

# Endoscopic Resection for Gastrointestinal Neoplastic Lesions:

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# Objectives

- Discuss the role of endoscopic resection (ER) on superficial neoplastic lesions of the GI tract
- Discuss the current endoscopic resection modalities
- Discuss endoscopic submucosal dissection (ESD) and compare with endoscopic mucosal resection (EMR)
- Review the current indications and limitation for ESD in the US

# Endoscopic Resection (ER)

- Well established modality for the removal of premalignant and early malignant lesion in the GI tract
- **Dedicated high-definition endoscopic evaluation with dye based or electronic chromoendoscopy in combination with standardized classification based on lesion morphology/surface is critical for optimal resection technique decision**

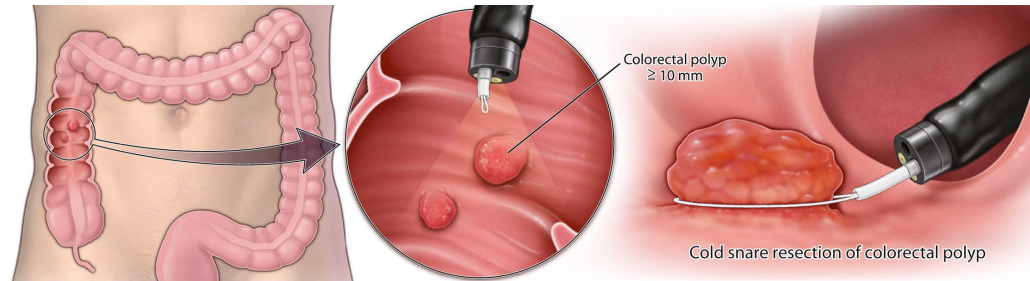
Gastrointest endosc. 2003; 58 (6): S3 – S43 Endoscopy 2005; 37:570 – 78.

# Endoscopic Resection (ER)

- Current ER modalities include:
  - Snare polypectomy
  - Endoscopic mucosal resection (EMR)
  - Endoscopic submucosal dissection (ESD)

# Snare Polypectomy

- Oldest modality for resection
- Widely available
- Good safety profile
- Easy to master
- Limited to lesions < 1 cm for en block resection
- Most used for premalignant lesions (e.g., adenomas)



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# EMR

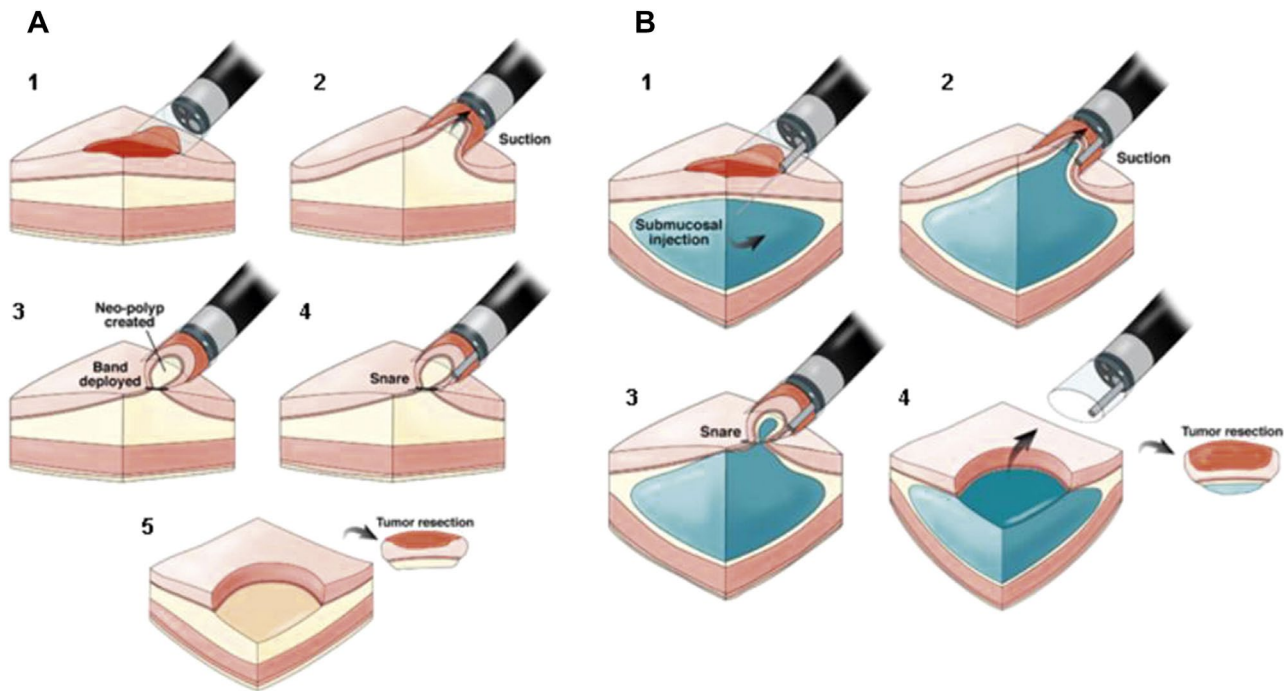
- Most common form of advanced endoscopic resection in US
  - Easy to perform
  - Good safety profile
  - Can be performed in any part of the GI tract
- Limitations
  - En-block resection is difficult for lesions > 2 cm
  - Piece-meal resection can limit the depth and margins for evaluation by pathologist
  - Increased recurrence of lesions (piece-meal resection)

- Kandel, P. et al. *Best Pract Res Clin Gastroenterol.* 2017; 31: 455–471.

# EMR technique

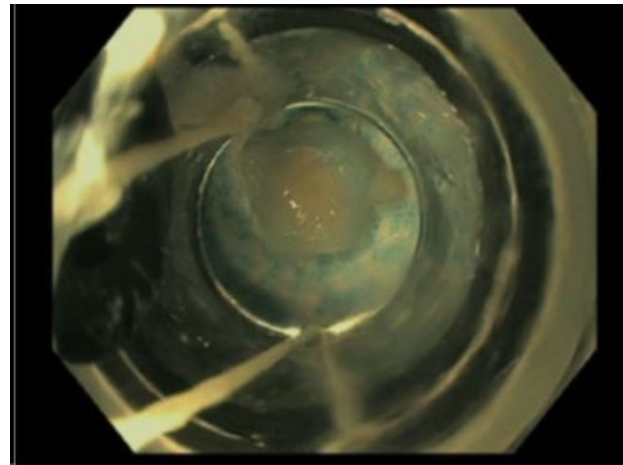
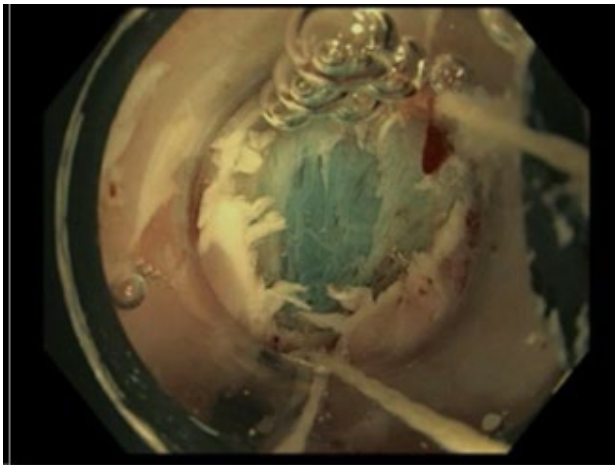
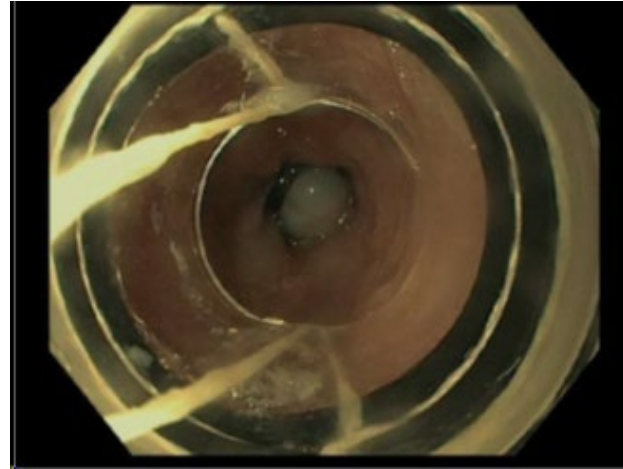
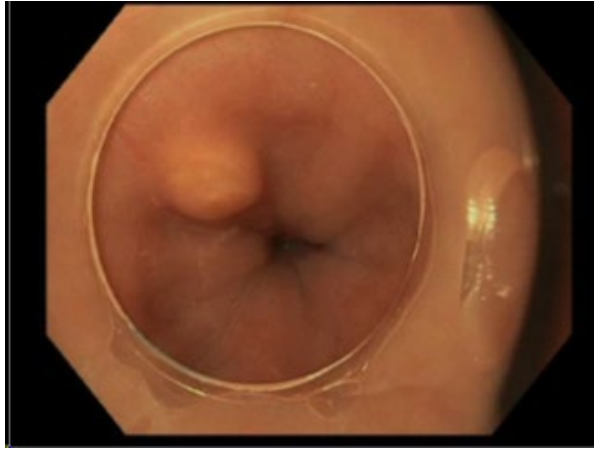
- Usually requires submucosal injection for adequate lift of the lesion away from the muscularis propria
- A snare is utilized for resection
- The most common EMR methods are:
  - Cap assisted EMR
  - Band ligation EMR
  - Underwater EMR

# EMR technique



Enestvedt B, Ginsberg G. Gastrointestinal Endoscopy Clinic. 2013;23(1);17-39

# EMR technique



# ESD

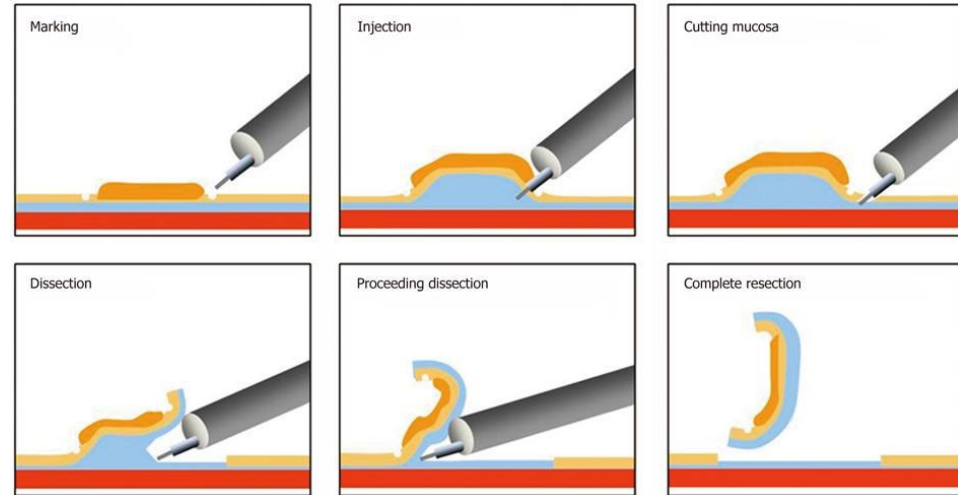
- Commonly used in Asia and more recently adopted in Europe
- High success rate for:
  - En-block resection of large lesions (> 2cm)
  - Good for margin and depth evaluation
  - Can be used in the esophagus, stomach and colorectal region
  - Used in small bowel is limited



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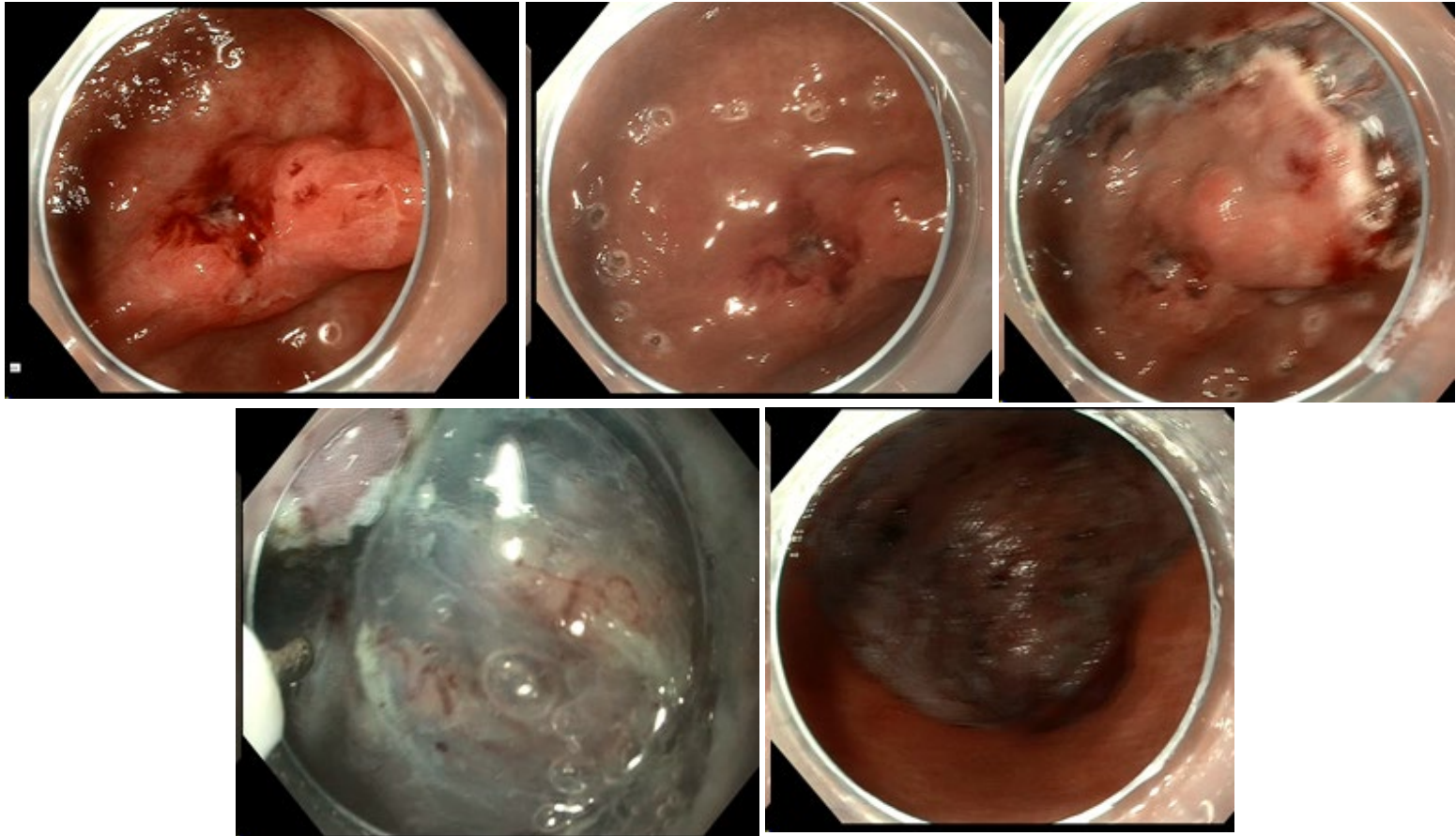
# ESD technique

- The lesion is lifted via submucosal injection
- The lesion is dissected from the submucosal using ESD knife
- Preventive coagulation of submucosal vessel is performed
- Methods
  - Pocket, tunneling and hybrid ESD



Asano M. World J Gastrointest Endosc. Oct 16, 2012; 4(10): 438-447

# ESD technique



# Limitations for performing ESD in the US

- Steeper learning curve
- Lengthier procedure
- Higher potential for adverse events
  - Odagiri, H. et al. *Ann Transl Med.* 2017; 5: 189.
- Bias of advance endoscopist toward EMR
- Bias of medical and surgical oncologist toward surgical resection
- Lack of ESD experts and training centers
- Pathologist without ESD interpretation experience
- Reimbursement
  - Wang AY, Draganov PV. *Tech Gastrointest Endosc* 2017;19:159-69.

# ESD vs EMR

## Esophageal Lesions

- **Barrett's related neoplasia**

- Meta-analysis ESD vs EMR for superficial EAC of 1080 patients

|                         | ESD   | EMR   | P value |
|-------------------------|-------|-------|---------|
| En-block resection rate | 97.1% | 49.3% | <.001   |
| Curative rate           | 92.3% | 52.7% | <.001   |
| Recurrence              | 0.3%  | 11.5% | <.001   |

- ⦿ Perforation rate higher on ESD (odds ratio [OR], 2.2; 95% CI, 1.08–4.47;  $P = .03$ )

• Guo, H.M. et al. *World J Gastroenterol.* 2014; 20: 5540–5547.

- Prospective Randomized control study multiband EMR vs ESD of 40 patients

|                         | ESD  | EMR   | P value |
|-------------------------|------|-------|---------|
| En-block resection rate | 100% | 15%   | <.0001  |
| Curative rate           | 53%  | 52.7% | <.03    |

- ⦿ Complete remission no difference and complications similar

• Terheggen, G. et al. *Gut.* 2017; 66: 783–793.

- **EMR continue to be first line with ESD for larger and suspected submucosal involvement lesions**

# ESD vs EMR

## Esophageal Lesions

- Squamous cell carcinoma
  - High risk for early metastasis
  - Accurate histopathological evaluation is key
  - ESD is superior to EMR for
    - ⊙ En block
    - ⊙ Curative rate
    - ⊙ Lower rate of recurrence

• Guo, H.M. et al. *World J Gastroenterol.* 2014; 20: 5540–5547.

- **ESD is first line therapy for SCC**

# ESD vs EMR

## Stomach Lesions

- Early gastric cancer have low risk for lymph node metastasis and high survival rate make it good candidate for endoscopic resection specifically ESD
  - Choi K, et al. Gastrointestinal Endosc 2016;83:896-901.
- Indistinct lesion margin, thickness of the gastric wall and the ESD precision make ESD superior to EMR for lesions >1 cm
  - Bourke M, et al. Gastroenterology 2018;154:1887-1900 e5.
- **ESD should be considered first line therapy for visible, endoscopically resectable, superficial gastric neoplasia**
  - Draganov P et al. Clinical Gastroenterology and Hepatology 2019;17:16-25.

# ESD vs EMR

## Colorectal Lesions

- ER for dysplasia confined to the colorectal mucosa is the most appropriate first line therapy
- Large, complex, superficial colorectal neoplasms should be referred to high volume referral centers
- EMR for larger (2cm) lesions required piece-meal resection in >43% of cases, with a > 20 % recurrence rate
- **ESD offers en-block resection with high curative rates and more accurate pathologic assessment**
- **For noninvasive lesions < 2 cm, EMR remains an option**

# ESD Indications: Esophagus

| Squamous cell cancer | HGD/well- to moderate-differentiated                                                                                                                   |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Barrett's esophagus  | HGD >15 mm<br>Large area of nodularity<br>IMC<br>Equivocal histology<br>Suspected submucosal involvement<br>Recurrent dysplasia<br>Positive margin EMR |
| Adenocarcinoma       | Well- to moderate-differentiated > 15 mm                                                                                                               |

Draganov P et al. Clinical Gastroenterology and Hepatology 2019;17:16-25.

# ESD Indications: Stomach

|                        | Absolute                                                                  | Expanded                                                                                                                                                            |
|------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adenocarcinoma and HGD | Intestinal type- well- to moderate-differentiated <2 cm.<br>No ulceration | Intestinal type- well- to moderate-differentiated any size or<br>sm invasion <500 micro or <3 cm with ulceration<br><br>Diffuse type- G3-4 <2 cm without ulceration |

Draganov P et al. Clinical Gastroenterology and Hepatology  
2019;17:16-25.

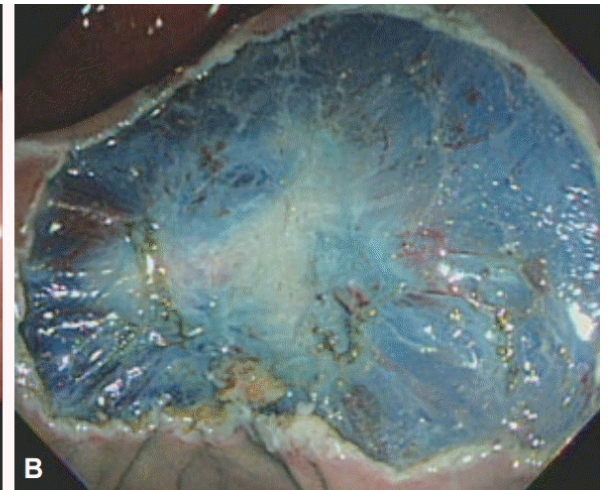
# ESD indication: Colorectal

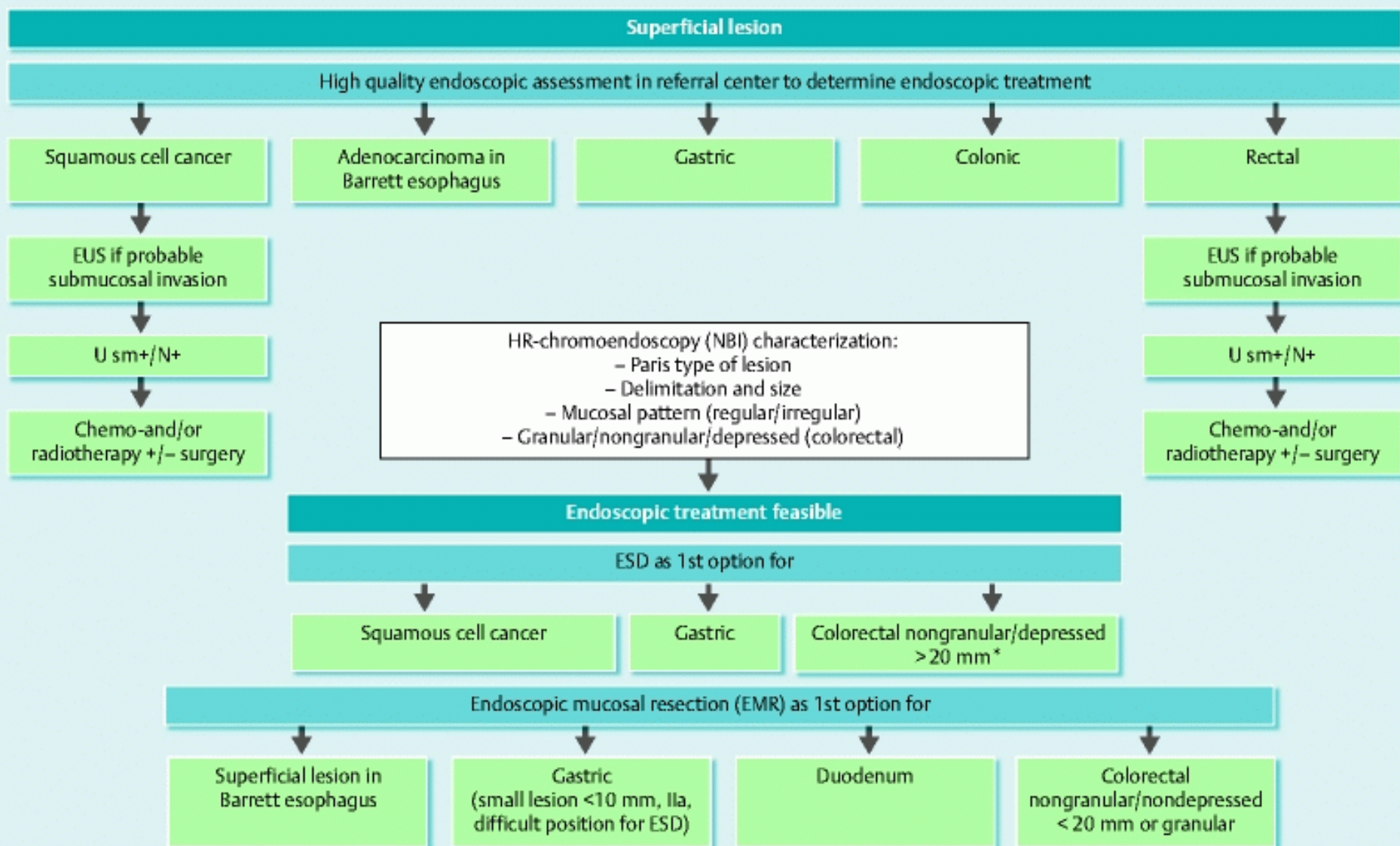
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|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>En bloc resection for high risk lesion for submucosal involvement evaluation</b> | <b>Rectosigmoid region<br/>Type V Kudo pit pattern<br/>Non granular LST &gt;20mm<br/>Granular LST &gt;30mm<br/>Area of depression<br/>Complex morphology</b> |
| Residual or recurrent adenoma                                                       |                                                                                                                                                              |

Draganov P et al. Clinical Gastroenterology and Hepatology  
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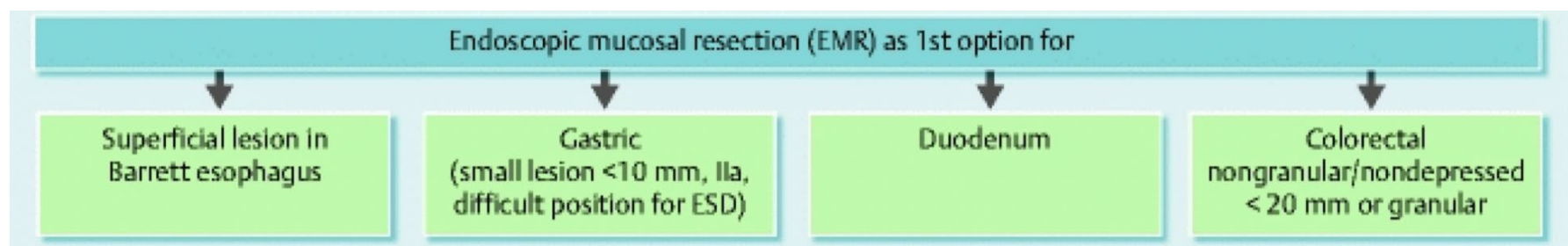
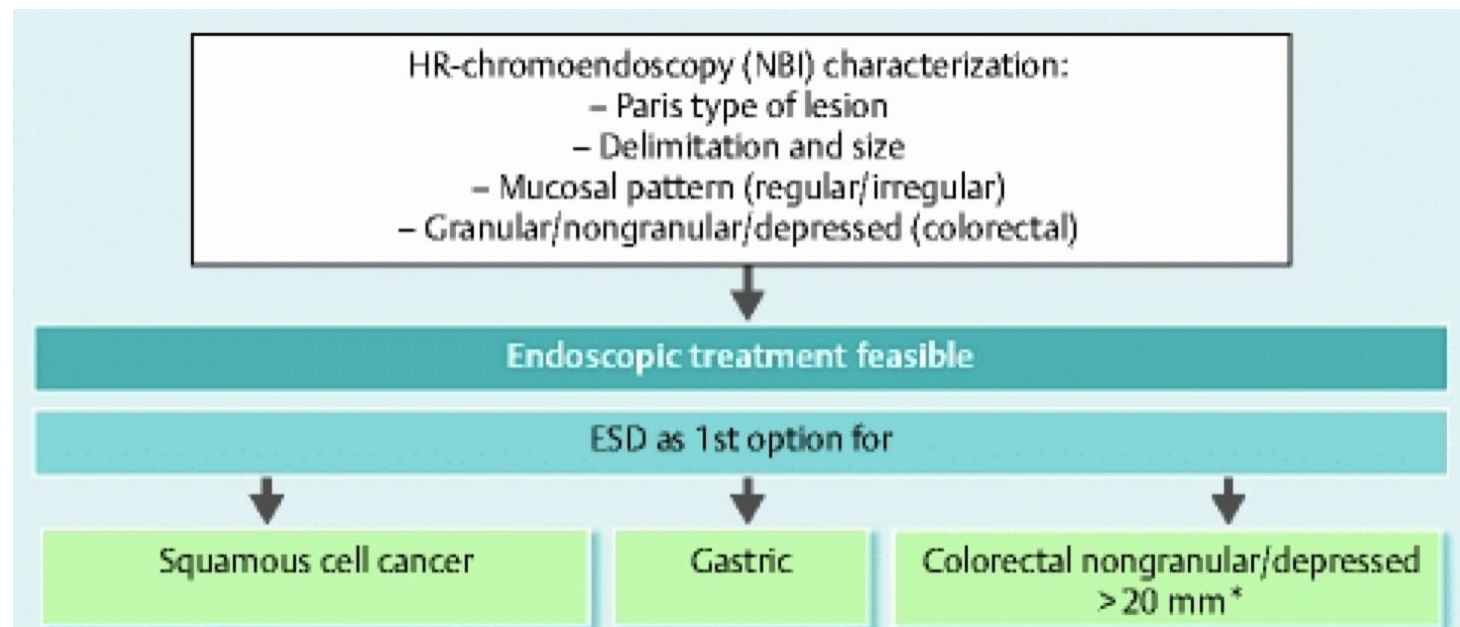
# A challenge for successful ESD

- Submucosal fibrosis makes ESD quite difficult and increases complications
- Avoid practices which increase submucosal fibrosis
  - Avoid multiple biopsies
  - Avoid partial snare removal
  - Tattooing near or in the lesion





\* Consider colectomy or video transanal surgical approaches as alternative to ESD, depending on local expertise.



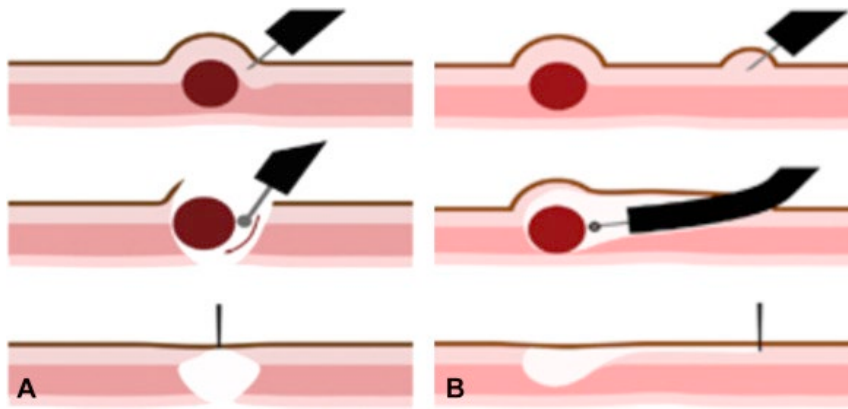
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# Endoscopic full-thickness resection (EFTR)

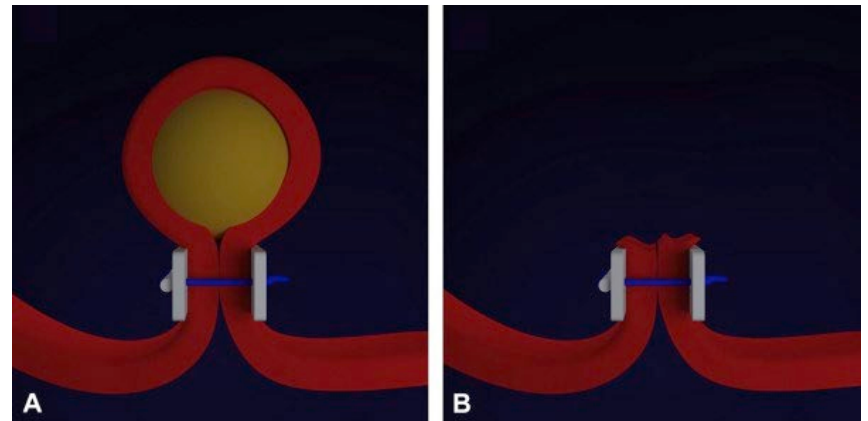
- Emergent therapeutic option for subepithelial tumors and deep epithelial neoplasia or epithelial neoplasia with significant fibrosis
- Techniques
  - Exposed EFTR
  - Non-exposed EFTR
- Limited to subepithelial lesion <4 cm
- Most cases for stromal tumors but can be done for difficult adenomas and perhaps in a subset of malignancies (T1)
- High risk for perforations and peritonitis
- No lymph nodes evaluation

# Endoscopic Full-thickness Resection (EFTR)

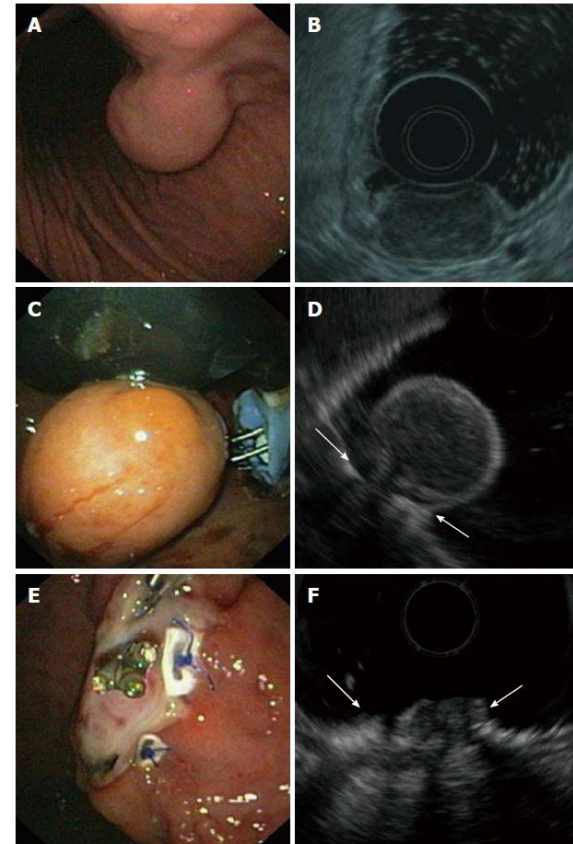
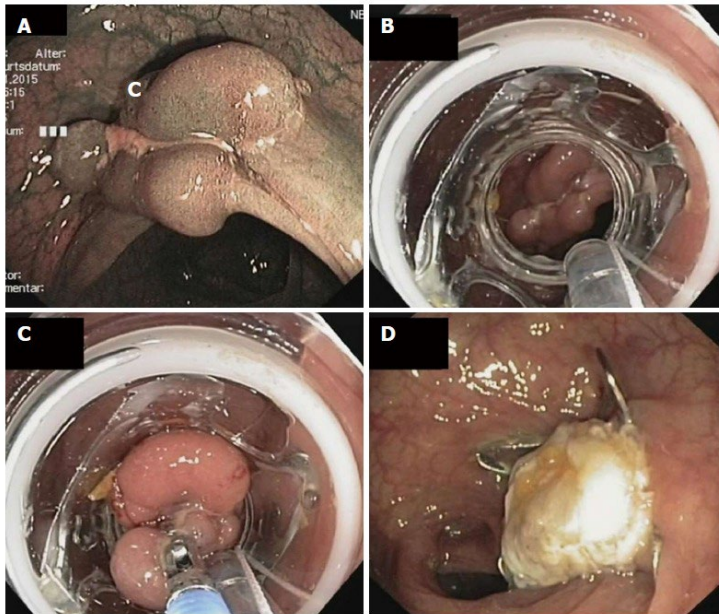
## Exposed



## Non-exposed



# Endoscopic Full-thickness Resection (EFTR)



# Conclusion

- Endoscopic resection (ER) has a proven role in the management of superficial neoplastic lesions of the GI tract
- Current advances in ER include EMR and ESD
- EMR appears to be a good option for premalignant and malignant lesions <2 cm
- ESD appears to be a good option for >2 cm premalignant and malignant lesions where en block resection, depth and margins are critical
- ESD indications continue to expand with the advance of technology and knowledge, however the steep learning curve, length of procedure and complications continue to be a limiting factor
- EFTR is a promising technique but further studies are required to clarify the role on ER