III Level Endoscopy: Indications and Outcomes

Roberta Maselli MD
Endoscopy Unit
Humanitas Research Hospital

HUMANITAS RESEARCH HOSPITAL

HUMANITAS UNIVERSITY

POLYPS/COLONIC LESIONS

- ✓ Small Polyps (1-5 mm): Resection
- ✓ Polyps > 5 mm: Polypectomy

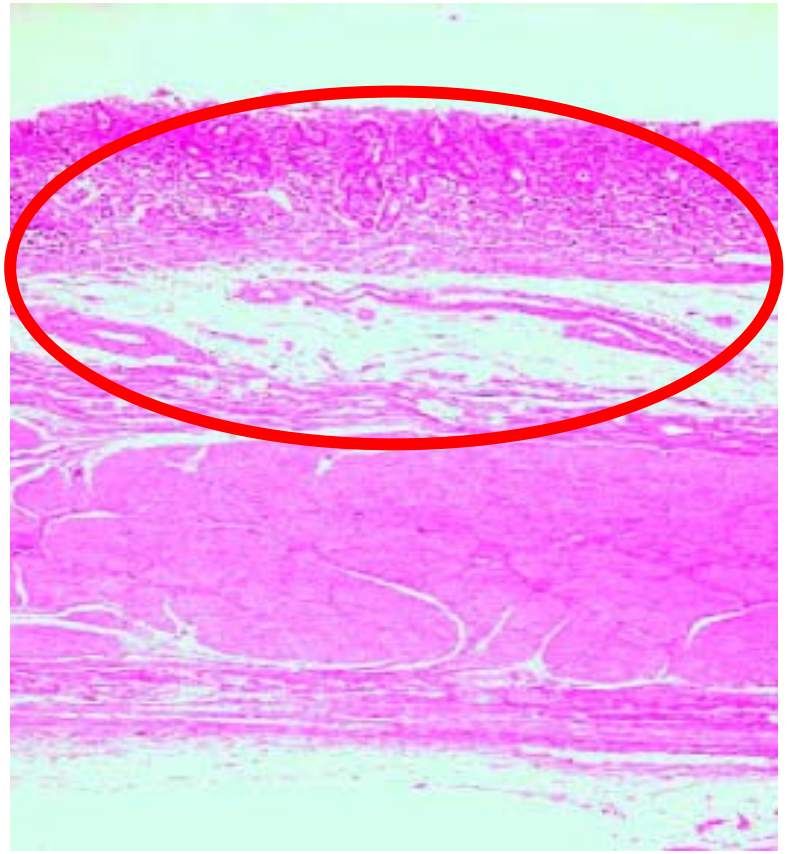
During Colonoscopy

- ✓ Multiple polyps (> 3): polypectomy in one/more sessions (depending on polyp characteristics, endoscopist skills)
- ✓ Polyp > 25 mm or difficult polyp (size, morphology, location): reference to specialized center/surgery

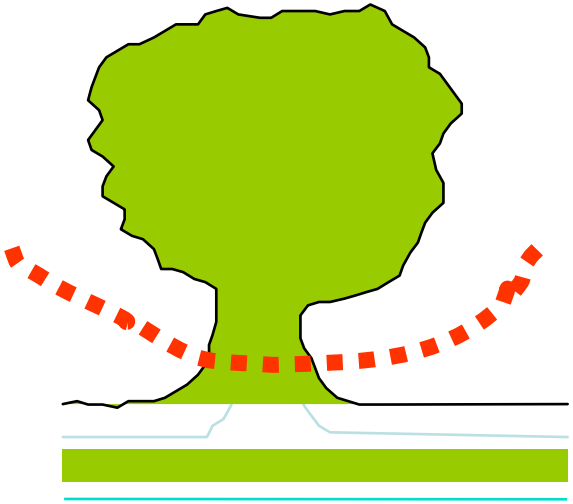
EMR/ESD

EMR/ESD Definition

Resection of a fragment of the GI wall including the mucosa, the muscularis mucosa and a part or even all of the submucosa



IS EMR DIFFERENT FROM POLYPECTOMY?



Flat/lightly elevated

YES, BECAUSE OF:

-morphology of resected specimen
-deep of cutting
-technique

Background…?WHY do It?

- Oesophageal, gastric and colorectal neoplasms made up 34% of worldwide cancer mortality in 2002.
- Early detection of these neoplasms or their precursors may be the only chance to reduce this high mortality.
- Endoscopy is currently the initial procedure used for early detection of gastrointestinal (GI) cancers worldwide.

MAIN INDICATION

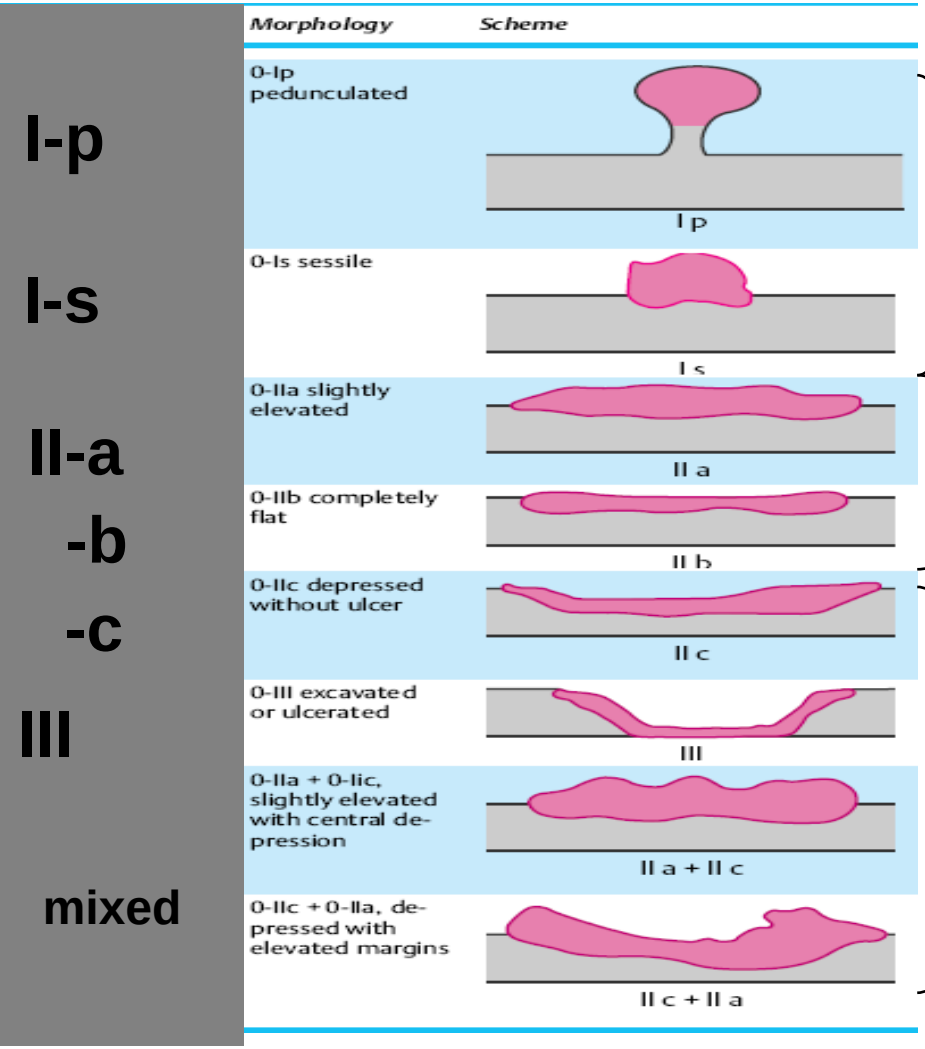
“Superficial” neoplastic lesion

“Superficial” neoplastic lesion

- Definition: endoscopic appearance suggests that the **depth** of penetration in the digestive wall is not more than into the submucosa, i.e., there is **no infiltration of the muscularis propria.**

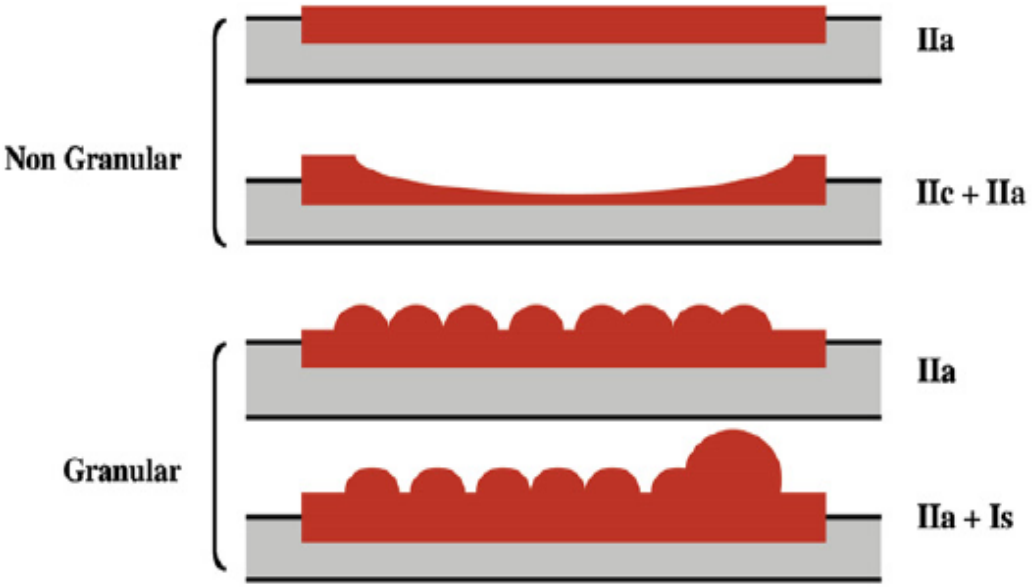
Digestive Endoscopy 1999

The Paris Classification



	Histology	Resection
I-p	Adenoma	Snare polypectomy
I-s		
II-a	High grade adenoma	EMR en bloc Or piecemeal
-b		
-c		
III	Carcinoma	EMR en bloc, ESD, or surgery
mixed		

Laterally Spreading Tumors

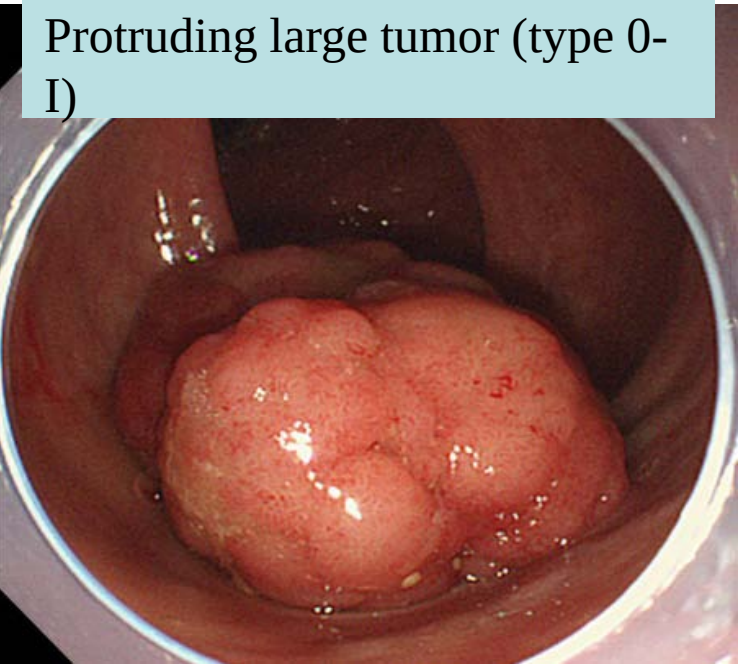


Subtypes of LST	Classification in type 0
LST granular	
Homogenous type	0-IIa
Nodular mixed type	0-IIa, 0-Is + IIa, 0-IIa +Is
LST nongranular	
Elevated type	0-IIa
Pseudodepressed type	0-IIa + IIc, 0-IIc + IIa

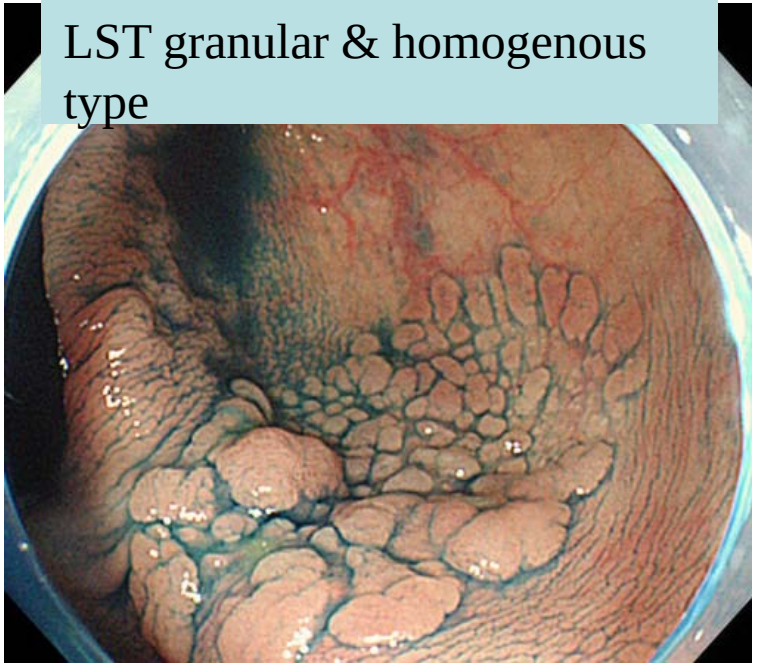
*The term "laterally spreading type (LST)" refers to the lateral growth of lesions at least 10 mm in diameter; this is in opposition to traditional polypoid (upward growth) or flat and depressed lesions (downward growth).

Colorectal early neoplasia findings

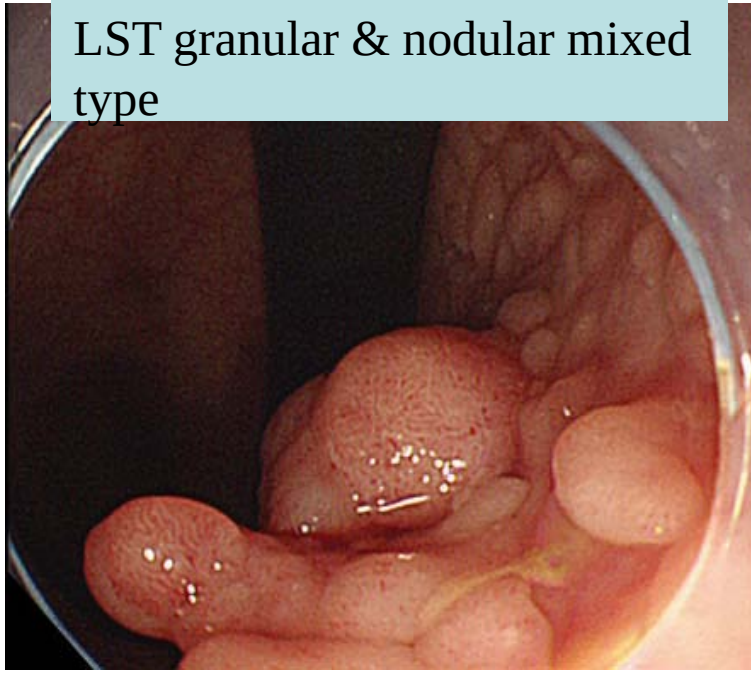
Protruding large tumor (type 0-I)



LST granular & homogenous type

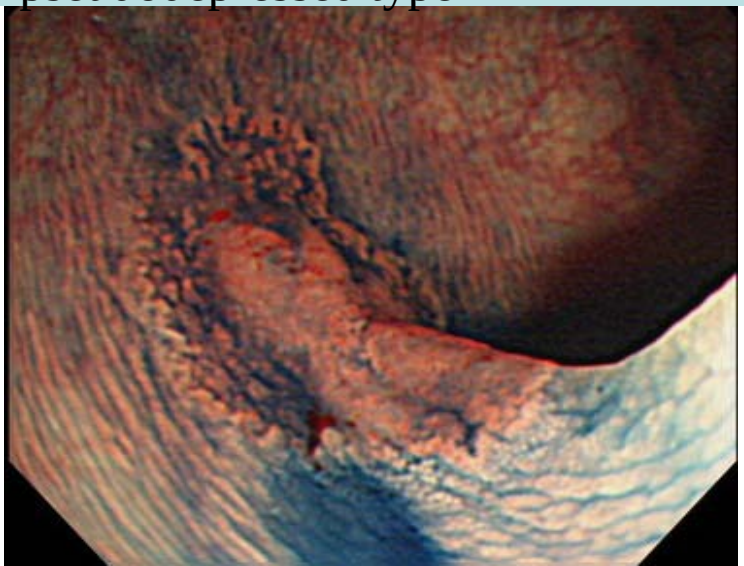


LST granular & nodular mixed type



LST non-granular & flat elevated type

LST non-granular & pseudodepressed type



Tumor with submucosal fibrosis

Indication for ER

- The risk of lymph node metastasis has to be smaller than the risk of a surgical procedure to perform local endoscopic resection with curative intention.

- Criteria differ with the size and morphology.

ESD/EMR/SURGERY...

These immediate decisions are extremely challenging as endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) emerge as **alternatives to surgery for the treatment of both pre-malignant lesions and cancers limited to the mucosa.**

EMR/ESD: RATIONALE

Incidence of lymph node metastases

Infiltration	Lymph node (N)
IM esophagus	1.3%
Sm esophagus	12%
IM stomach	1.2%
Sm stomach	10 – 15%
IM colon	0.5%
Sm1 colon	2.0%

Techniques for early lesions

- Strictly related to:

  - size

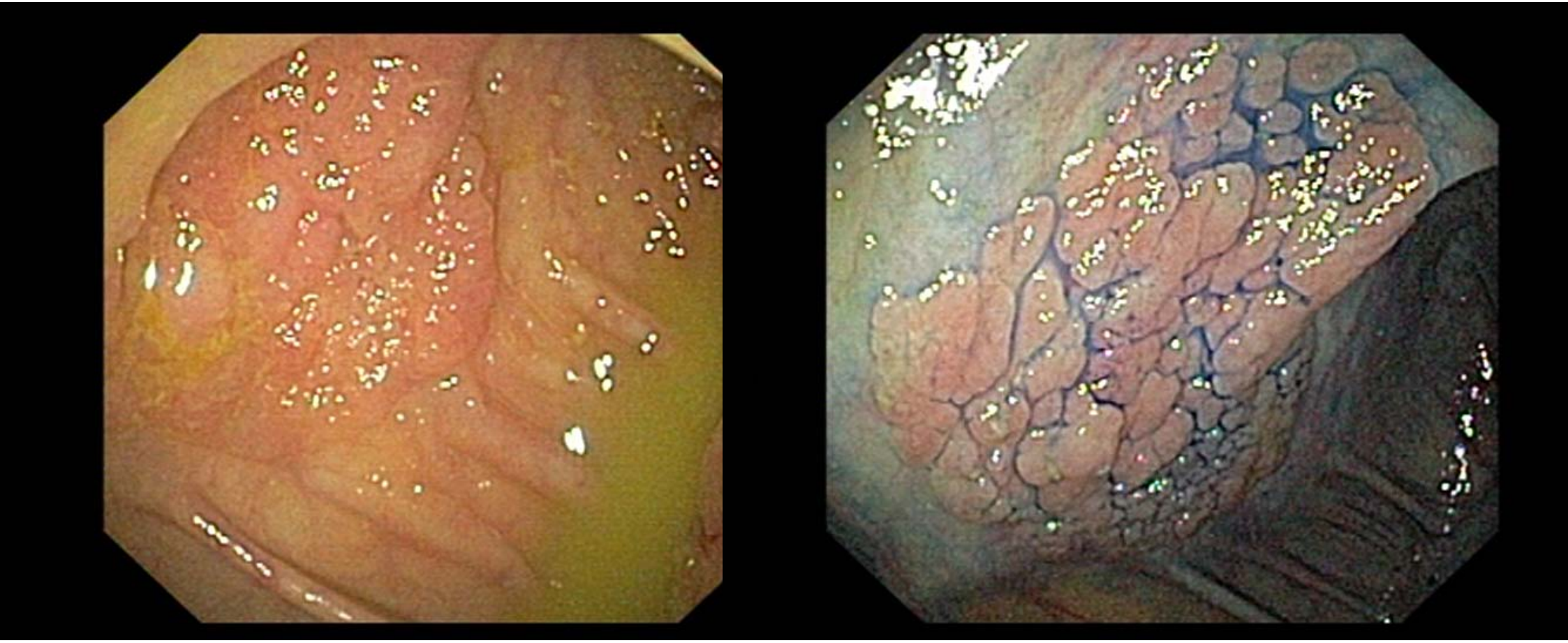
  - morphology

  - histology/staging

  - location

  - patient’s condition

PIECEMEAL OR EN-BLOC?



EMR OR ESD?

Different patterns

- ✓ Paris classification system review

- ✓ Dye and optical staining methods
  - ✓ Role in detection
  - ✓ Role in classification;

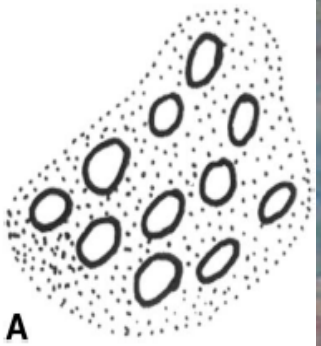
    Kudo & Sano

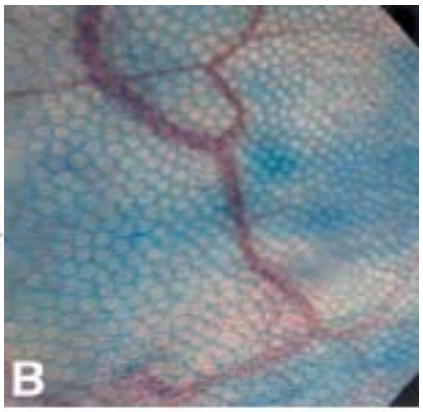
Kudo Pit Pattern

- ✓ Pits = openings of the colonic crypts
- ✓ Pit pattern = arrangement of openings on mucosal surface
- ✓ Pit patterns categories
  - ✓ Normal mucosa – pit pattern I
  - ✓ Hyperplastic – pit pattern II
  - ✓ Adenomatous – pit pattern III-L
  - ✓ High grade adenoma: pit pattern III-s, and IV
  - ✓ Cancerous – pit pattern V

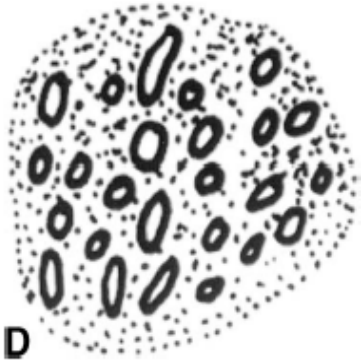
Kudo Pit Patterns

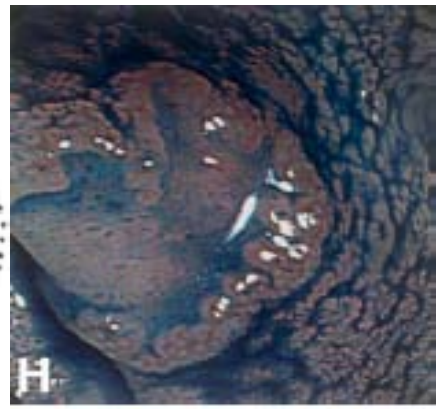
I



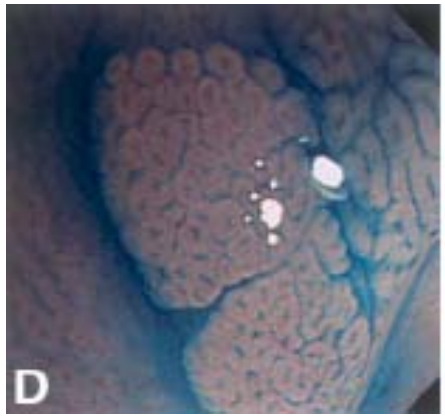


IIIs

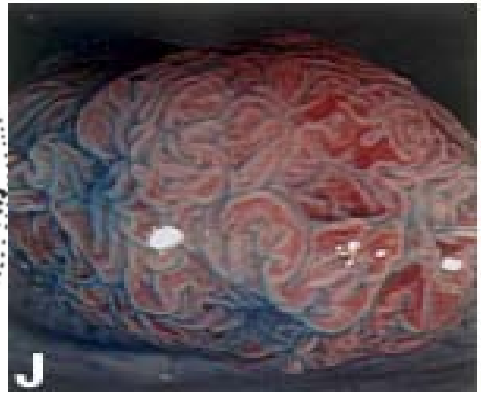




II

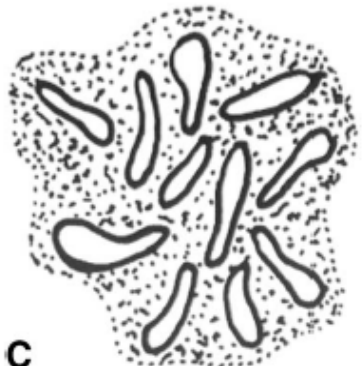


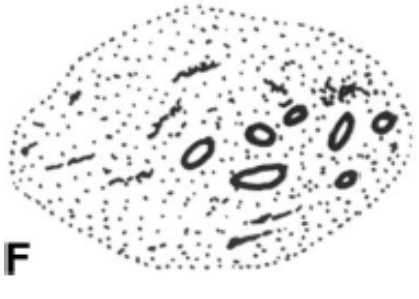
IV

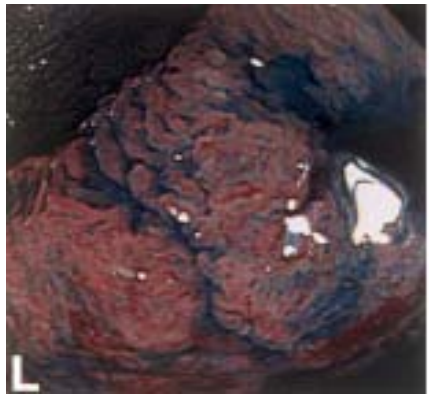


V

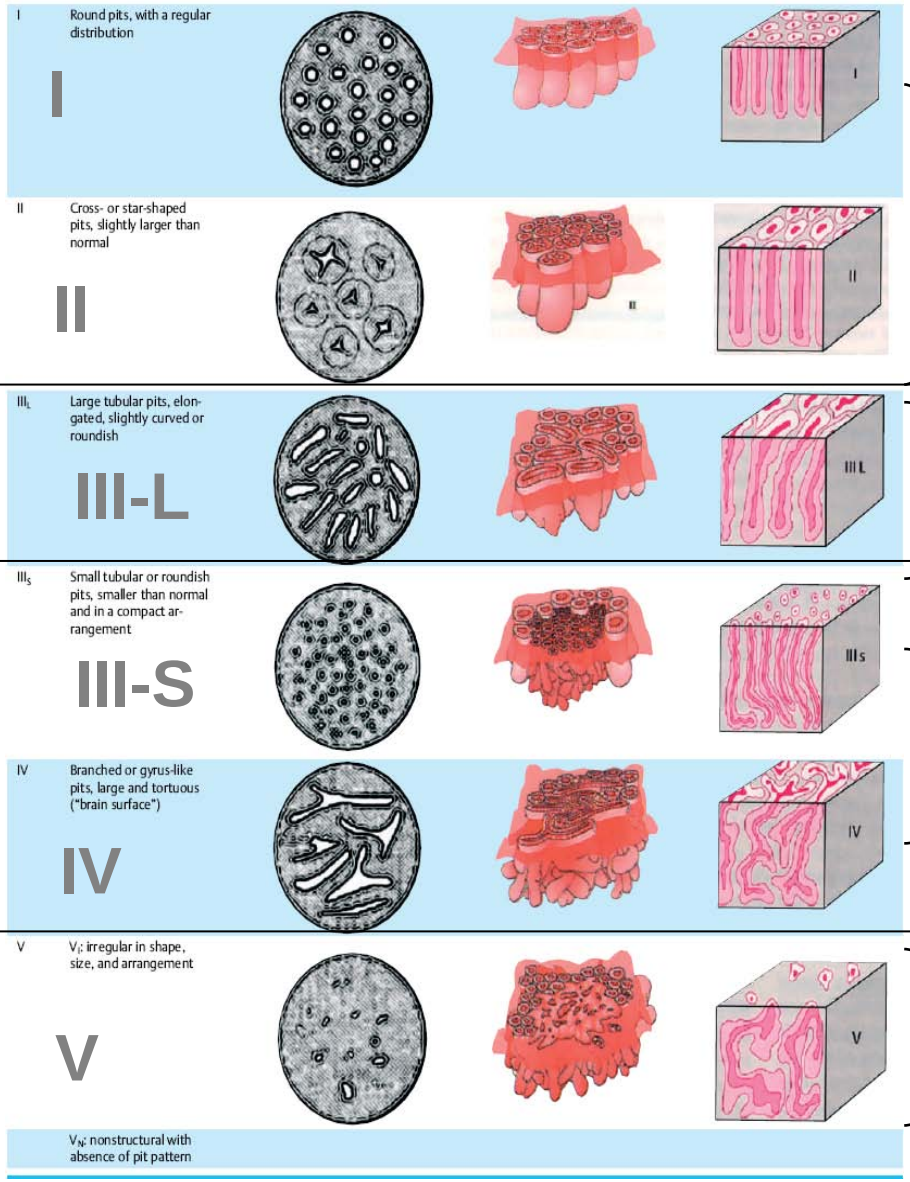
IIIL







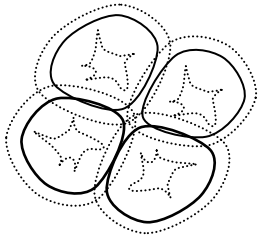
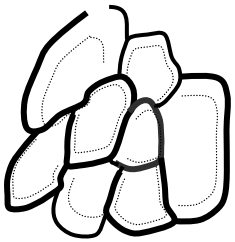
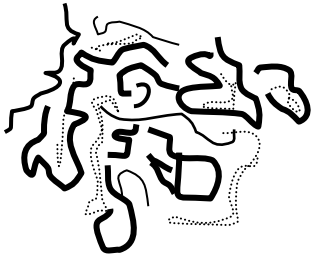
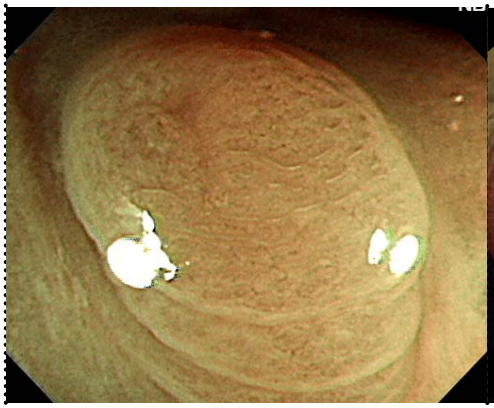
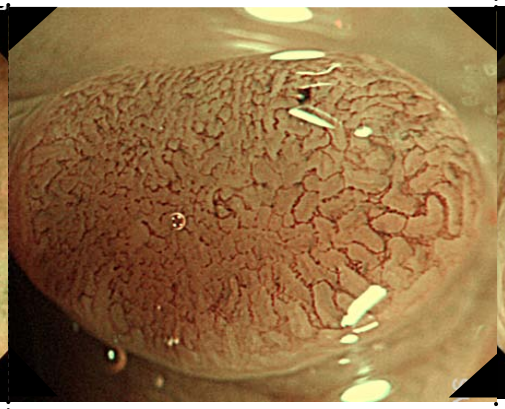
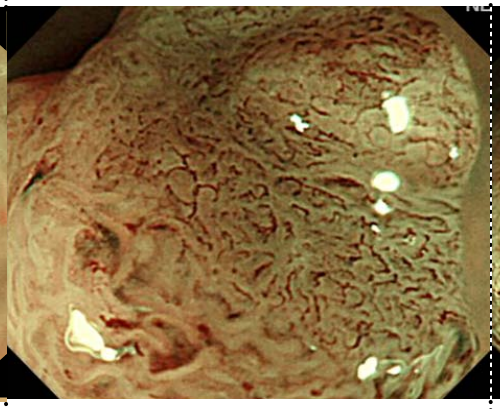
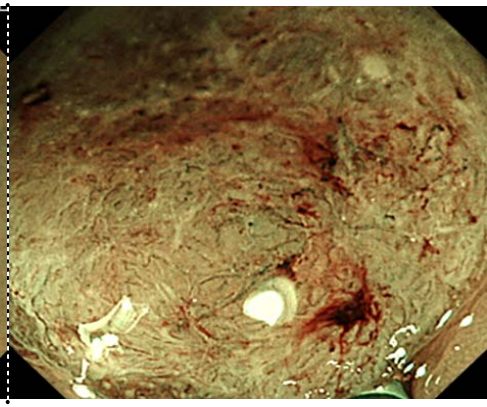
The Kudo Classification
Pit Patterns



	Histology	Management
I, II	Hyperplastic	Nothing
III-L	Adenoma	Snare polypectomy
III-S, IV	High grade adenoma	EMR en bloc Or piecemeal
V	Carcinoma	EMR en bloc, ESD, or surgery

Sano capillary patterns

- ✓ Developed with Narrow band imaging
  - Narrow spectrum allows visualization of capillary pattern in superficial layer
  - Capillary vessels appear brown on NBI
  - Capillary pattern around glands change with neoplasia
- ✓ 3 capillary pattern types
  - CP I: Normal mucosa or hyperplastic lesion
  - CP II: Adenomatous lesion
  - CP III: Cancer (further subdivided into A & B)

Capillary pattern	I	II	IIIA	IIIB
Schema				
Endoscopic findings				
Capillary characteristics	Meshed capillary vessels (-)	• Meshed capillary vessels (+) • Capillary vessel surrounds mucosal glands	Meshed capillary vessels characterized by: blind ending, branching and curtailed irregularly • Lack of uniformity • High density of capillary vessels	• Nearly avascular or loose micro capillary vessels

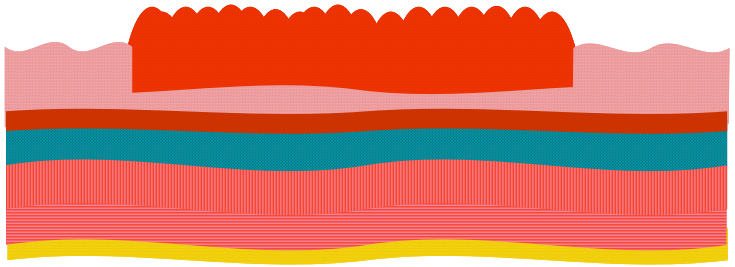
		LGD	HGD	Ca sm
IIIL ……	71.2%	94.7%	5.3%	0.0%
IV ……	20.4%	75.5%	21.8%	2.8%
IIIS ……	0.9%	76.7%	20.5%	2.7%
Vi ……	6.0%	23.5%	42.8%	33.7%
Vn ……	1.5%	0.0%	8.5%	91.5%

Morphology and Invasive carcinoma

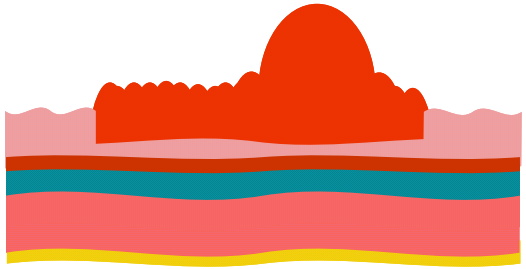
	% (38673 lesions)	size			
		~5mm	6-10mm	11-19mm	20mm
polyps ……	1.7- 2.4%	0-0.07%	1.3- 1.6%	5.8 -10.3%	14.0-29.1%
non polypoid	1.3- 2.1%	0-0.03%	0.3- 1.7%	5.3- 5.4%	7.4-19.5%
Depressed lesions….	27.0-35.9%	6.0-8.4%	17.7-43.6%	53.4-73.2%	80.0-87.0%

- LST-NG: 30-56% multifocal infiltration → "en bloc" resection
- LST-G (Is + IIa) >30 mm: > 25% multifocal sm infiltration

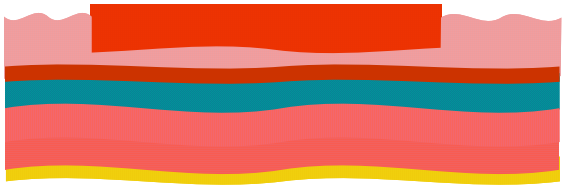
Risk of submucosal invasion according to lesion morphology



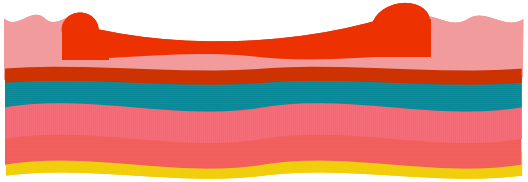
Granular type H 0%



Granular type Mixed 33%



Non- Granular type 40%

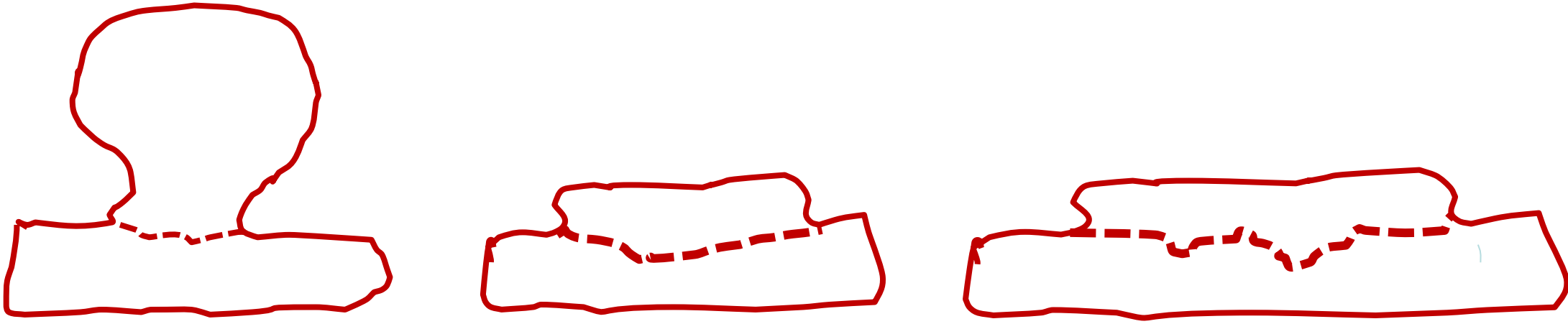


Non-Granular type 65%

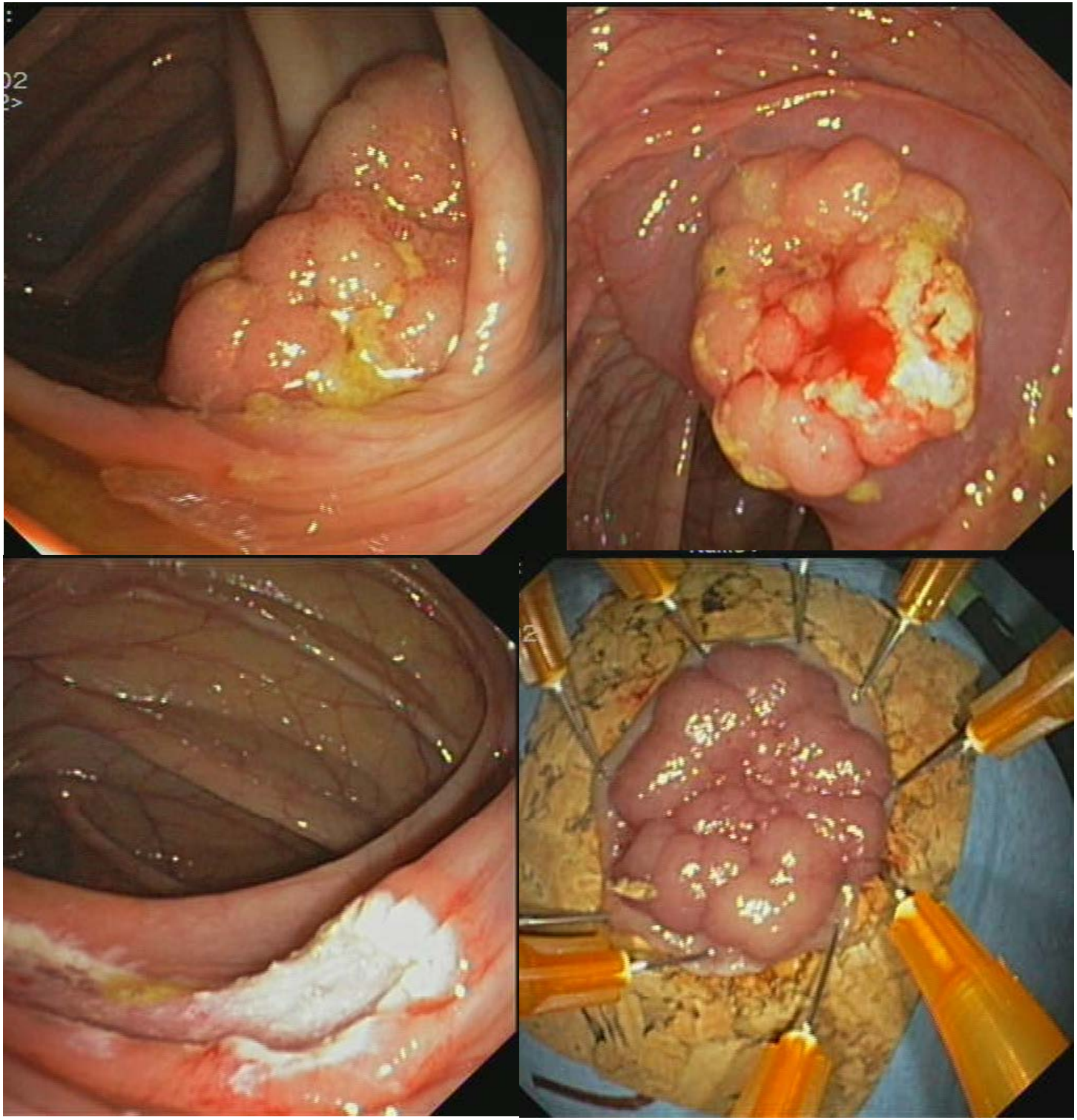
En-bloc resection is indicated

Horiuchi Y, et al Dig Endosc 2013

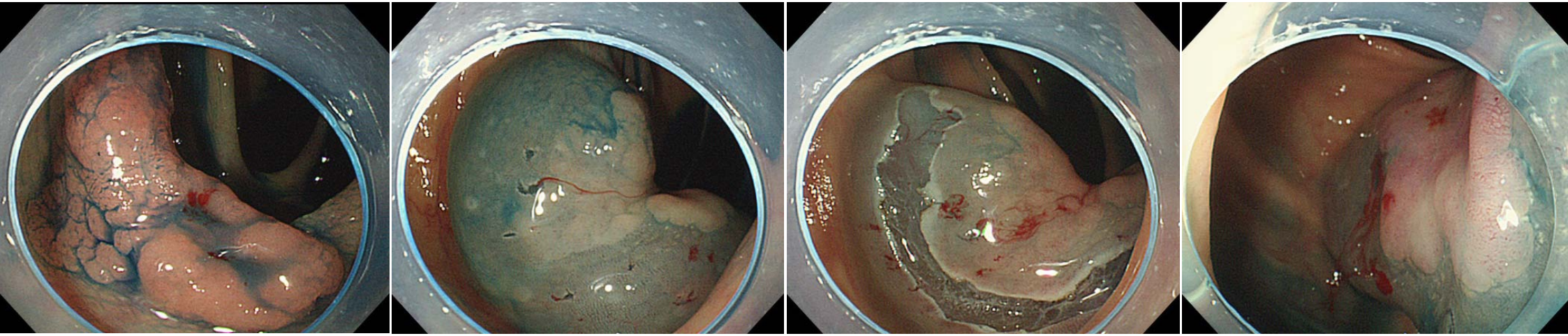
Techniques for colonic lesions

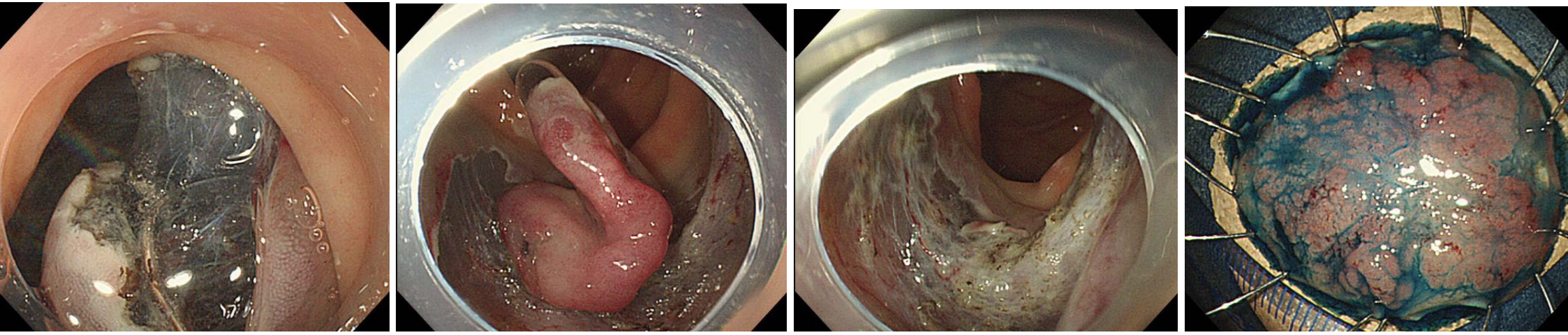


EMR

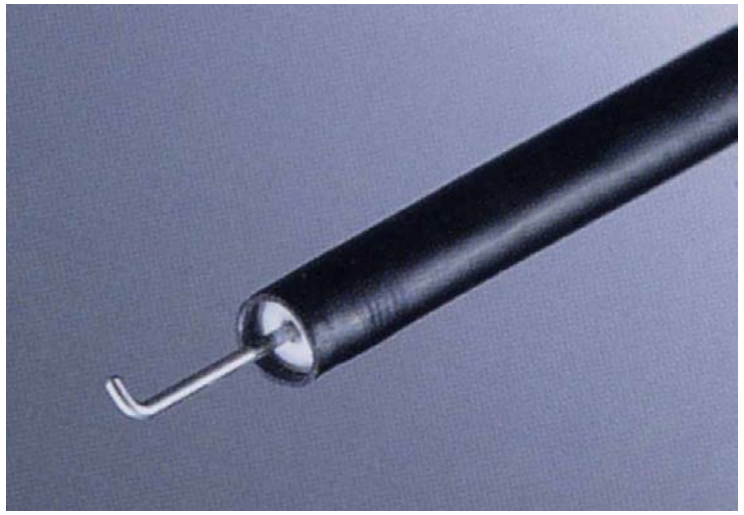


Endoscopic **S**ubmucosal **D**issection





Endoscopic knives for ESD



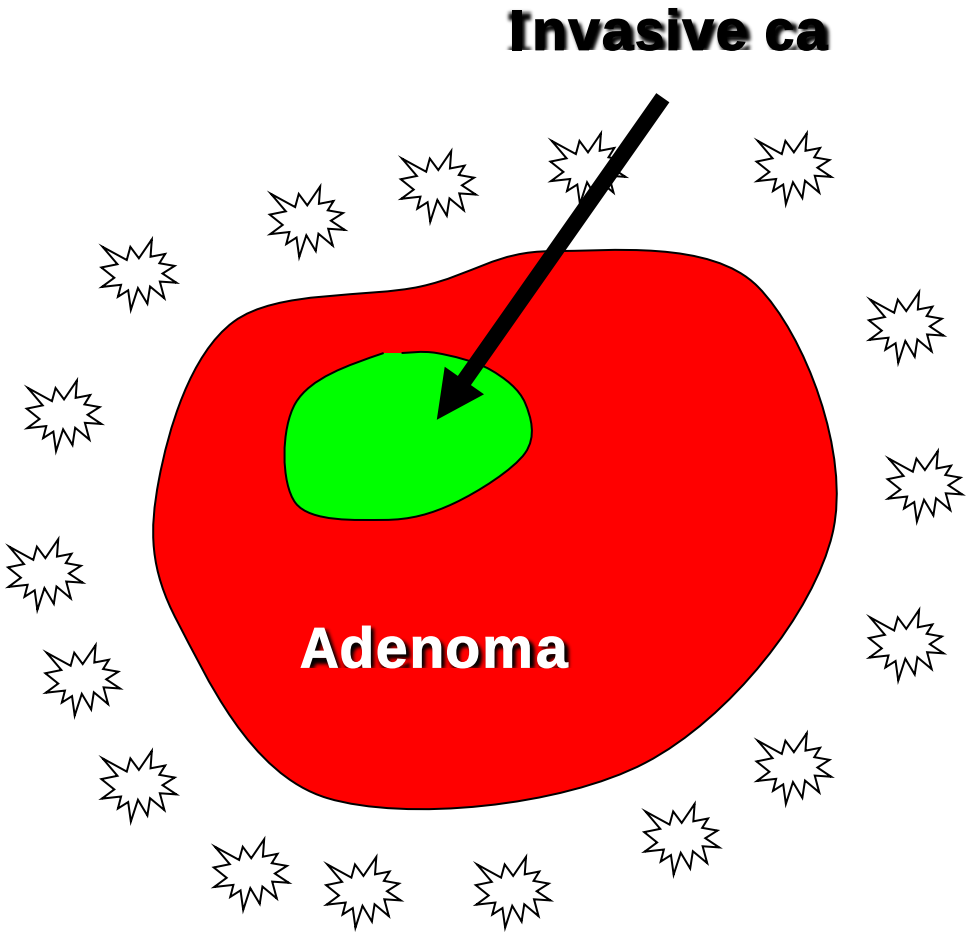
What we should choose?

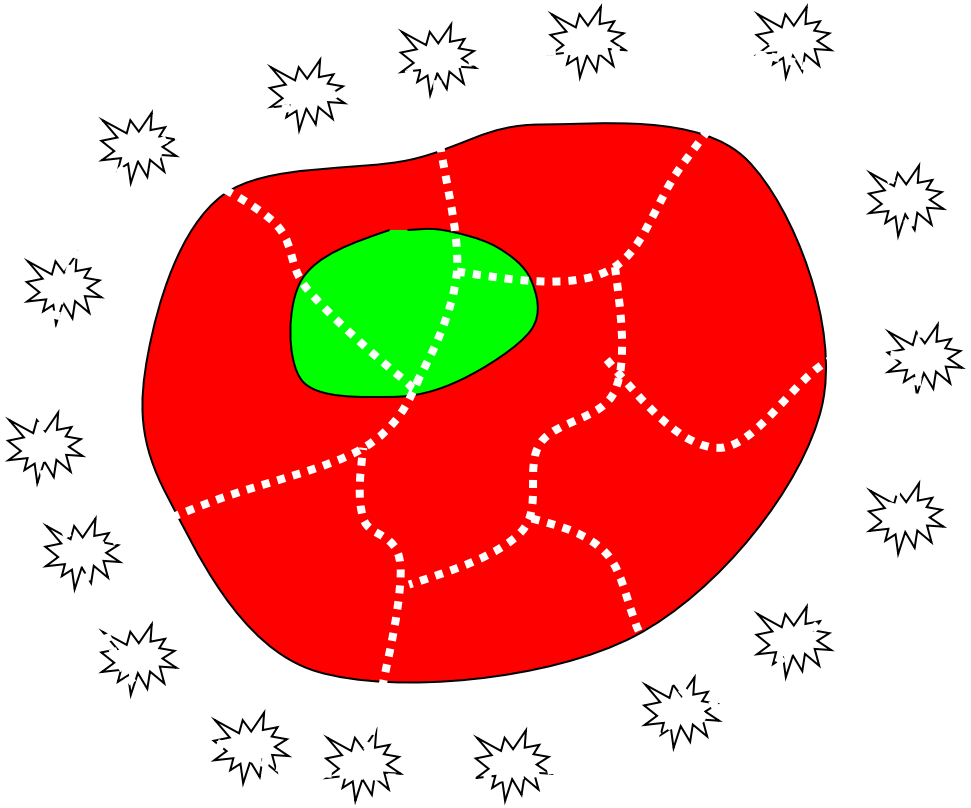
Piecemeal EMR	*vs*	ESD
Easy		Challenging
Quick		Time consuming
Low cost		High cost
Standard devices		Dedicated devices

What we should choose?

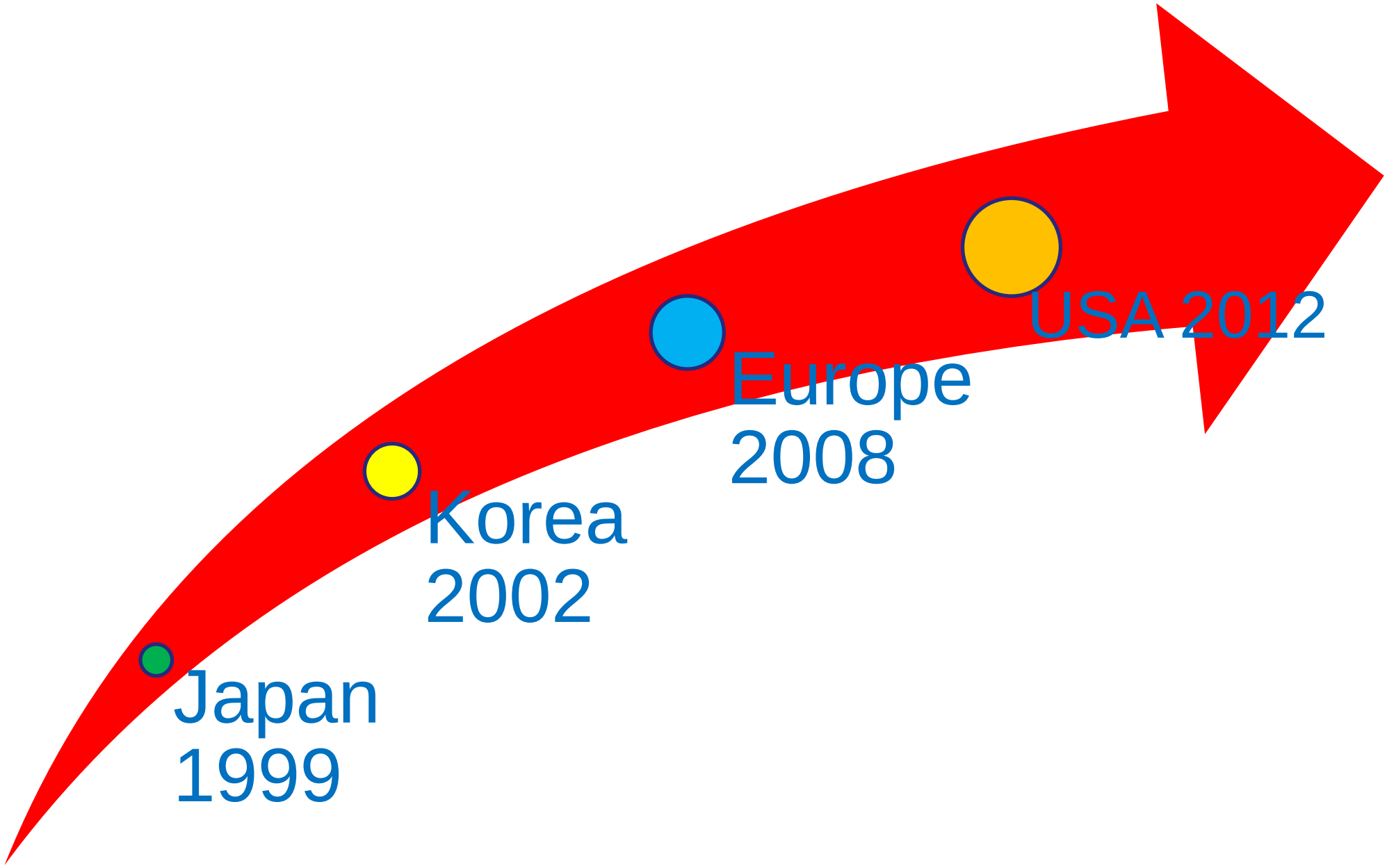
Piecemeal EMR	*vs*	**ESD**
Incomplete pathology		Appropriate pathology
High recurrence rate		Low recurrence rate
Low complication rate		Higher complication rate*

* Mostly treatable by endoscopic methods and conservative management

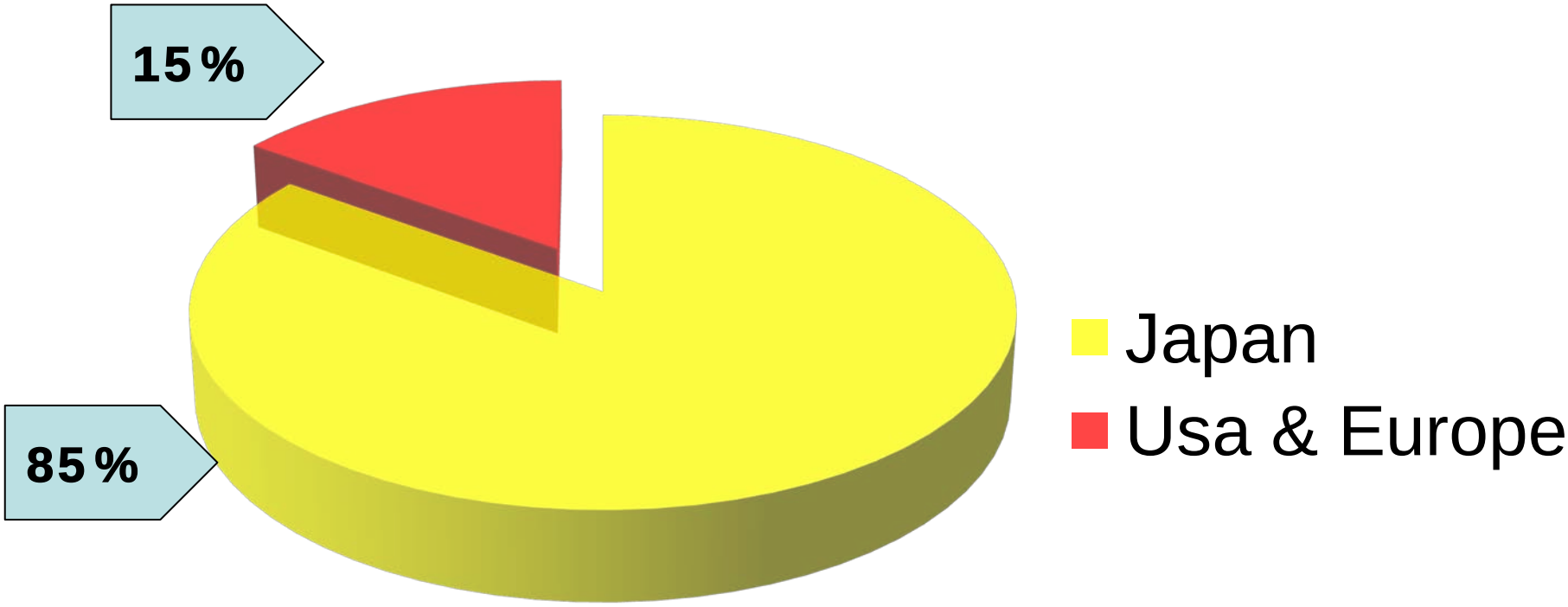

Invasive ca
Adenoma



ESD around the world



PUBLISHED PAPERS



Outcomes – Technical and Clinical

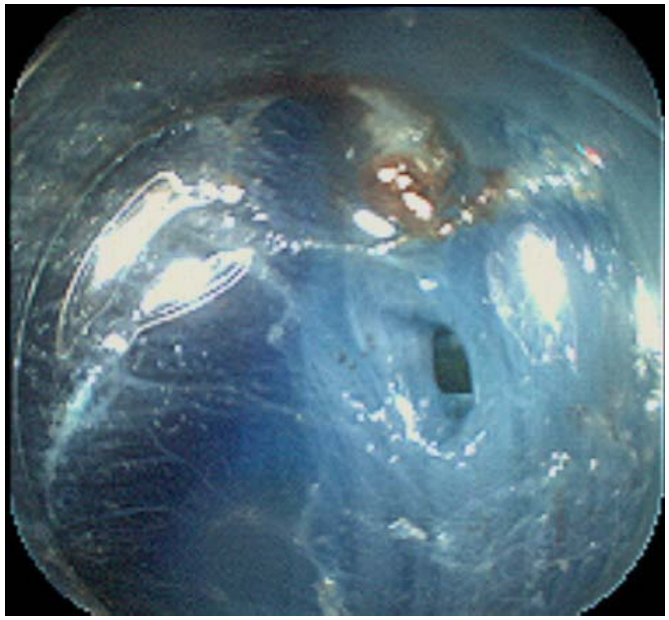
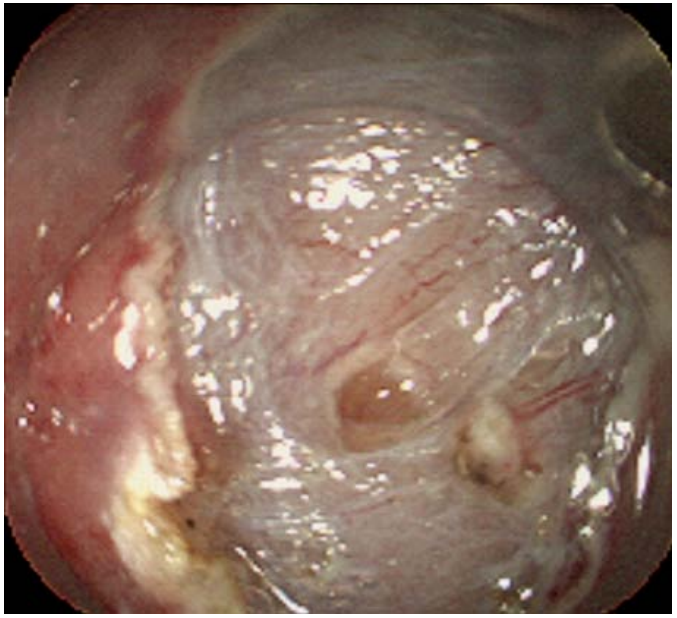
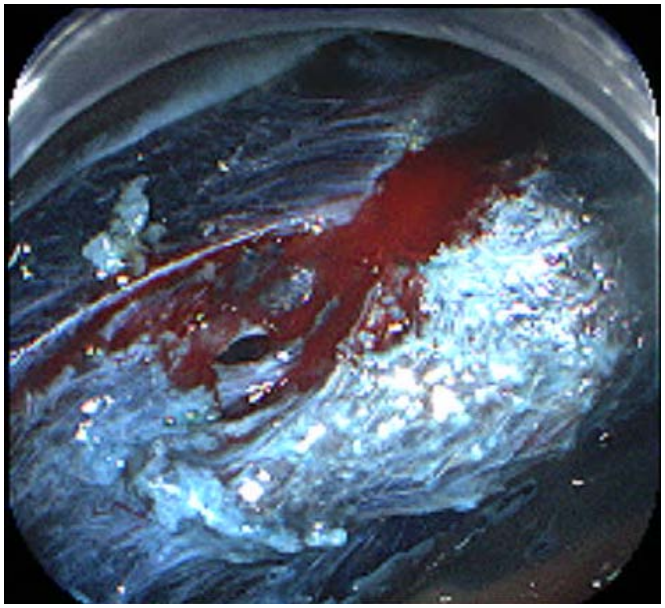
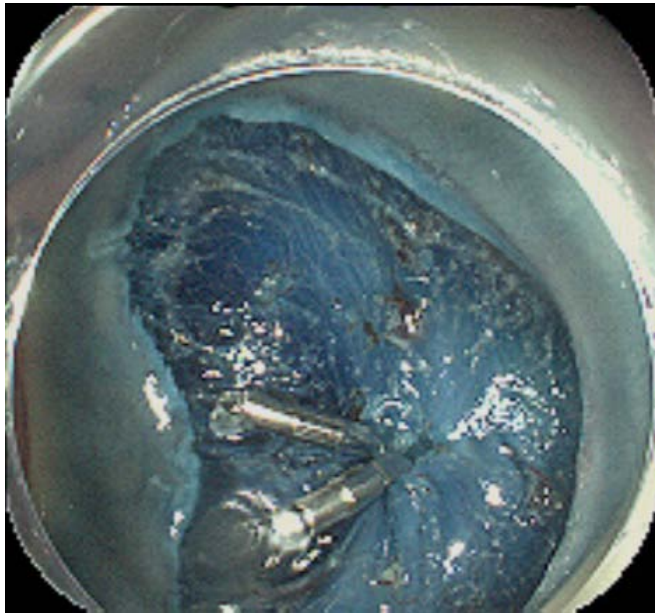
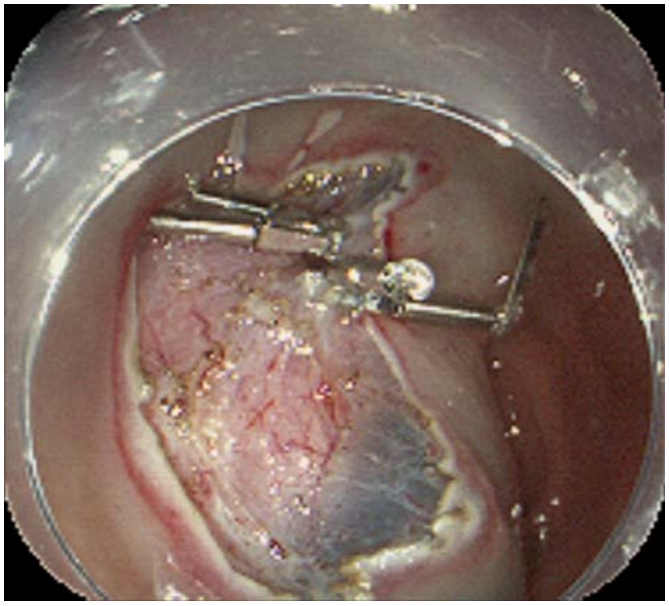
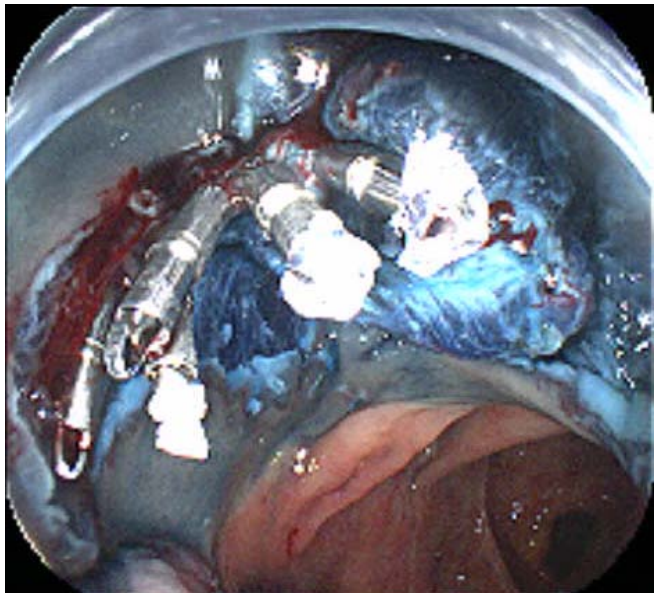
1. **Technical success:** 85% EMR *vs* 80% ESD
1. **Complication rate:** 1-3% EMR *vs* 4-12% ESD
   - Perforation 75%
   - Bleeding 15%
   - Others 10%
3. **R0 at pathology:** 60% EMR *vs* 85% ESD
4. **Recurrence rate:** 15-26% EMR *vs* 1-3% ESD
5. **Long-term FU:** comparable to surgical series

Gotoda T, GIE 2007

Definition of success

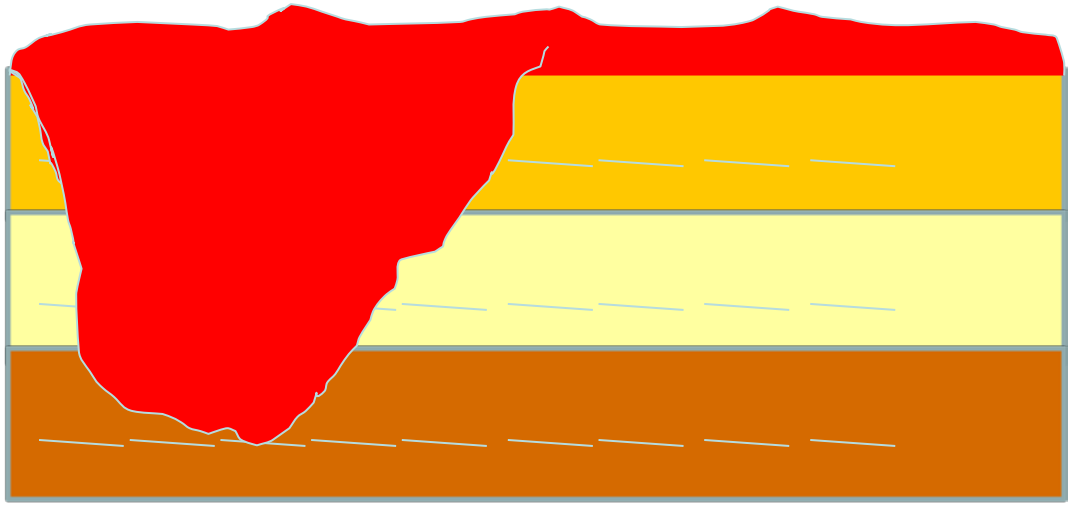
- “En-bloc” resection
- No need for surgery to treat complication
- R0 histology: lateral vs deep margin
- m3/sm1 Well differentiated cancer
- no lymphatic or vascular invasion/embolism

Perforation- life-threatening complication?

Rectal Lesions

Local Excision Techniques without LNs for Superficial Rectal Lesions



→ Sm1 0-3%

→ Sm2 3-8%

→ Sm3 10-14%

Kikuchi R et al, Dis Col Rectum 1995
Tytherleigh R et al, Br J Surg 2008

HUMANITAS

Three main Questions

- For which rectal lesion Local Excision (LE) is indicated?
  - EMR
  - ESD
  - TEM
  - TAMIS……..
- How to properly select rectal lesions?
- Which LE techniques works better?

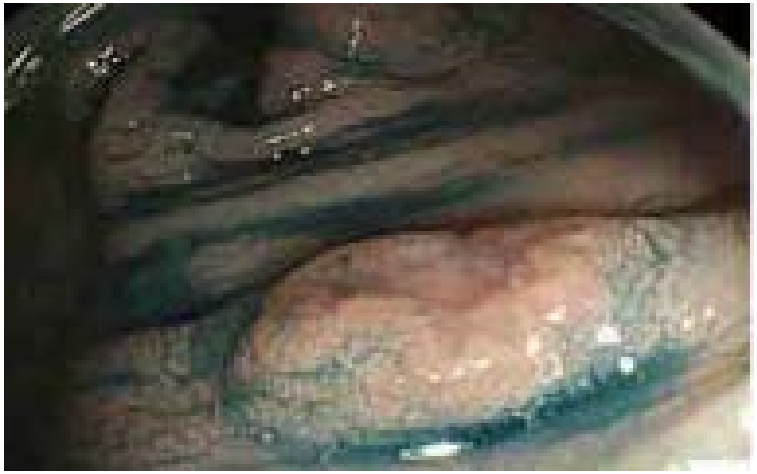
Staging/Selection of Rectal Lesions

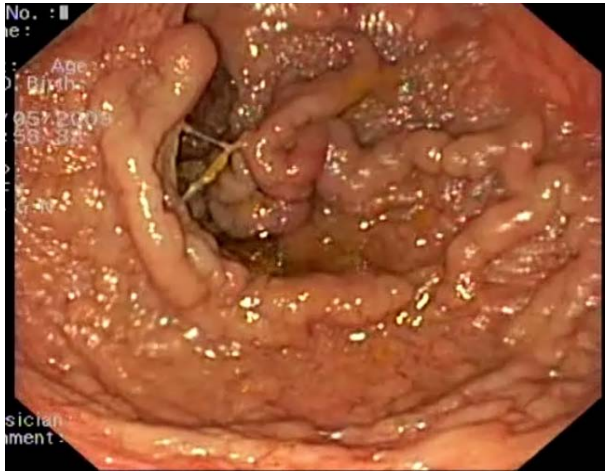
- Lesion morphology
- Chromoendoscopy
  - Surface pattern
  - Vascular pattern
- EUS
- MRI

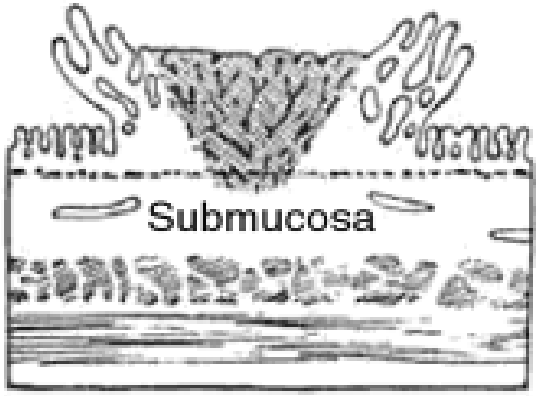
Reliable staging of submucosal infiltration and LN status is still an issue


Adenocarcinoma

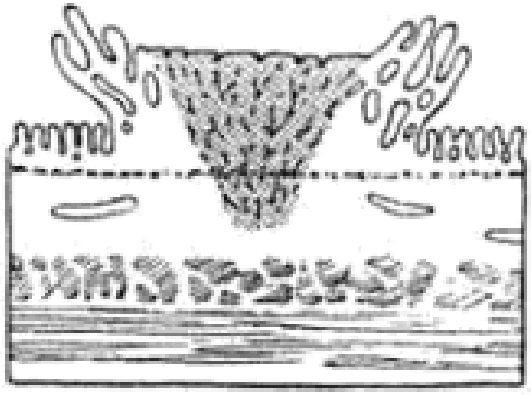
T1 rectal cancer is a diseases with multiple faces



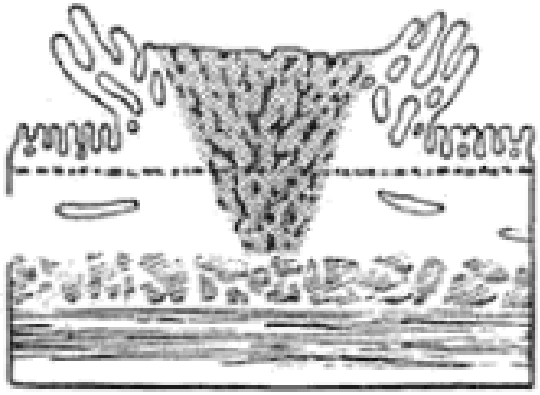




Sm$_1$

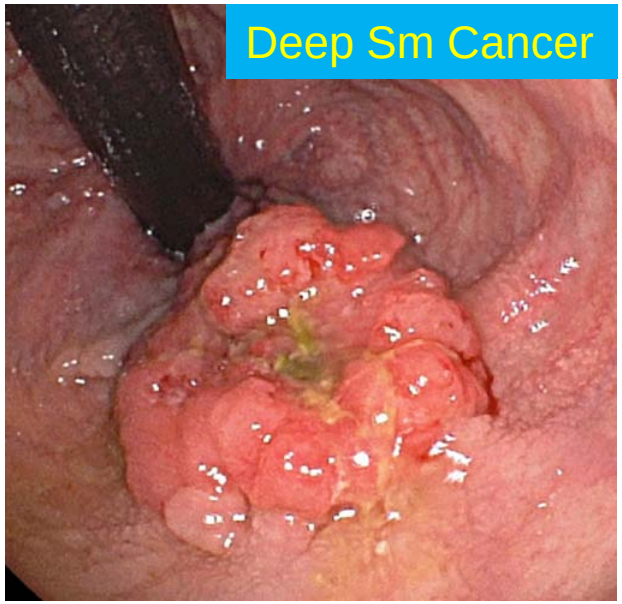


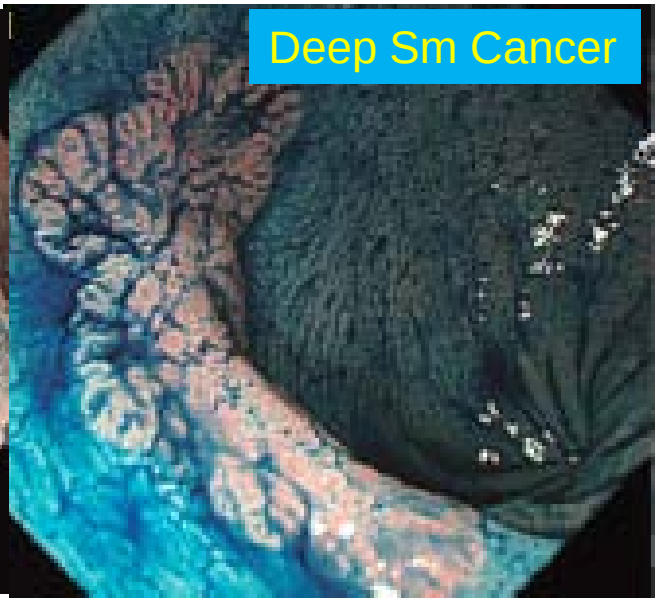
Sm$_2$

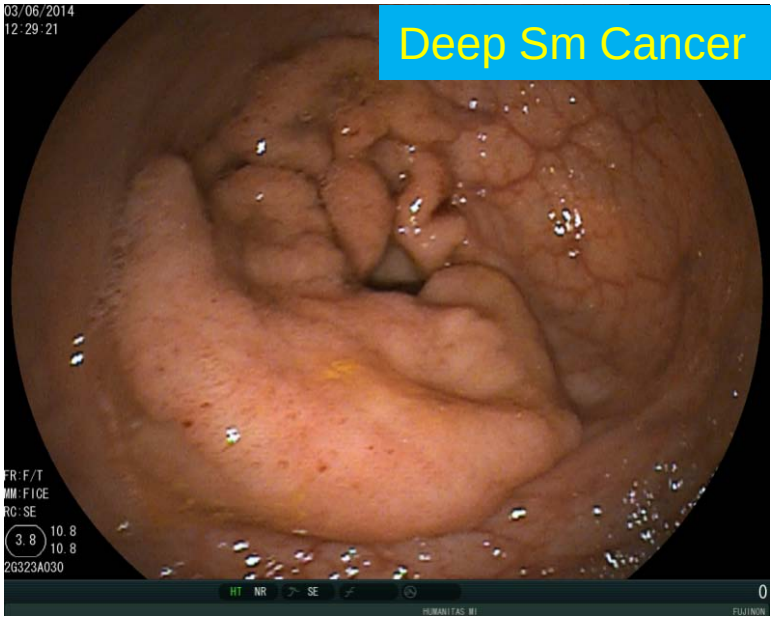


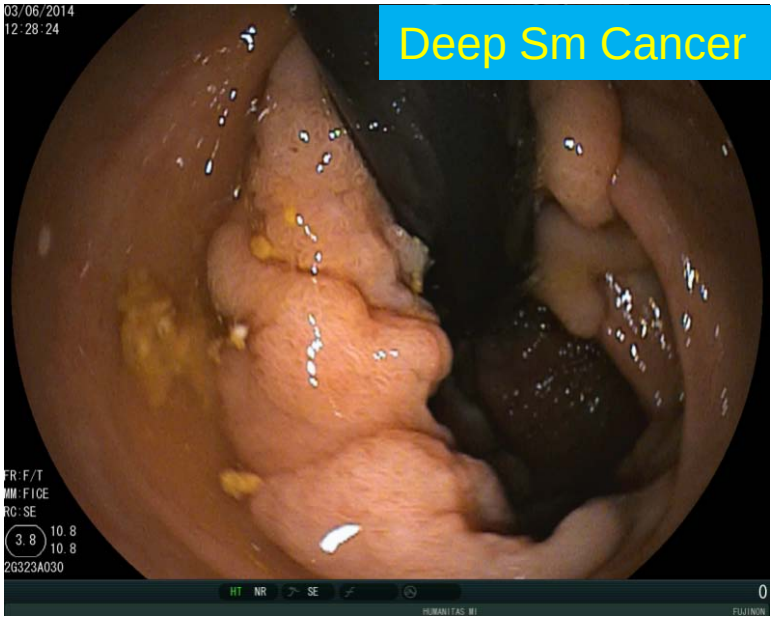
Sm$_3$

D.F
MAYO

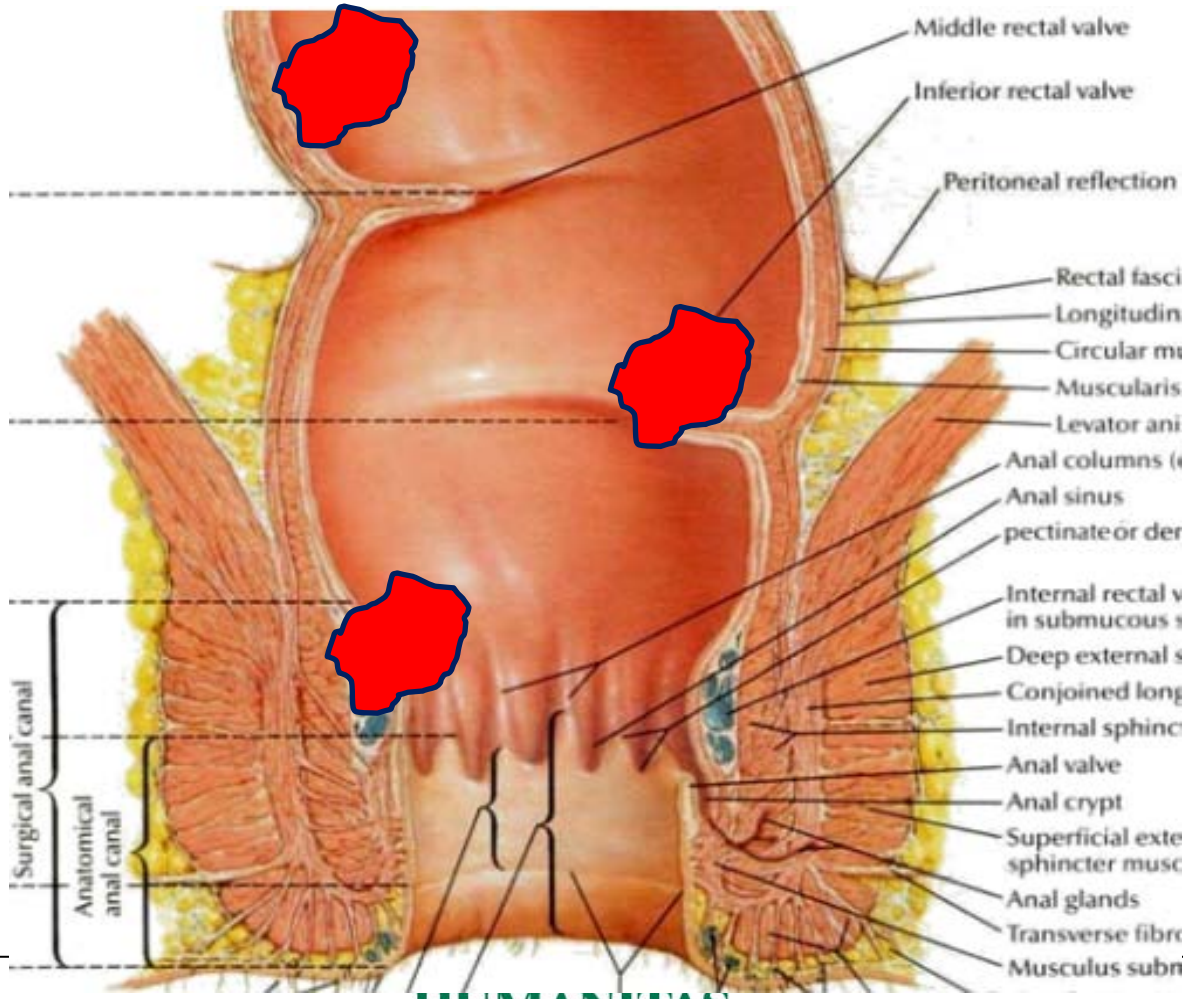

Deep Sm Cancer


Deep Sm Cancer


03/06/2014
12:29:21
Deep Sm Cancer
FR:F/T
MM:FICE
RC:SE
3.8
10.8
10.8
2G323A030
HT NR SE
0
HUMANITAS MI
FUJINON


03/06/2014
12:28:24
Deep Sm Cancer
FR:F/T
MM:FICE
RC:SE
3.8
10.8
10.8
2G323A030
HT NR SE
0
HUMANITAS MI
FUJINON

T1 rectal cancer is a diseases with different locations



Which LE works better?

ESD vs TEM

- Flexible endoscopy
- CO2
- Endoscopy suite
- Mild to deep sedation
- Selection of knifes
- Resection limited to sm

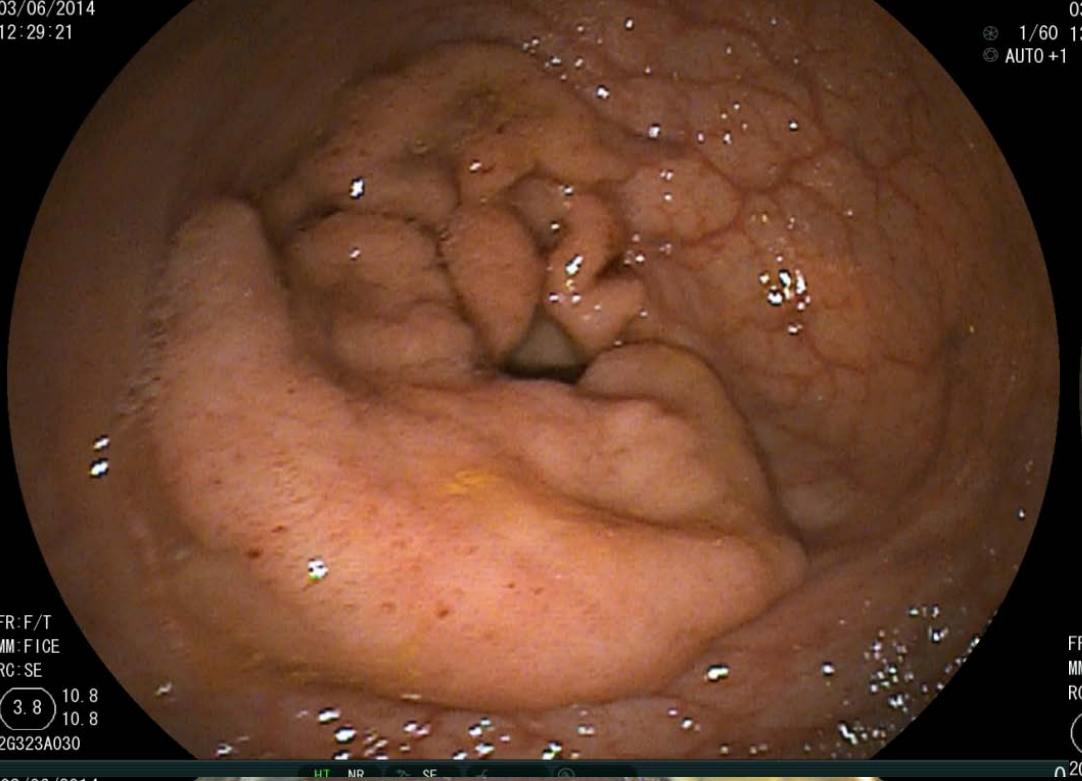
Endoscopy procedure

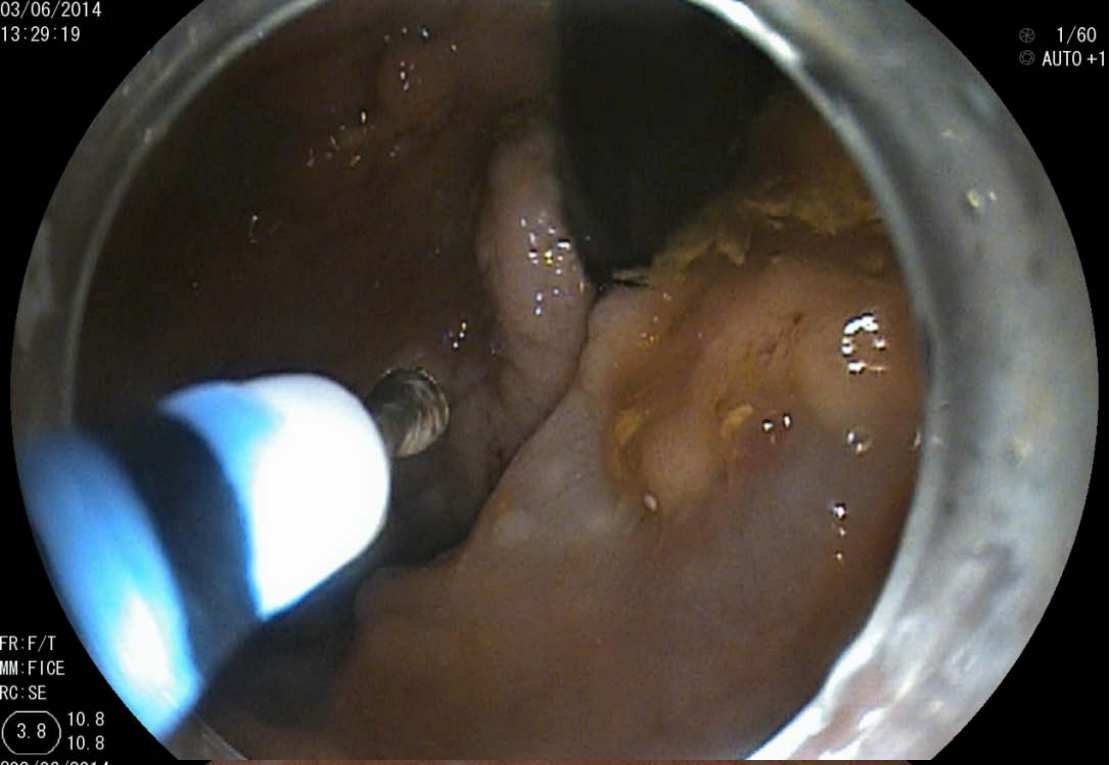
- TEM apparatus
- CO2
- Operating room
- General anesthesia
- Cutting and suturing devices
- Full-thickness resection

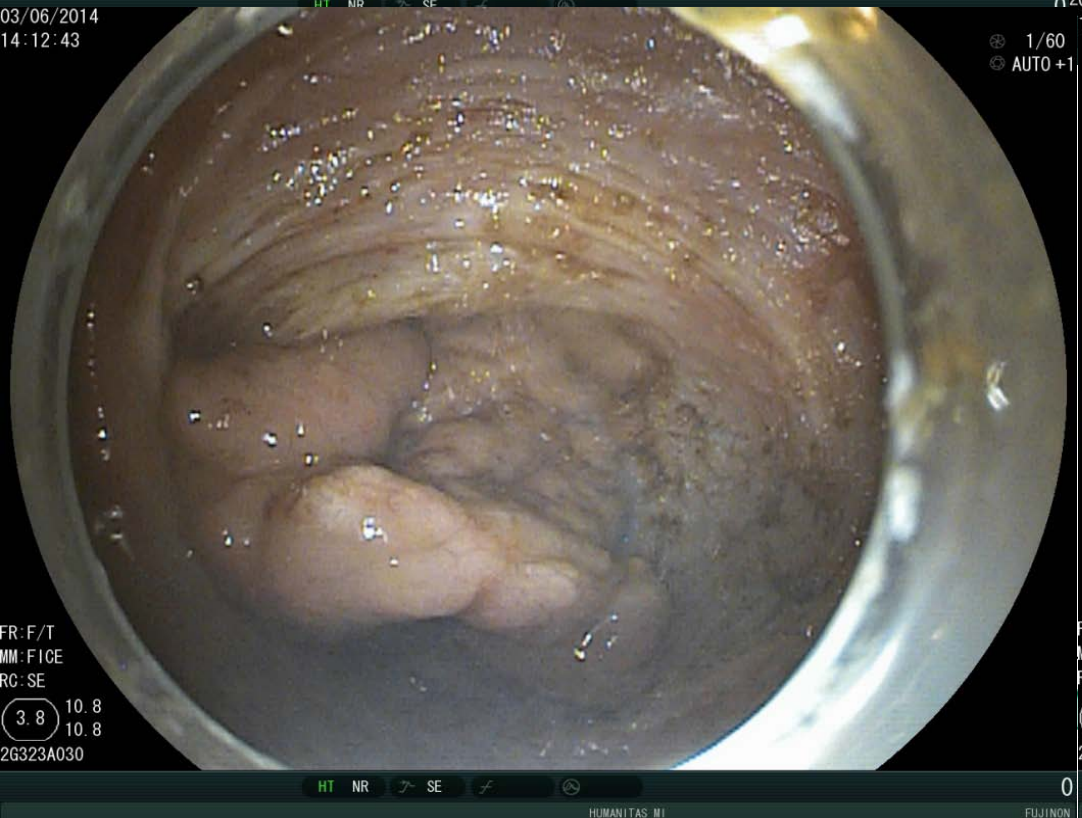
Surgical procedure

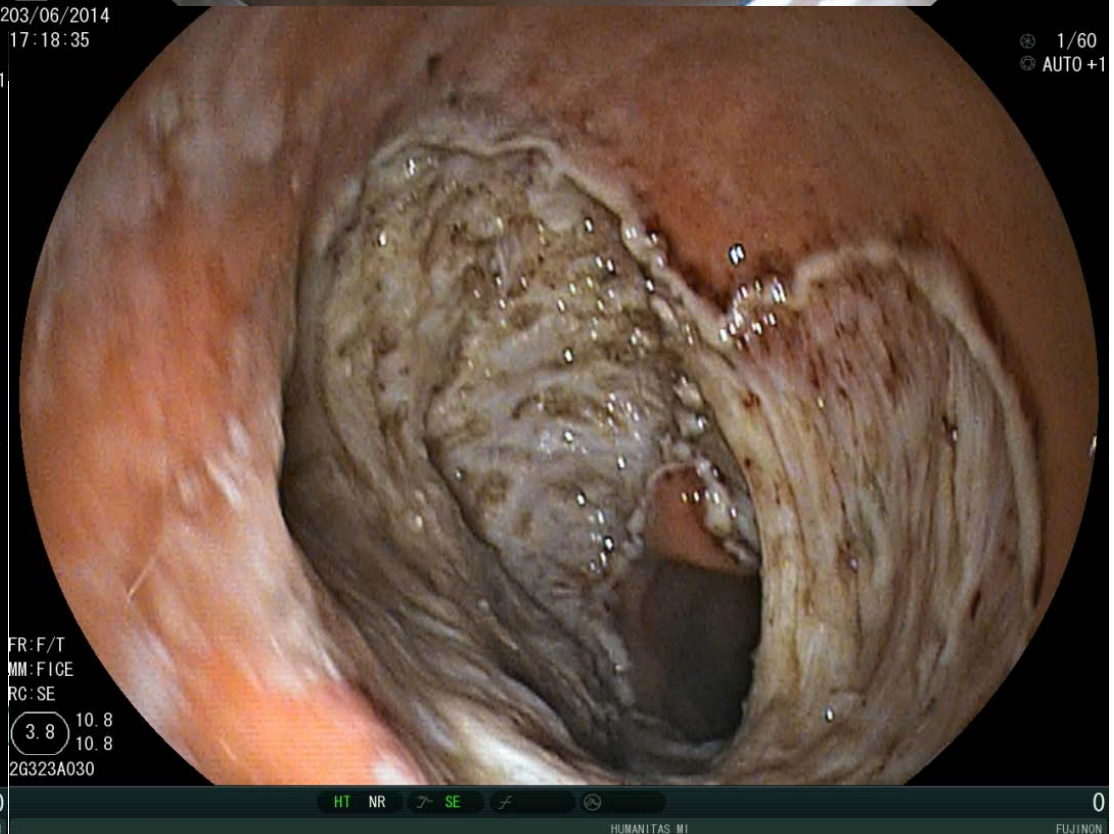
How to deal with rectal lesions with potential Sm involvement?

- First: *look to morphology and pattern*
- Second: *evaluate size and location*
- Third: *EUS and MRI*
- Fourth: *consider ESD vs TEM*
  - Bigger the lesion more challenging the ESD
  - Closer to the anus more challenging the TEM
  - Anterior vs posterior wall
  - Local expertise
  - Patient preference


03/06/2014
12:29:21
FR:F/T
MM:FICE
RC:SE
3.8
10.8
10.8
2G323A030


03/06/2014
13:29:19
1/60
AUTO +1
FR:F/T
MM:FICE
RC:SE
3.8
10.8
10.8


03/06/2014
14:12:43
1/60
FR:F/T
MM:FICE
RC:SE
3.8
10.8
10.8
2G323A030
HT NR SE
0
HUMANITAS MI
FUJINON


203/06/2014
17:18:35
1/60
AUTO +1
FR:F/T
MM:FICE
RC:SE
3.8
10.8
10.8
2G323A030
HT NR SE
0
HUMANITAS MI
FUJINON

CONCLUSIONS

- ✓ **The correct endoscopic resection technique must be chosen after properly lesion evaluation:**
  - **Morphology**
  - **Size**
  - **Pit pattern**
  - **Vascular Pattern**

- ✓ **The correct endoscopic resection technique must be chosen considering endoscopist skills and training**

- ✓ **ESD is a promising and efficacy technique to resect superificial neoplasm, with a low recurrence rate**

- ✓ **In expert hands, ESD is a safe procedure, allowing an accurata histological invasion depth assessment**

Thank you

roberta.maselli@humanitas.it