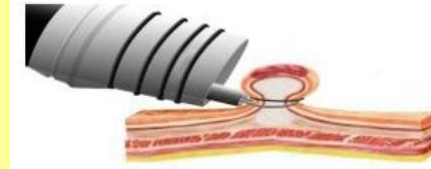
All introduced in Japan!



Strip Biopsy; Tada et al.,
Gastroenterol Endosc, 1984



EMR-C; Inoue et al.,
Gastrointest Endosc, 1993



EMR-L; Akiyama et al.,
Gastrointest Endosc, 1997

1970s

1980s

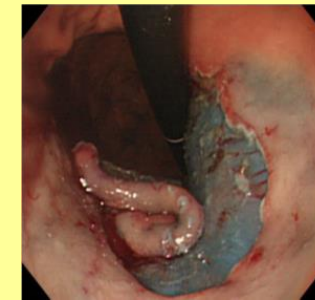
1990s

2000s

2010 2019



Polypectomy; Shinya H.
1969 (colon)

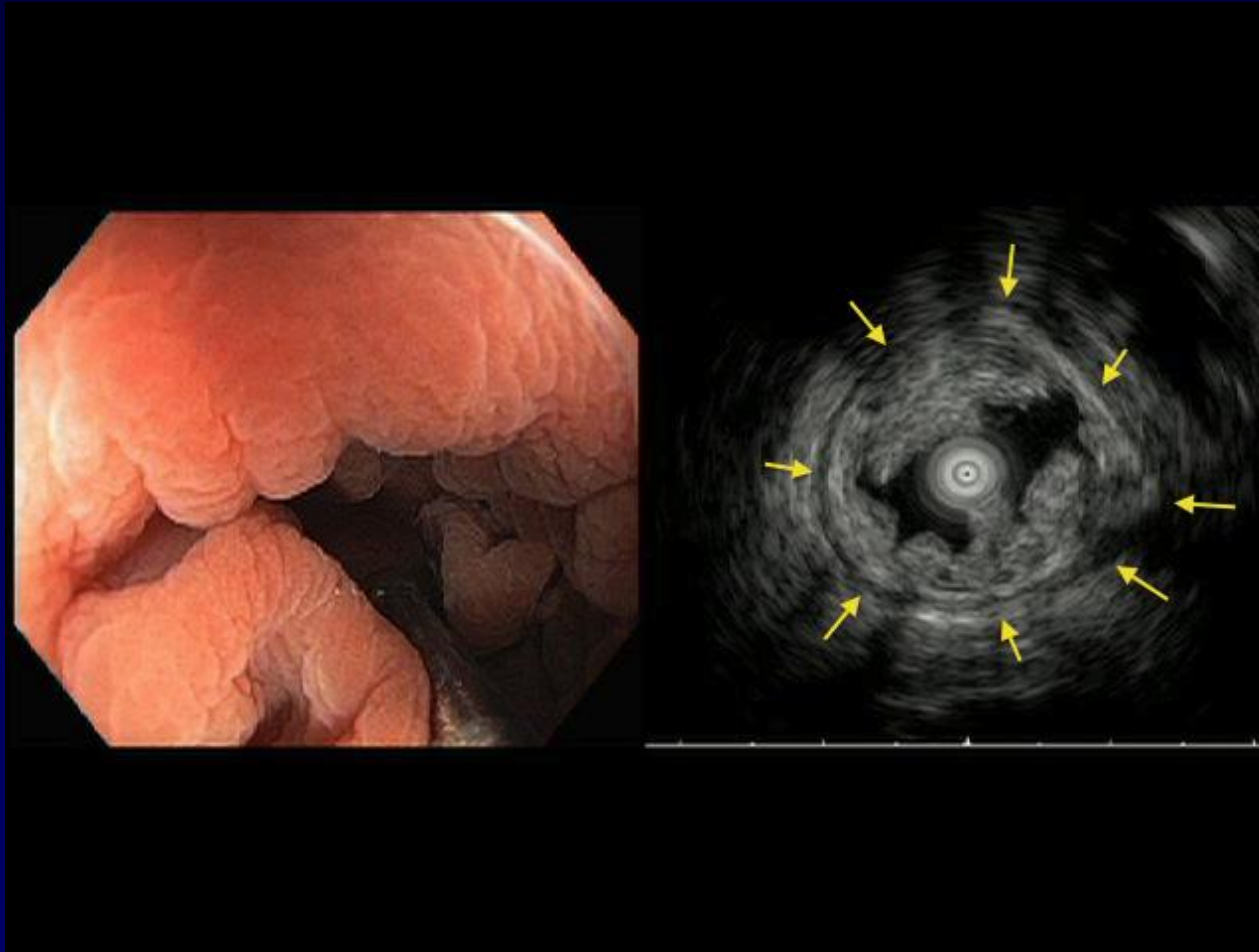


ESD; Ono H, Gotoda T et al.
Gut, 2001

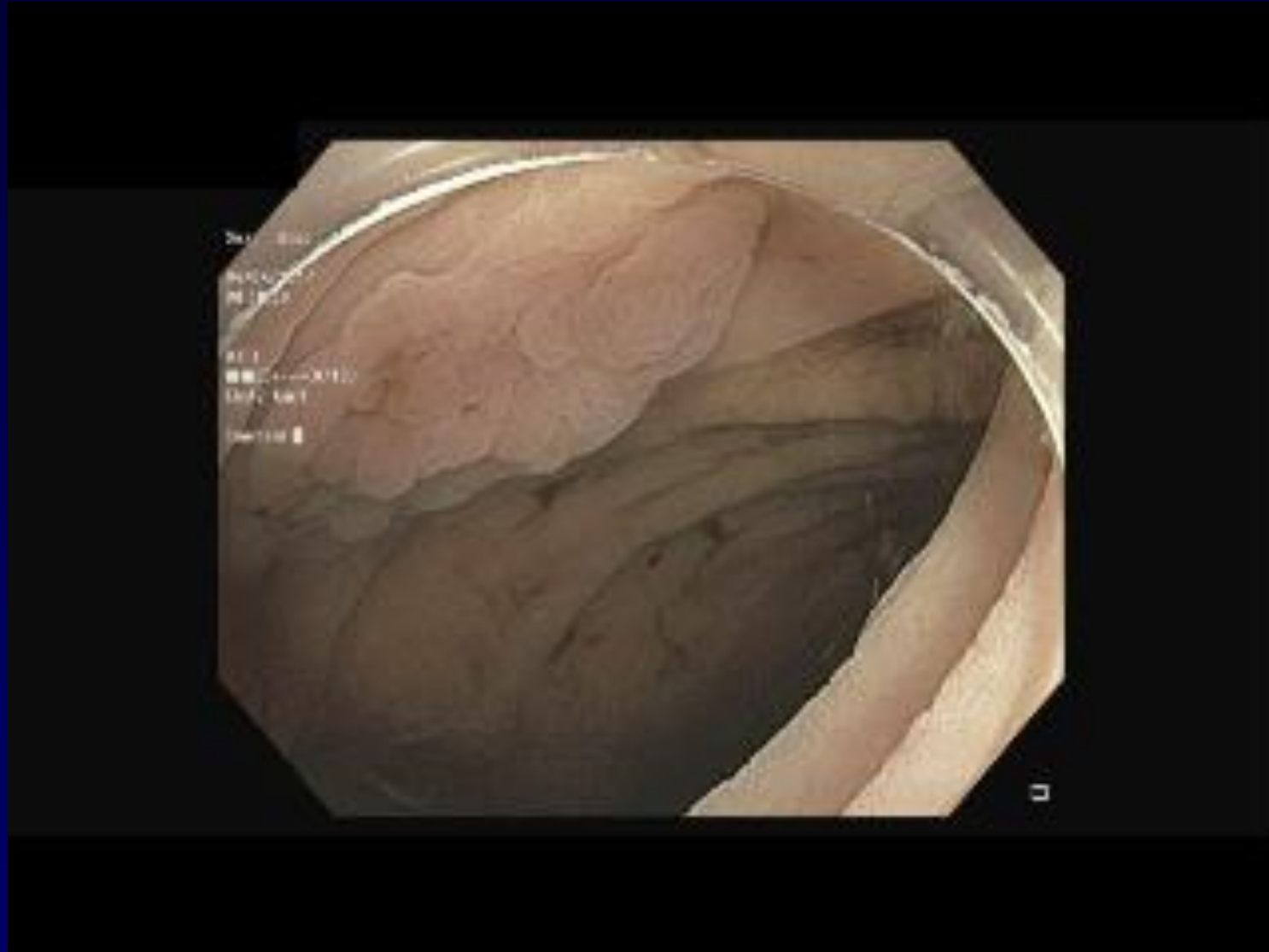
Endoscopic Resection

- Advances in technique
- Advances in devices
- Refining indications

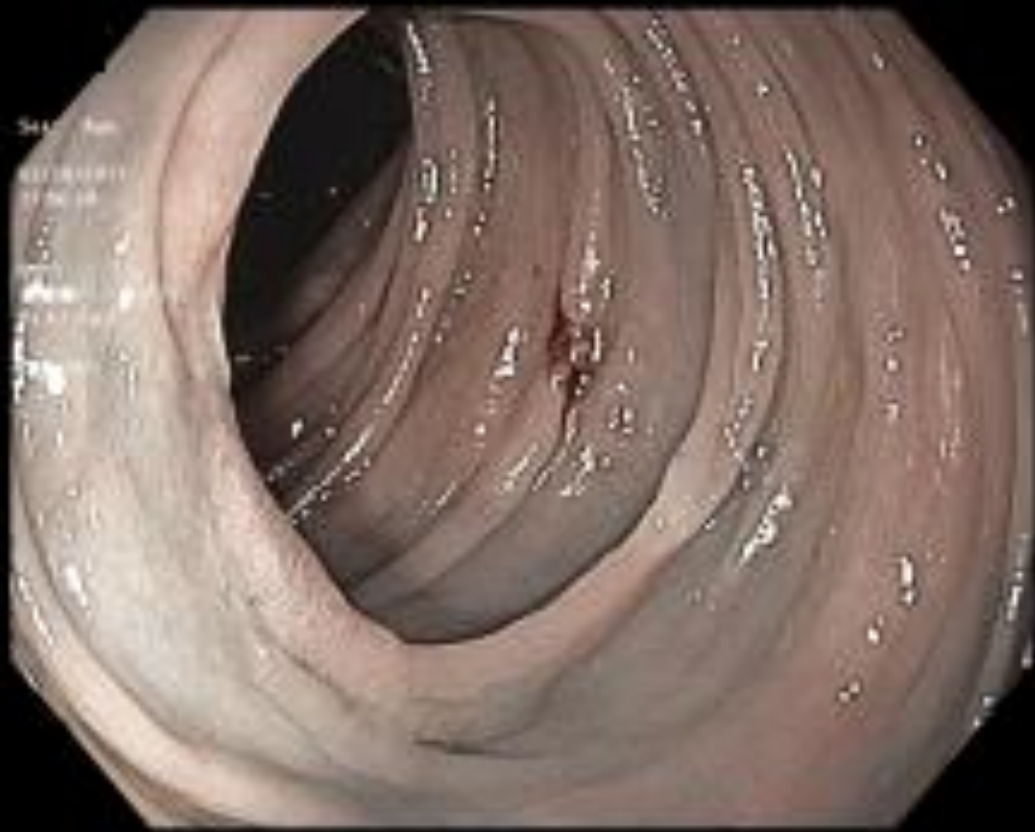
Underwater EMR



Underwater EMR



Avulsion technique



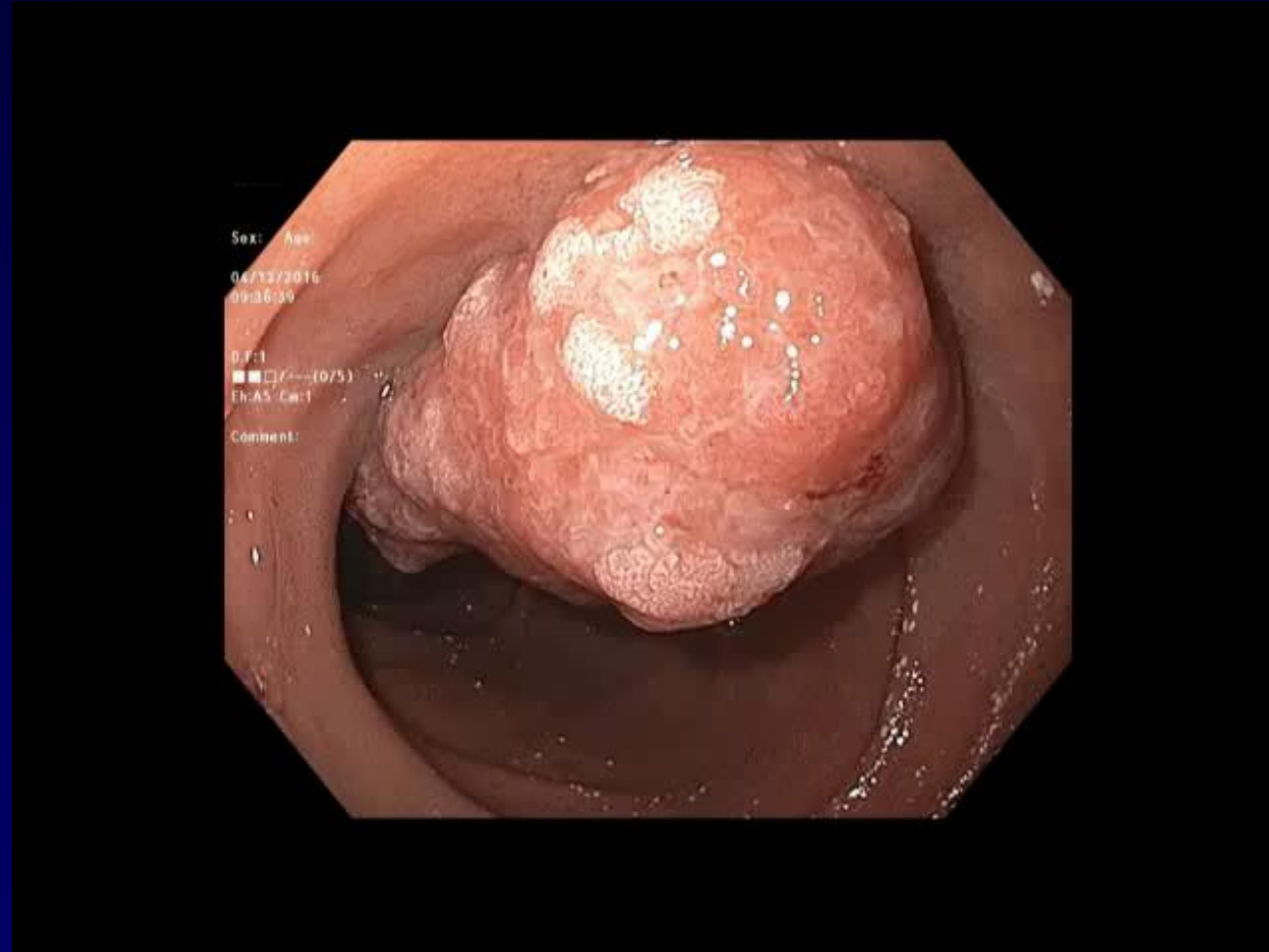
Tip anchor technique



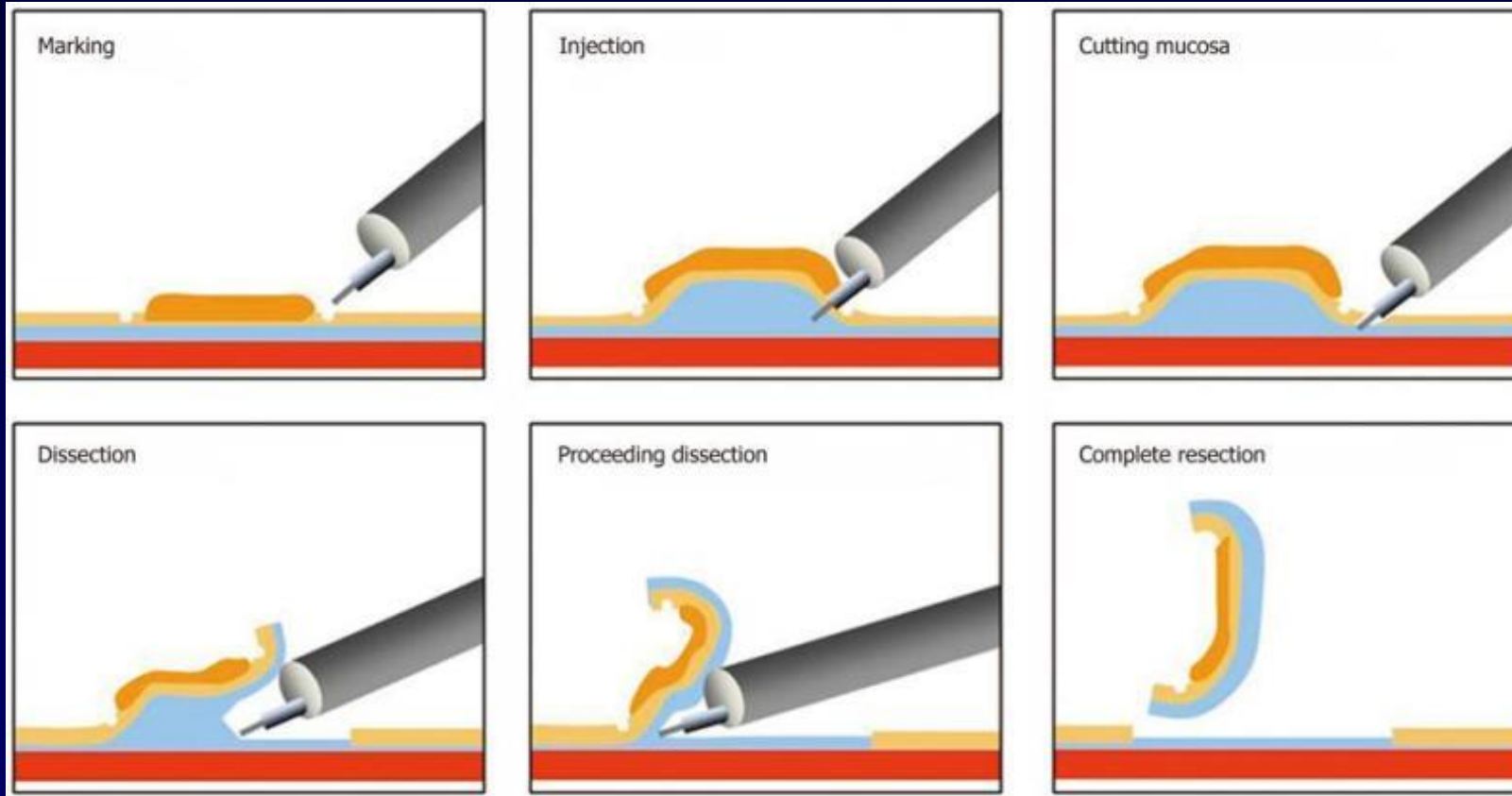
Coagulating Forceps and Caps



Use of Cap and Coag grasper for Brisk Bleeding



What is ESD?



Developed in Japan to treat early gastric cancer

ESD

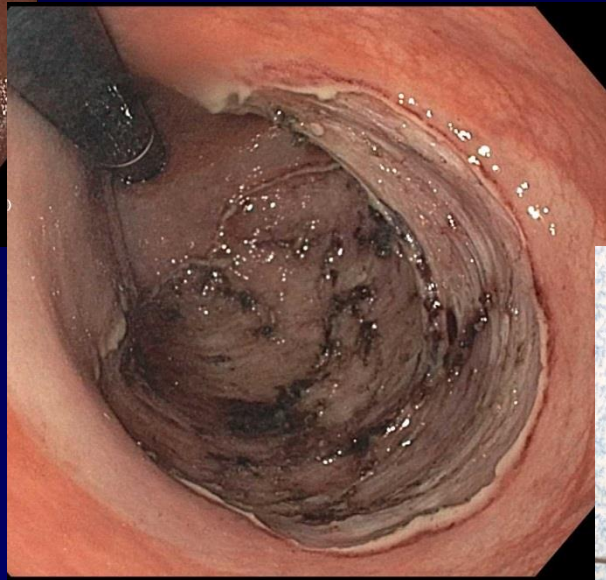
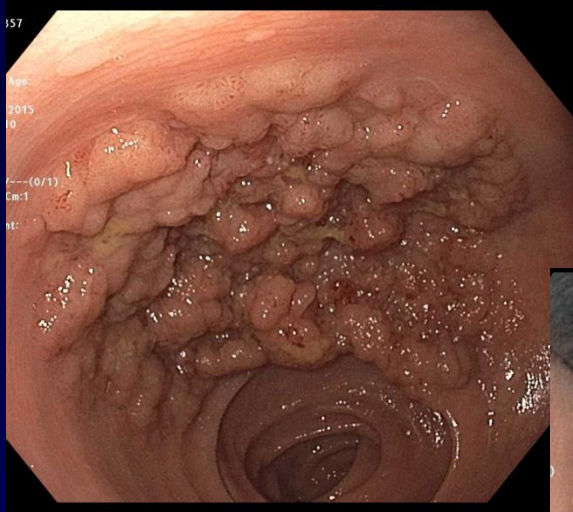
- Ontologically sound procedure providing en bloc resection
- Lower recurrence rate/Higher curative rate
- Allows resection when EMR is not feasible
- Accurate histopathologic assessment of curative treatment
- Preserves organ integrity with higher quality of life

Recurrence

- EMR \approx 15-20%
- ESD \approx <1%

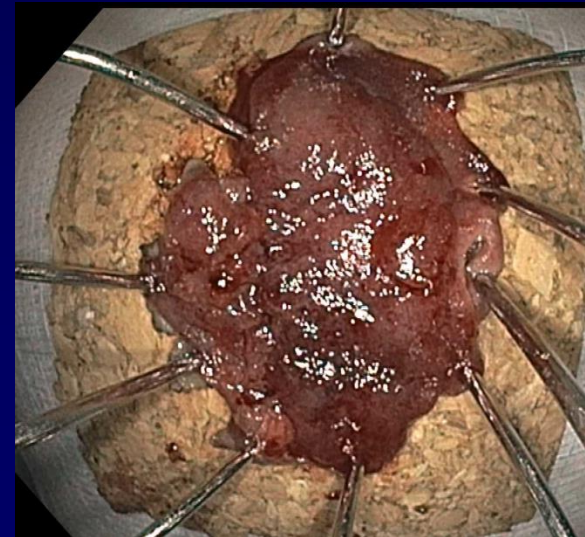
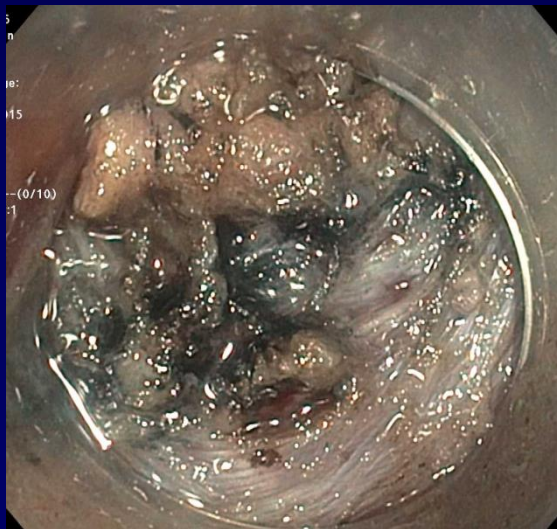
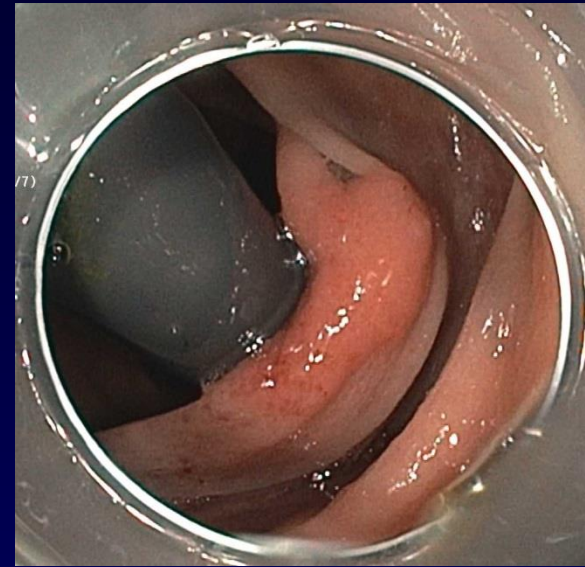
Fujiya M. Gastrointest Endosc. 2015;81(3):583
Wang J. World J Gastroenterol. 2014;20(25):8282

Colonic ESD Has Lower Recurrence and Higher Curative Rate Compare with EMR

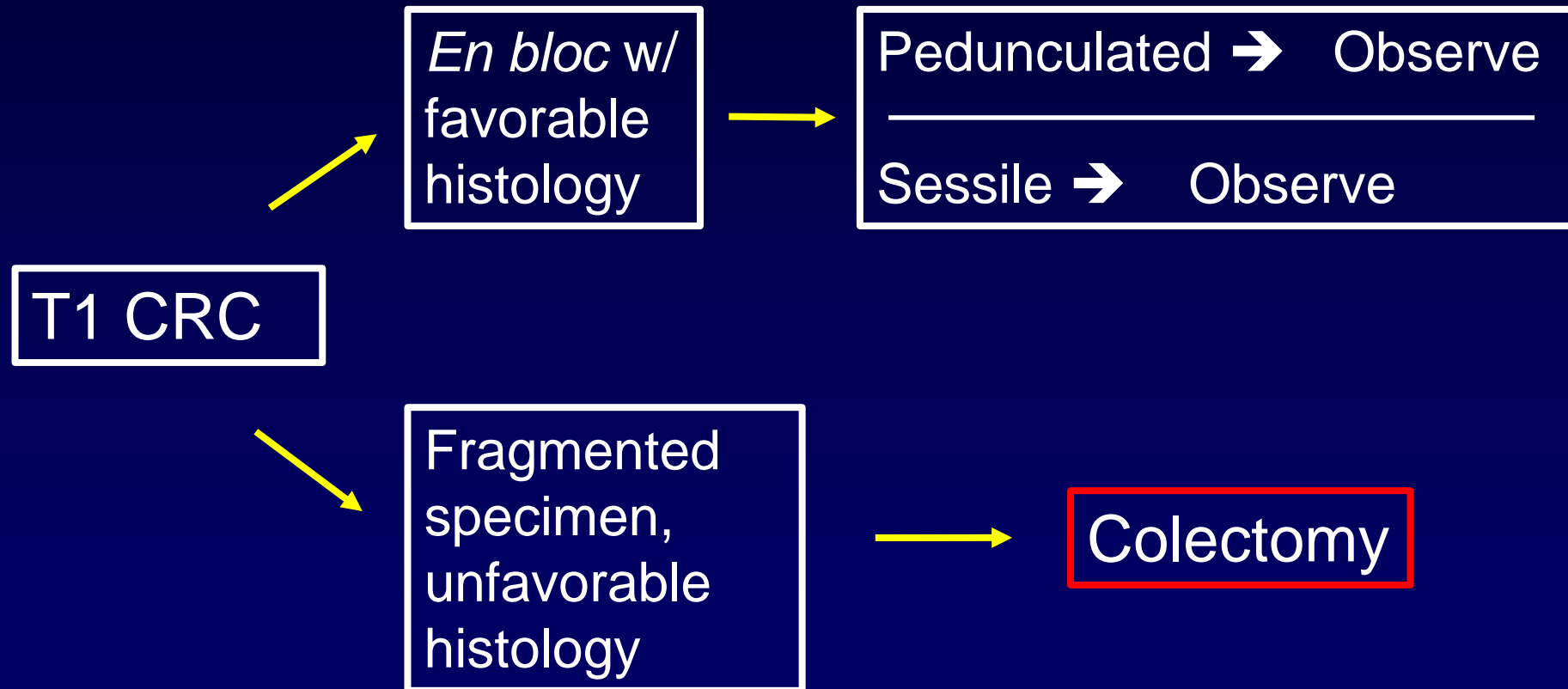


ESD Allows Resection When EMR is not Feasible

LST-NG depressed center and tattoo



Piecemeal removal of T1 CRC can lead to unnecessary surgery:



Colonic ESD is Cost-effective

Wide-field endoscopic mucosal resection versus endoscopic submucosal dissection for laterally spreading colorectal lesions: a cost-effectiveness analysis

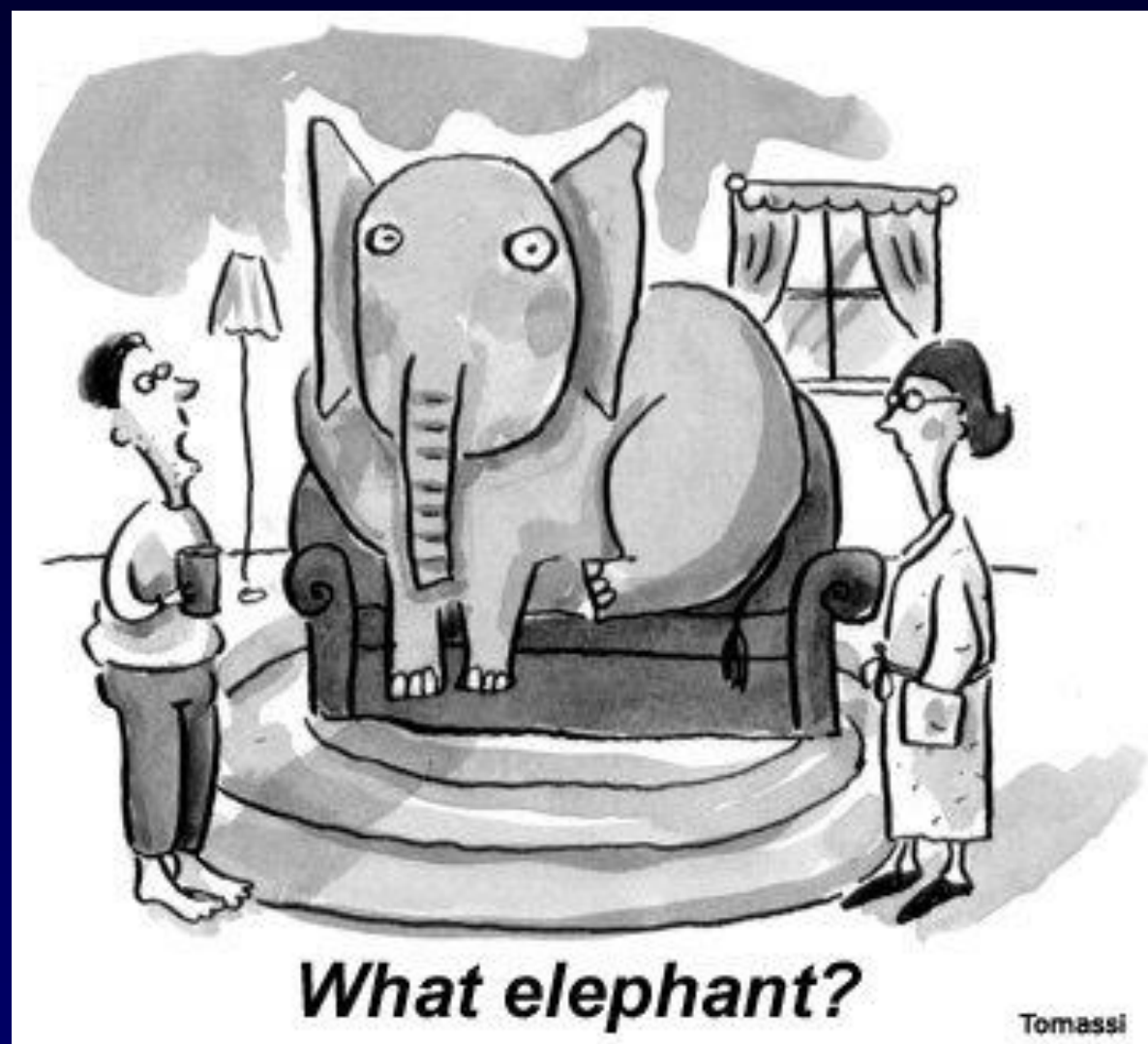
Farzan F Bahin,^{1,2} Steven J Heitman,^{1,3} Khalid N Rasouli,¹ Hema Mahajan,⁴ Duncan McLeod,⁴ Eric Y T Lee,¹ Stephen J Williams,³ Michael J Bourke^{1,2}

- 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

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
Tanaka, Shinji. Digestive Endoscopy 27.4 (2015): 417





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 caries 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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Adam B. Gluskin, MD,¹ David J. Bentrem, MD,⁴ Sri Komanduri, MD,¹ Jennifer A. Pacheco, BA,²
David Grande, BS,¹ William K. Thompson, PhD²

Chicago, Illinois, USA

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

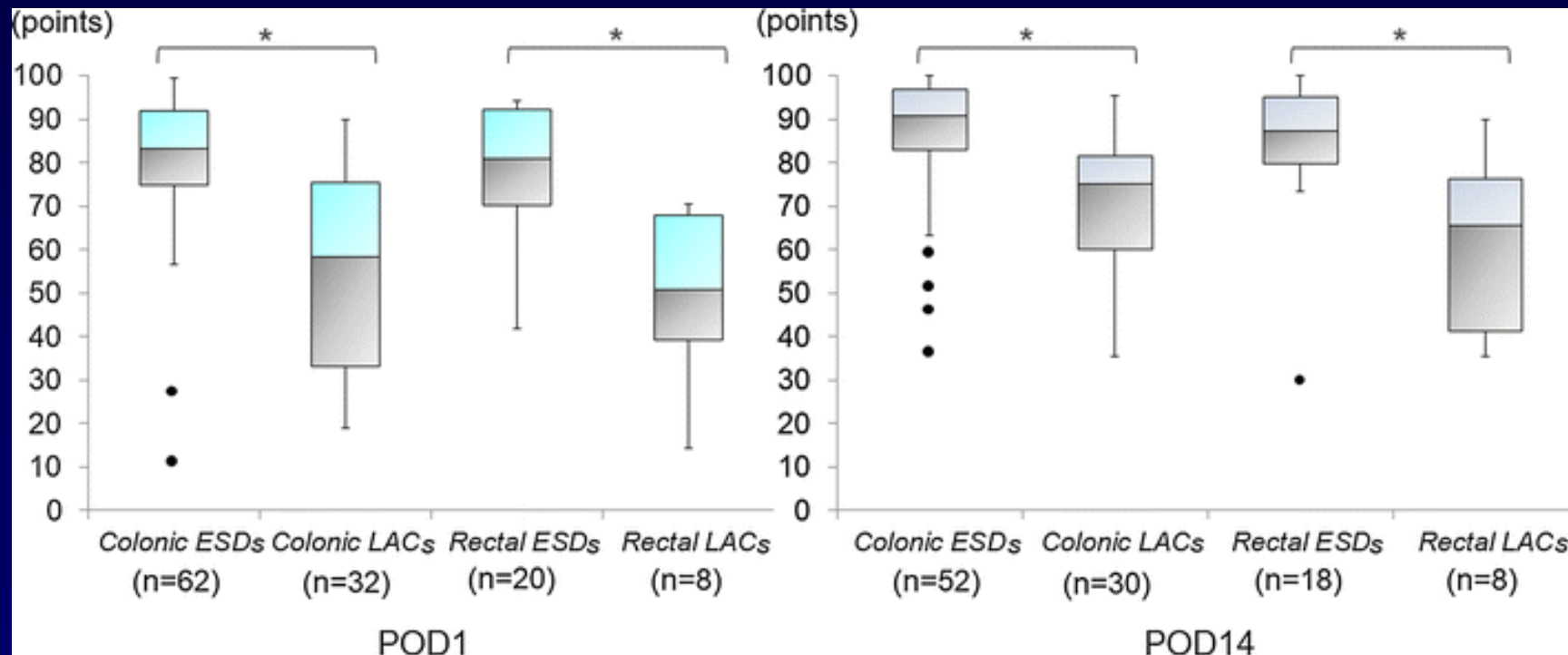


Gottumukkala S. Raju, MD, FASGE, Phillip J. Lum, MS, William A. Ross, MD, MBA, FASGE,
Selvi Thirumurthi, MD, Ethan Miller, MD, Patrick M. Lynch, MD, Jeffrey H. Lee, MD, MPH, FASGE,
Manoop S. Bhutani, MD, FASGE, Mehnaz A. Shafi, MD, Brian R. Weston, MD, Mala Pande, MBBS, MPH, PhD,
Robert S. Bresalier,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

Quality of Life

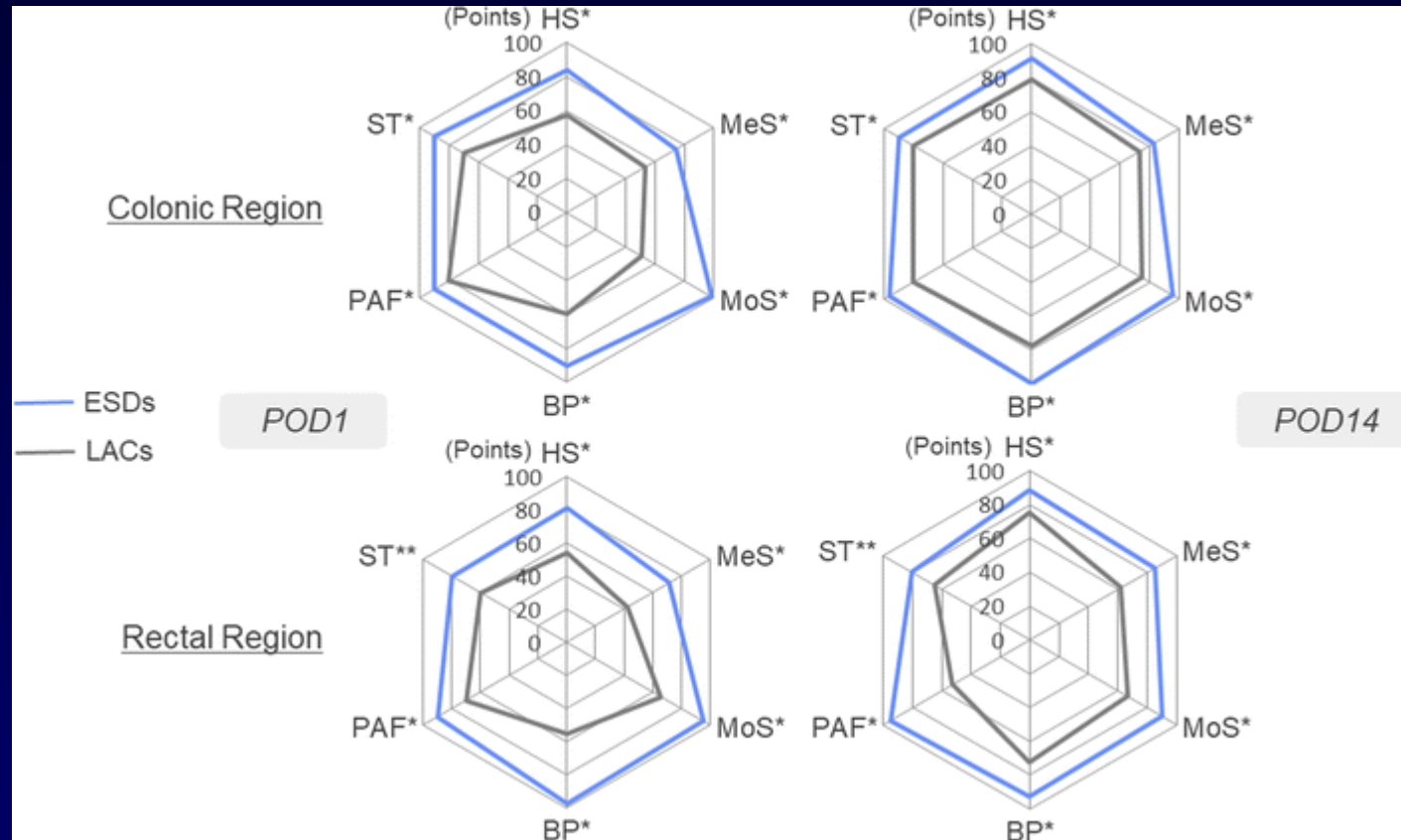
ESD vs Laparoscopic Colonic Resection

Total Quality of Life Score Day 1 and Day 14



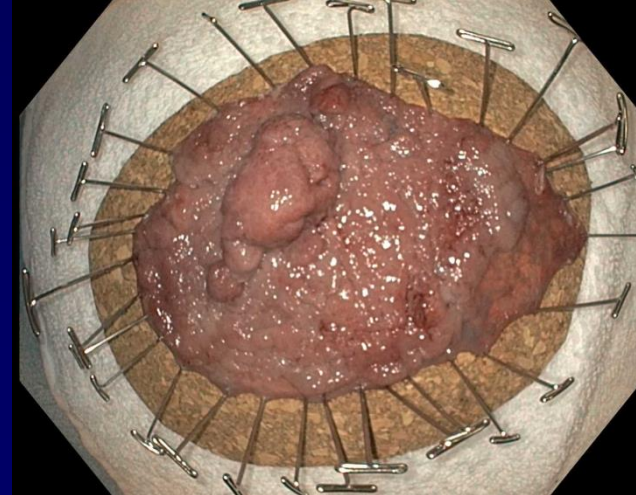
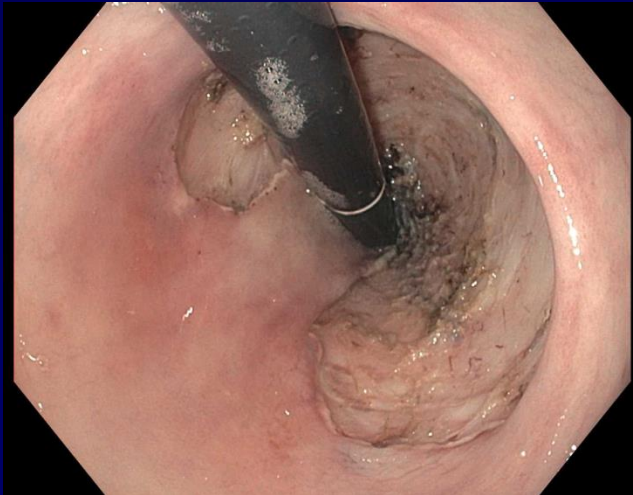
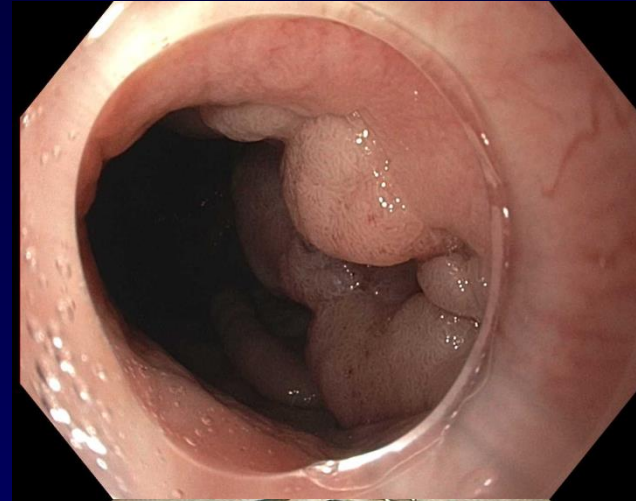
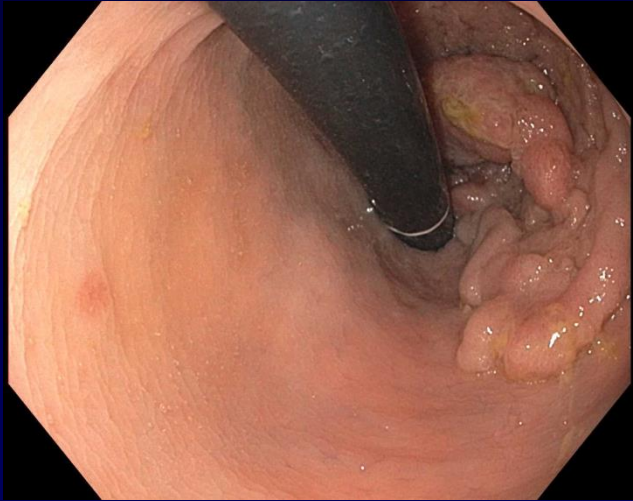
Quality of Life

ESD vs Laparoscopic Colonic Resection



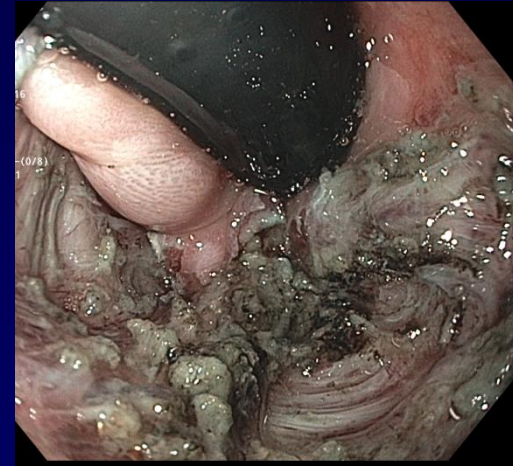
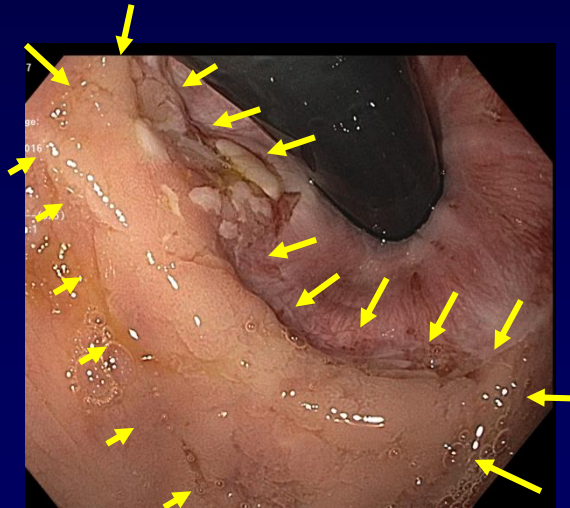
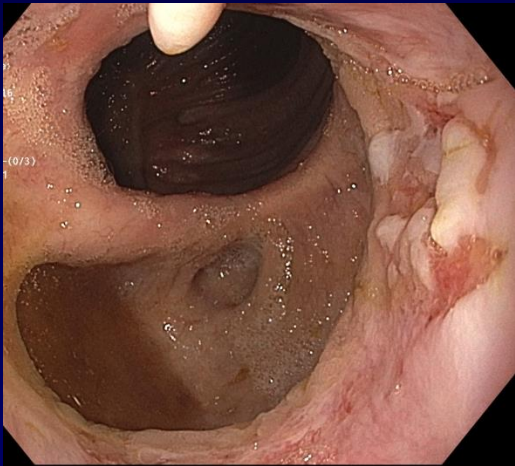
HS health status, MeS mental status, MoS motor status, BP bodily painless, PAF passage and anorectal function, and ST stress for the treatment

When is ESD 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

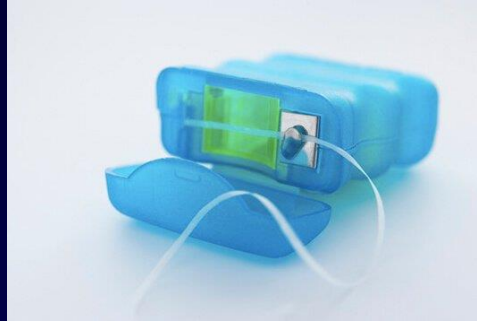


Laparoscopic Surgery for Benign Polyps?

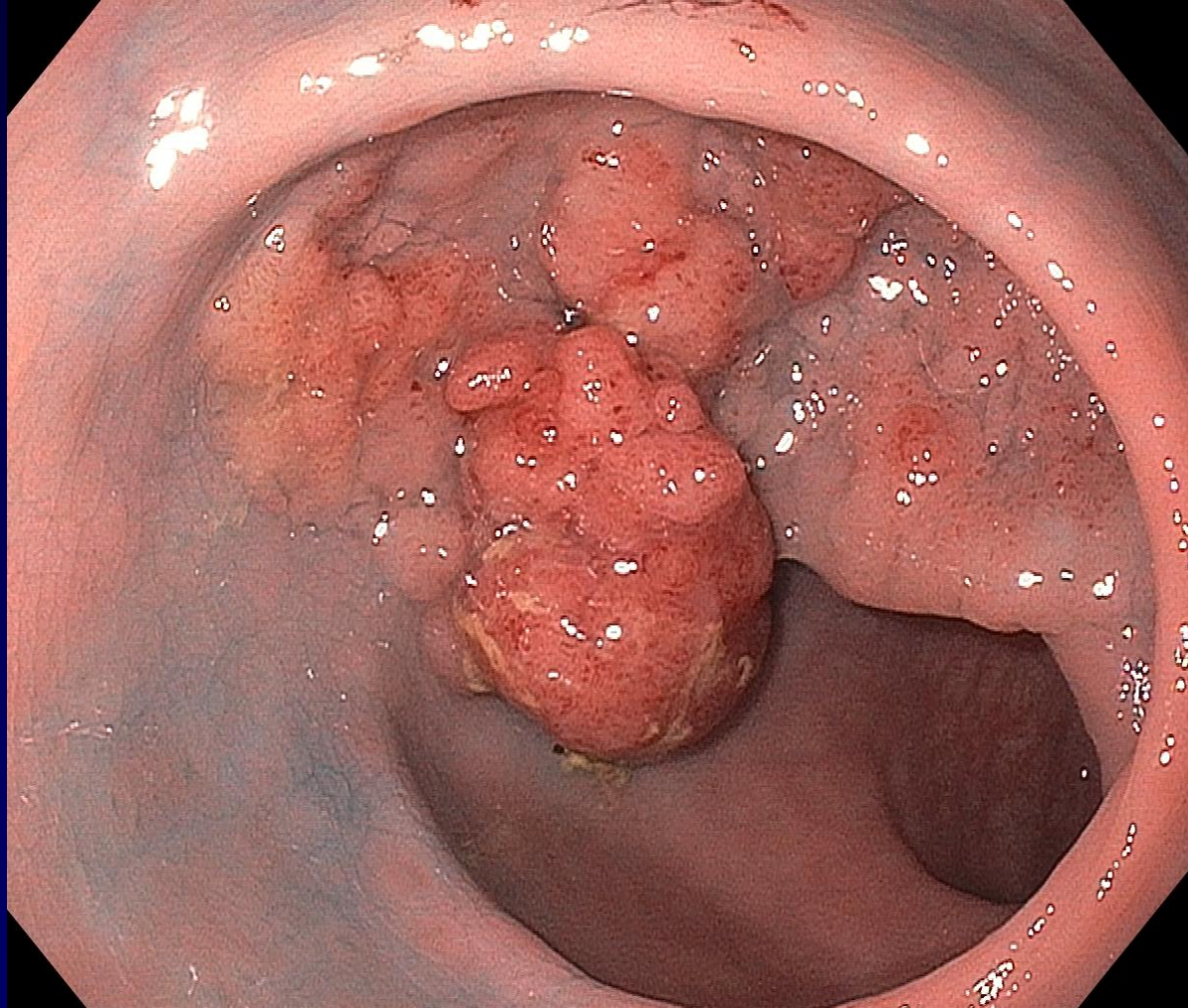
- 25% of benign polyps in the US are treated with laparoscopic colonic resection
- High price to pay
 - Mortality – 0.7% (1 out of 142)
 - Colostomy or ileostomy – 2.2% (1 out of 45)
 - For rectal lesions - risk of colostomy 6 times higher
 - Second major surgery – 3.6% (1 out of 28)
 - Major complication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

Retraction Devices

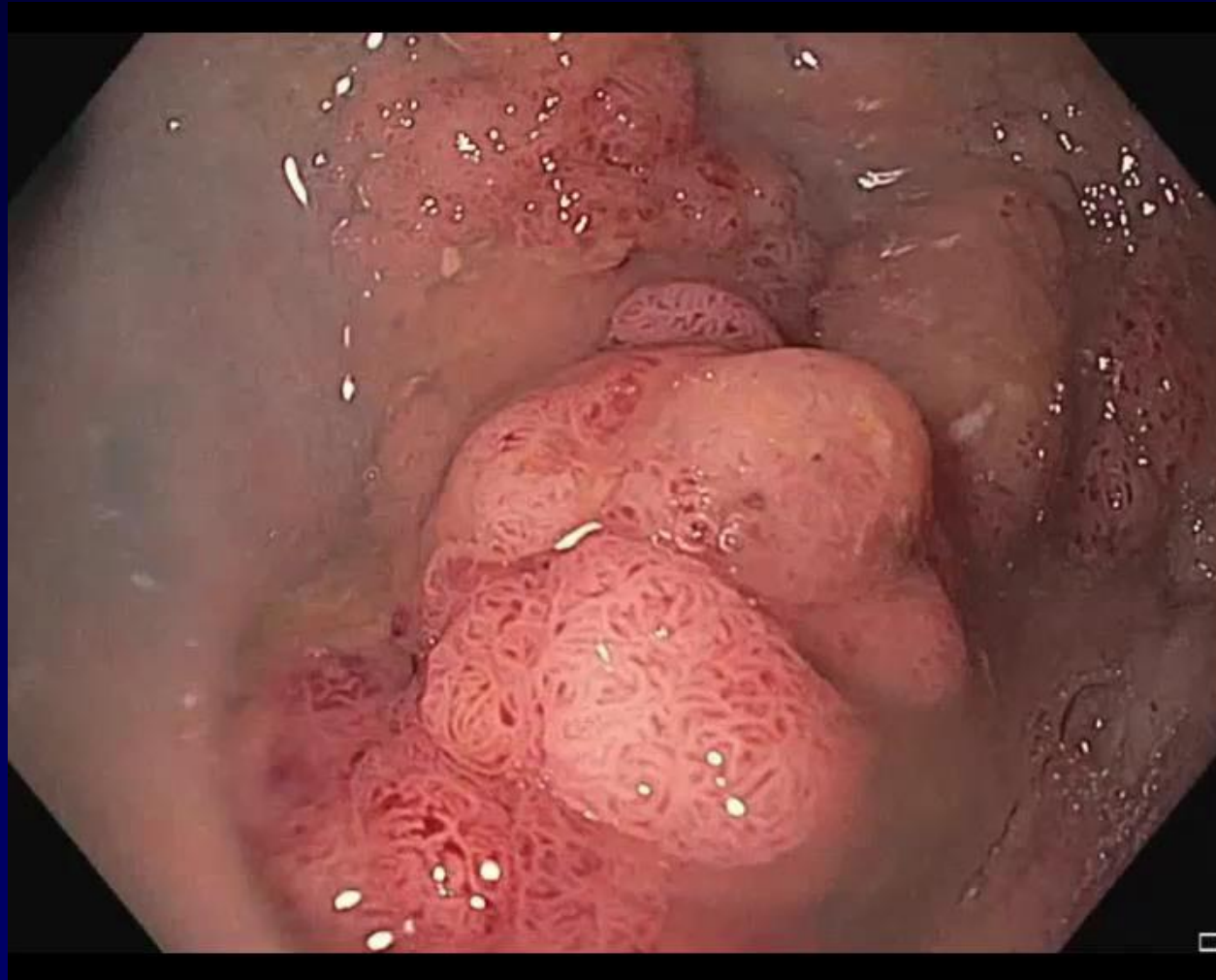
- Dental floss
- Lumendi
- ORISE Tissue Retractor System



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

Pathology	Mucosal				Submucosal	
	Ulcer (-)		Ulcer (+)		<500µm	>500µm
	≤2cm	>2cm	≤3cm	>3cm	≤3cm	Any size
Differentiated type	ESD/EMR	ESD	ESD	Surgery	ESD	Surgery
Undifferentiated type	ESD	Surgery	Surgery	Surgery	Surgery	Surgery

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

Absolute indications	T1a esophageal cancer involving the epithelium or lamina propria	<2/3 the circumference of the esophagus
Relative indications	Esophageal cancer involving the muscularis mucosa or <200µm invasion of the submucosa	

Absolute criteria

Expanded criteria

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
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Pimentel-Nunes, P. Endoscopy. 2015;47(9):829-54

Tanaka, Shinji. Digestive Endoscopy 27.4 (2015): 417

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

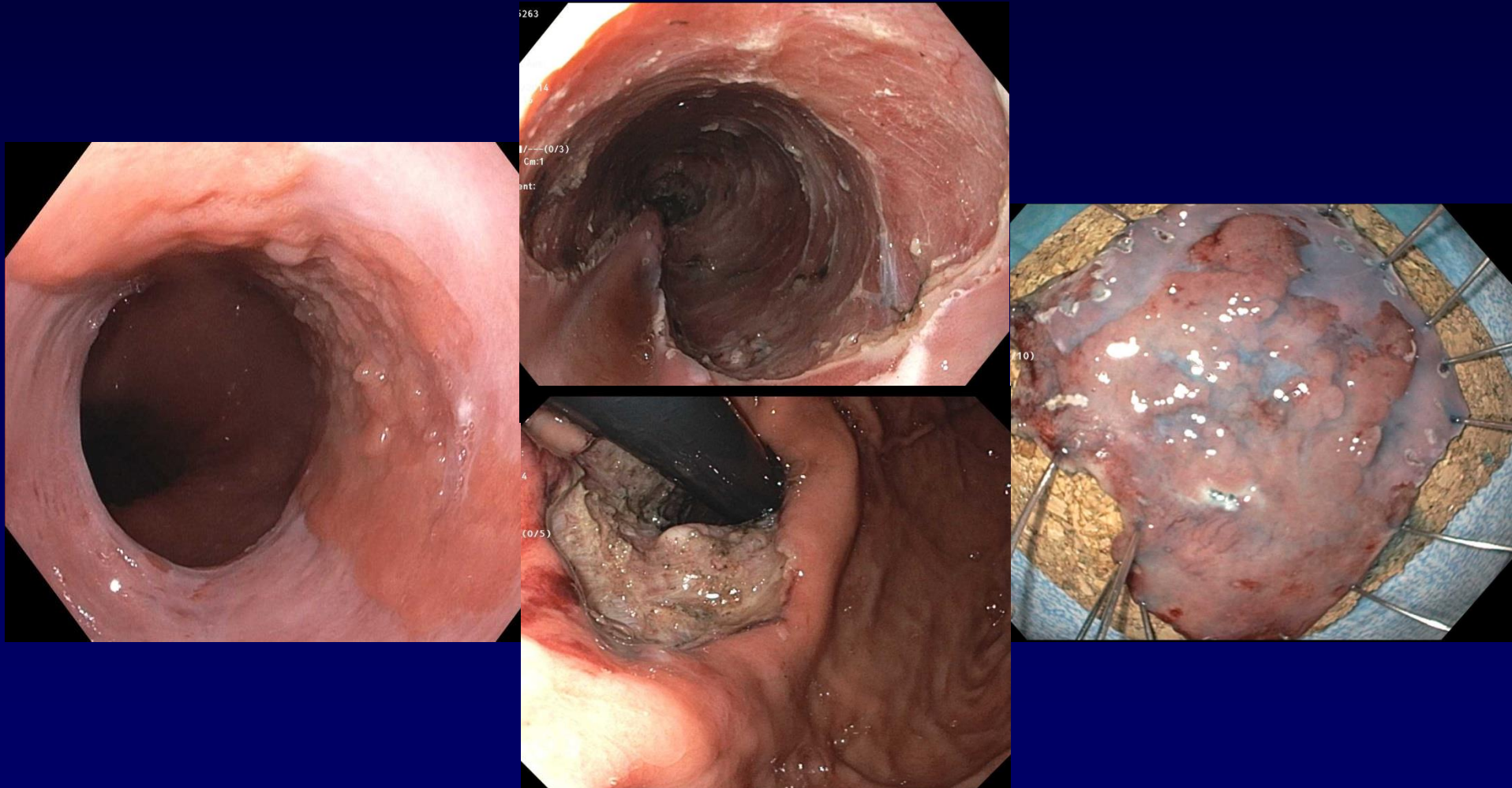
Yang, D, Othman M, Draganov PV. Clin Gastroenterol Hepatol. 2018: S1542

Draganov PV, Wang AY, Othman MO, Fukami N. Clin Gastroenterol Hepatol. 2018: S1542

Yang D, Zou F, Xiong S, Forde JJ, Wang Y, Draganov PV. GIE

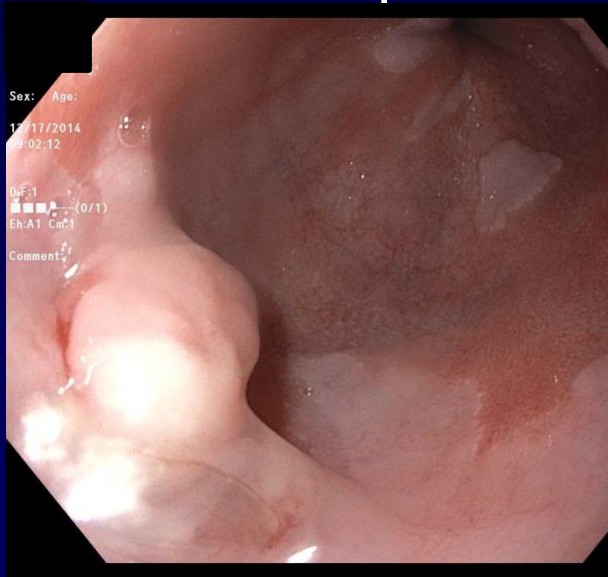
Barrett's with HGD and extensive nodularity

- ESD: HGD, margins negative for dysplasia



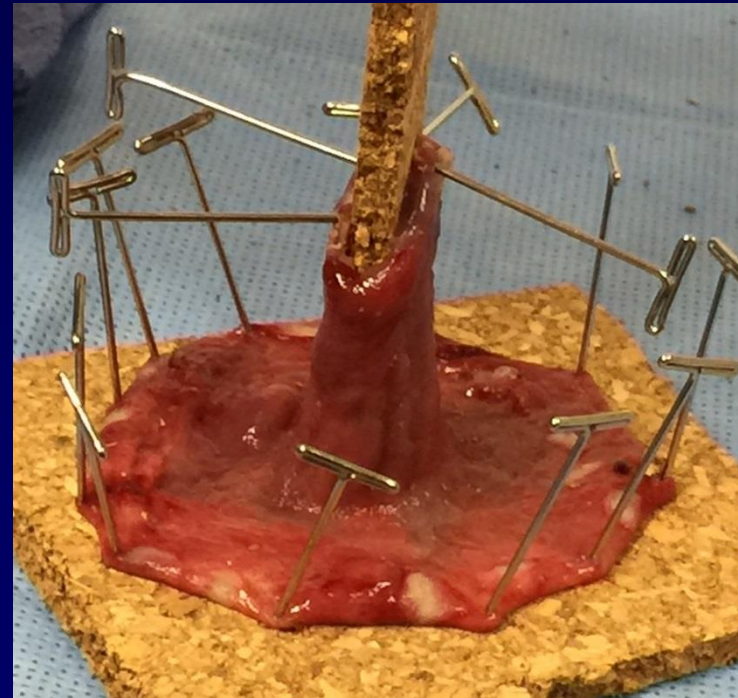
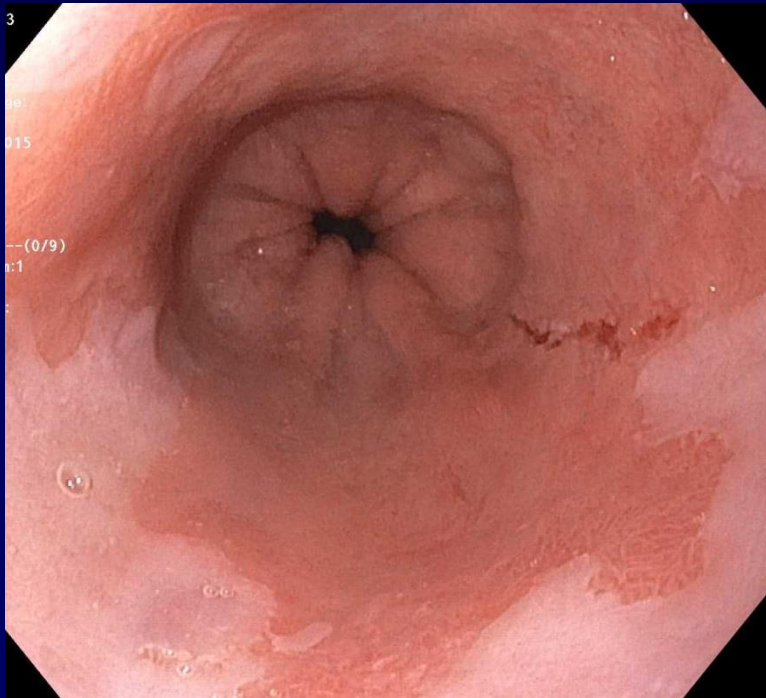
ESD Allows Resection when EMR May Not be Feasible

- Barrett's with nodule s/p EMR: At least intramucosal Ca with positive lateral and deep margins
- ESD specimen: Intramucosal Ca with negative margins



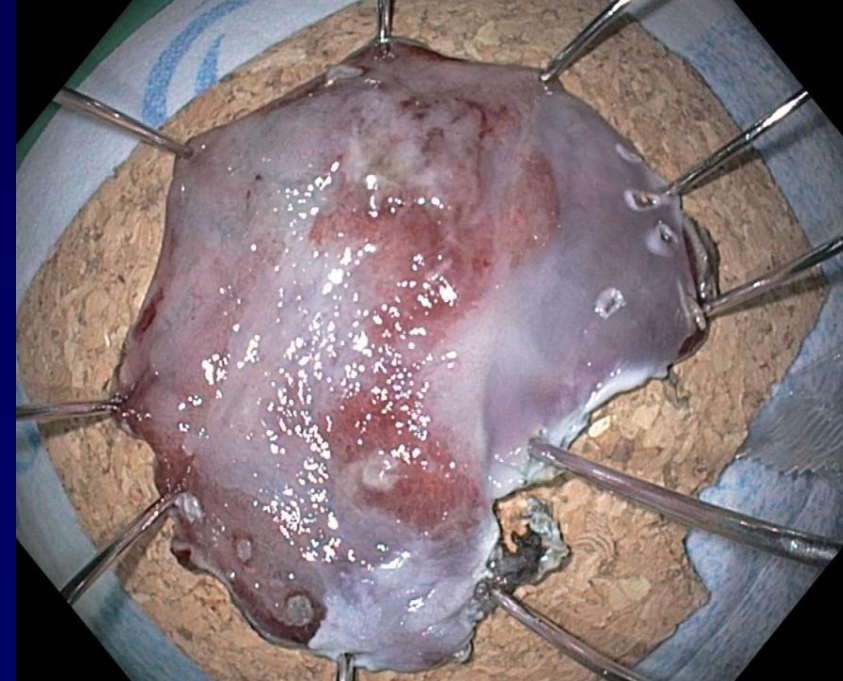
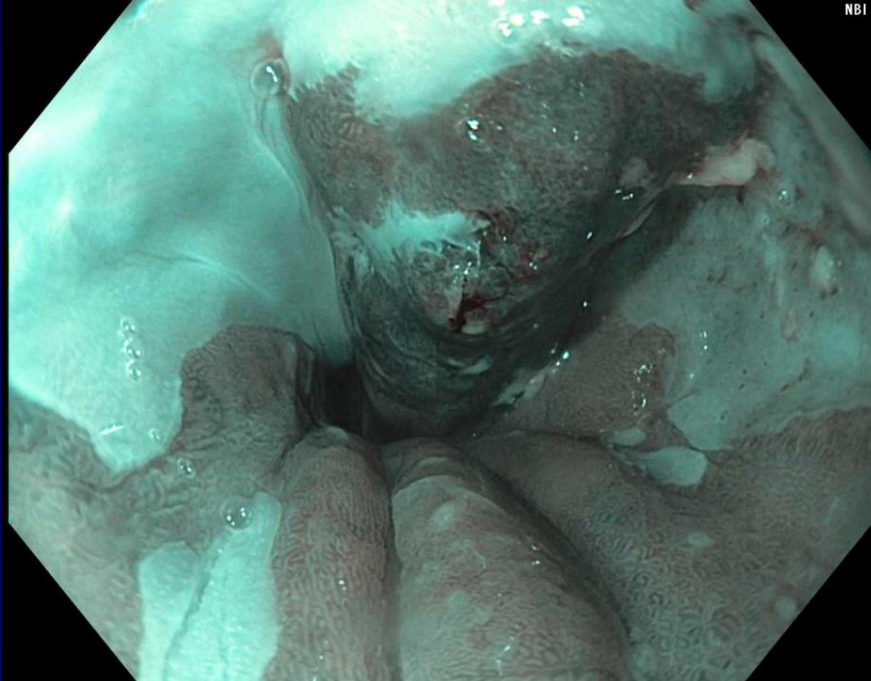
ESD Preserves Patient Quality of Life and Allows for *en bloc* Resection Regardless of Size

- Barrett's intramucosal cancer, no obvious lesion
- ESD: intramucosal Ca with negative margins



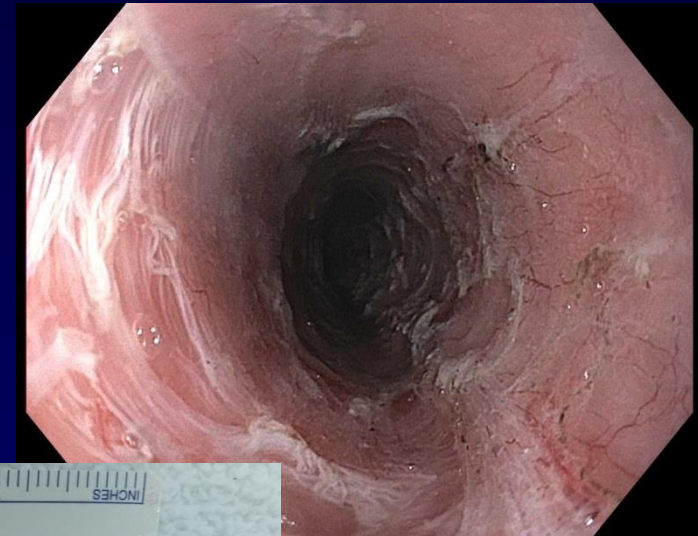
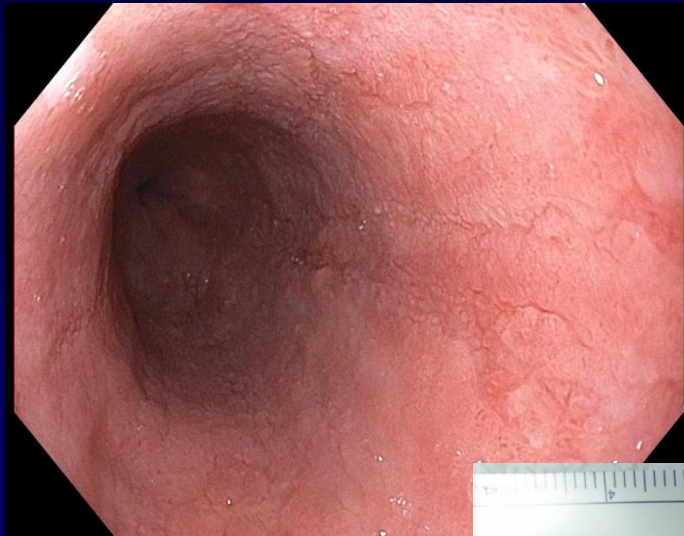
Equivocal histology

- 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