



How to manage colonic polyps: Polypectomy, ESD, and Radical Surgery

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Disclosures

- No relevant disclosures



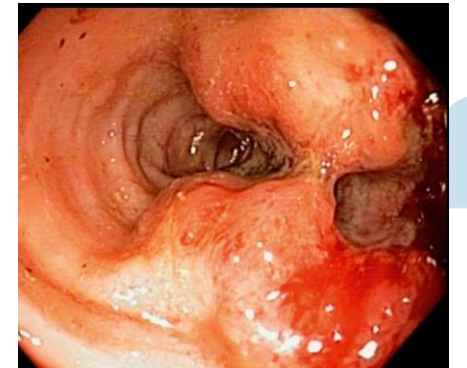
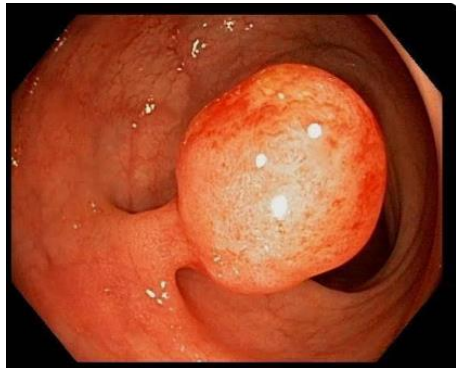
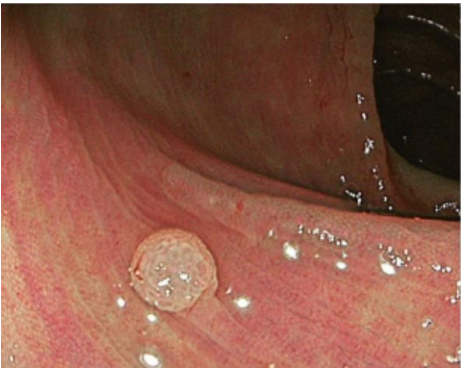
Colorectal Polyps Come in Many Shapes and Sizes

Some are clearly benign and low risk; others are clearly malignant and high risk

Ideal Management:

The least invasive treatment that provides:

- Complete removal
- Adequate histologic and oncologic staging
- Minimal risk for recurrence



Precision Polyp Treatment

Matching the Treatment to the Polyp

Treatment continuum:

	Standard polypectomy →	EMR →	ESD/TAMIS →	Radical surgery
Type of polyp	Small sessile or pedunculated	Large, benign-appearing lesions	Lesions requiring en bloc resection	Deep invasion or ↑risk for disease
Resection	En bloc when feasible	Often piecemeal	En bloc	Bowel and lymph nodes
Result	Complete removal	Complete removal ↓ procedure risk/\$	Complete removal & precise staging	Oncologic clearance

Increasing invasiveness must be justified by increasing oncologic benefit

Colectomy for a Benign Polyp is **Not** Benign

27%

Of elective colectomies for neoplasms were performed for benign lesions

153,435 operations, United States, 2012–2019

24%

30-day morbidity

2.9%

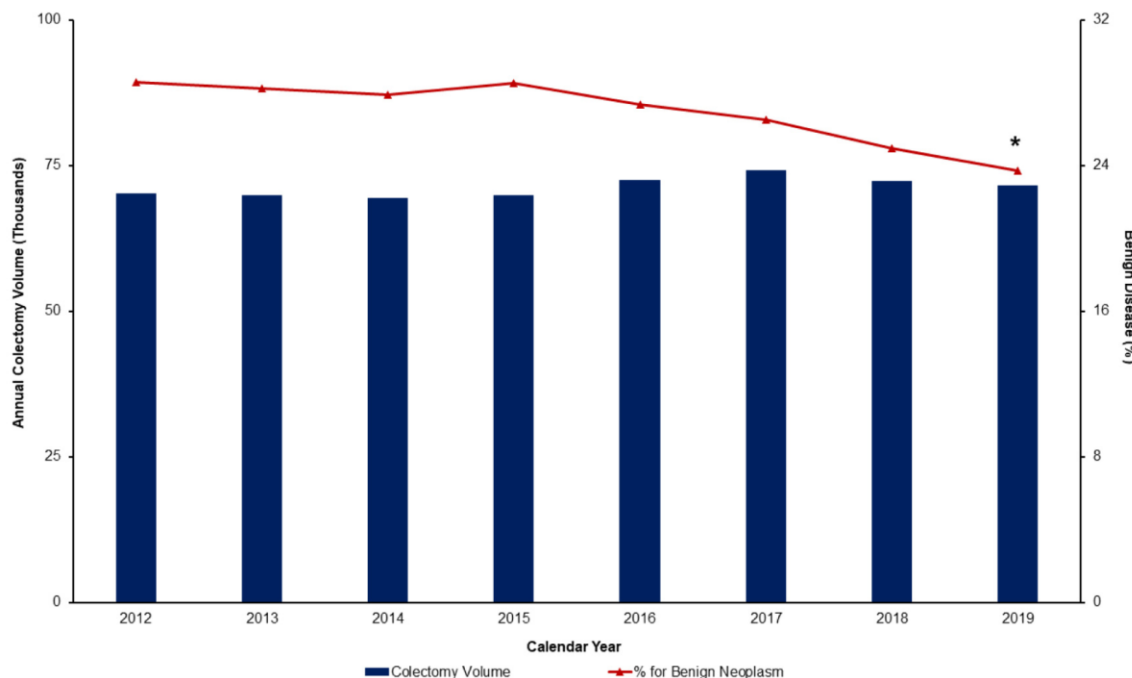
Require a stoma

0.7%

30-day mortality

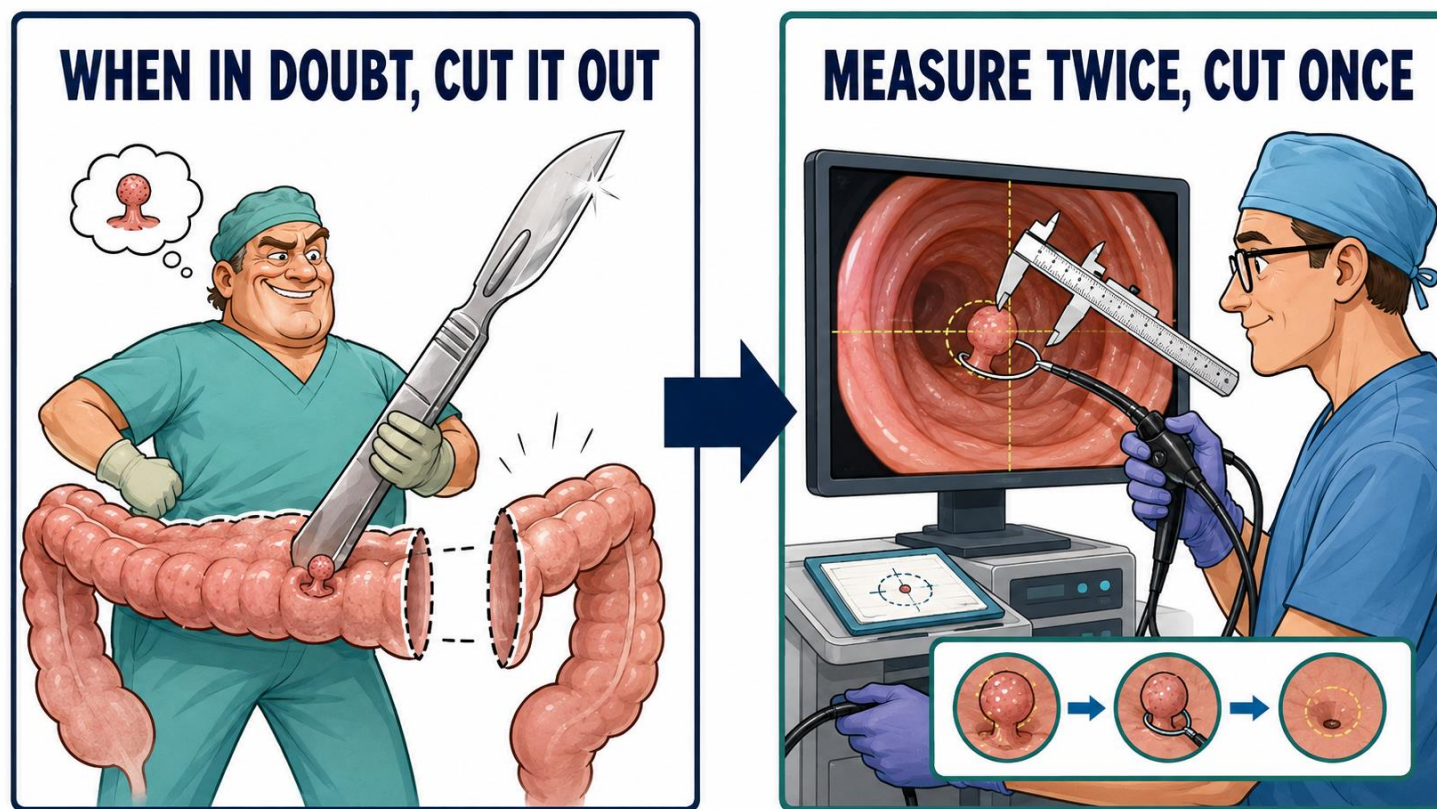
\$13,700

Median hospitalization cost



Although slowly declining, colectomy for benign polyps remains common and carries meaningful consequences

Precision Treatment Requires Precision Assessment

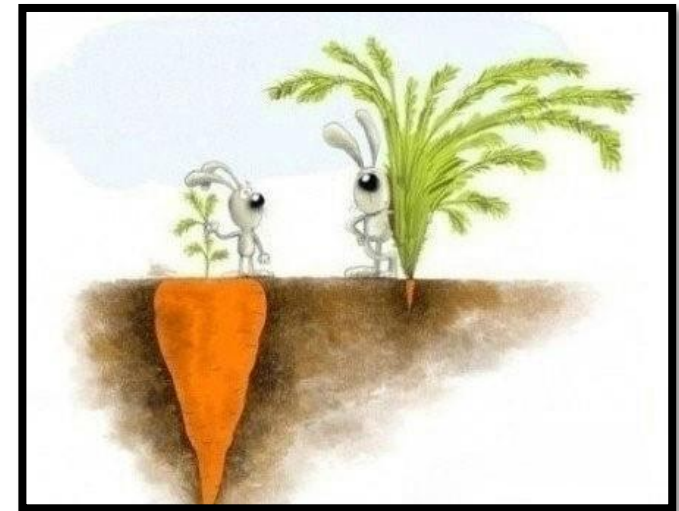
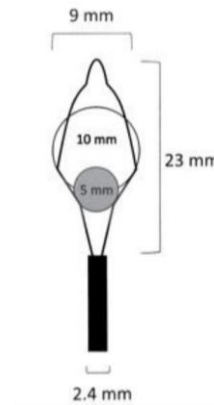


Characterize the lesion before choosing the resection

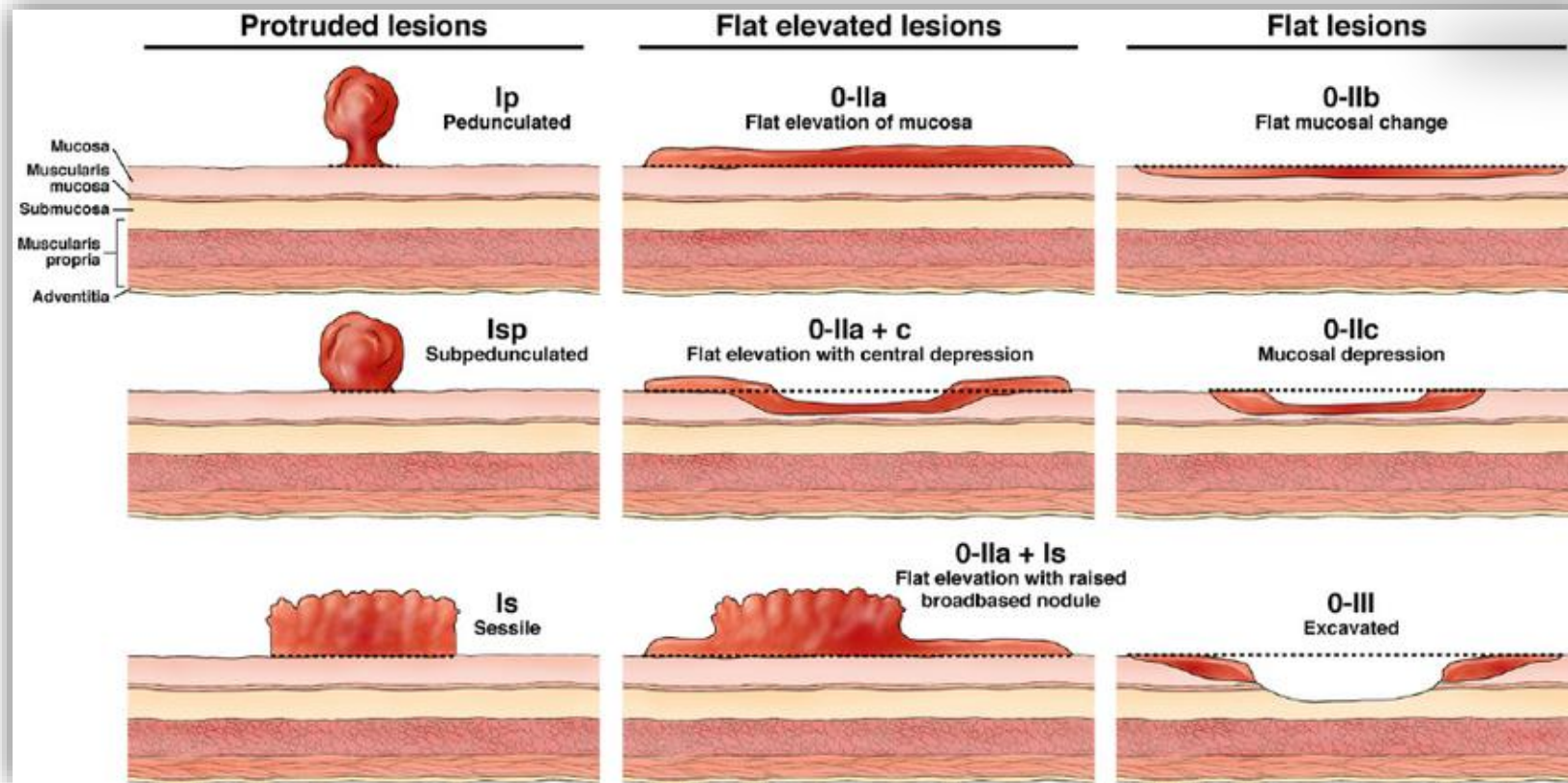
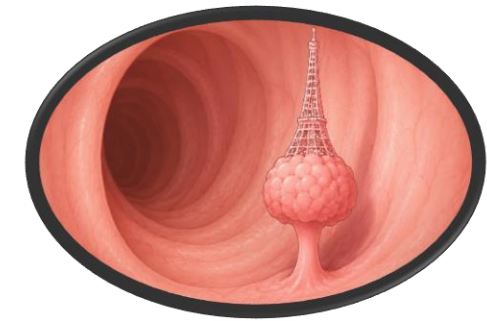
Structured Lesion Assessment

USMSTF: Structured optical assessment of every polyp before resection, using high-definition white light and image-enhanced endoscopy, with photodocumentation

- Size
 - relate to open snare/forceps
 - interobserver variability is real
- Paris classification
- LST (Lateral Spreading Tumor) classification
- Surface pit and vascular patterns: NICE, Kudo, and JNET
- Features of invasion or fibrosis
 - Depression, ulceration, nonlifting, prior manipulation, fixation



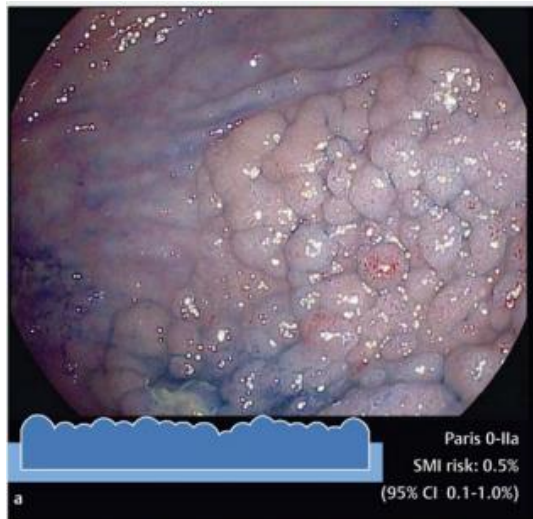
Paris Classification



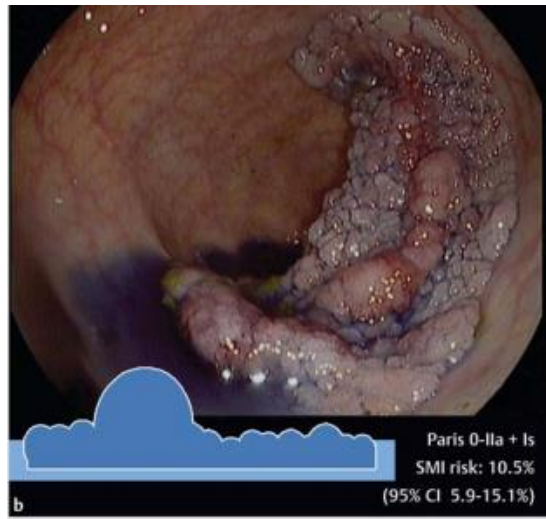
Classifies Vertical Morphology

Lateral Spreading Tumor Characterization

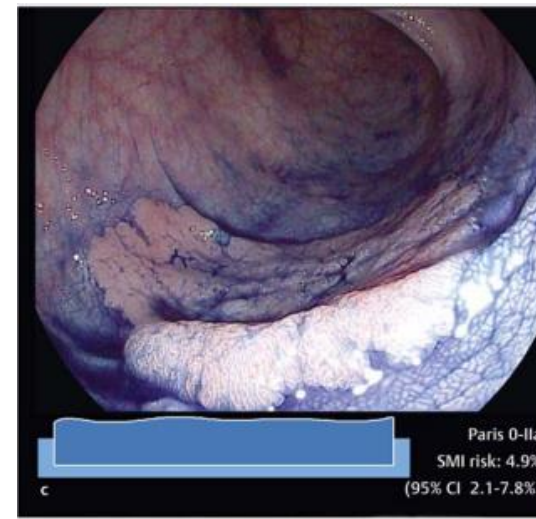
LST: nonpolypoid colorectal lesion ≥ 10 mm that extends laterally along the luminal wall rather than vertically.



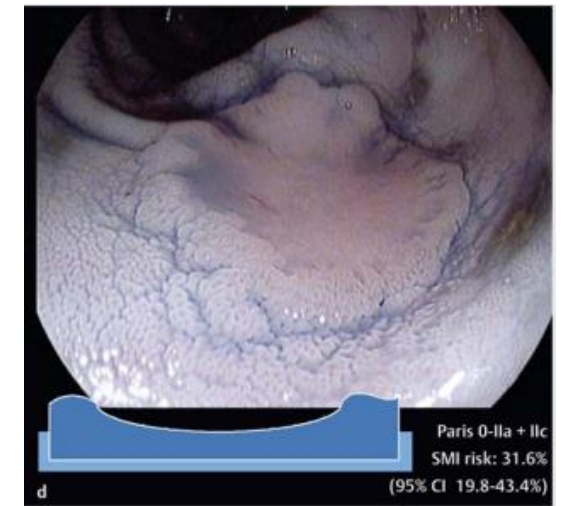
Granular, homogenous
LST-G-H (Paris 0-IIa)



Granular, nodular mixed
LST-G-NM (Paris 0-IIa + Is)



Nongranular, flat, elevated
LST-NG-FE (Paris 0-IIa)



Nongranular, pseudo-depressed
LST-NG-PD (Paris 0-IIa + IIc)

Describes surface architecture

Optical Classification System

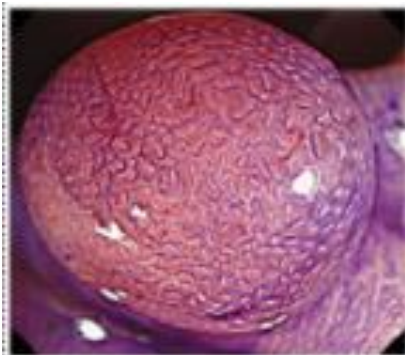
Kudo, NICE, JNET

Different Imaging – Same Clinical Question

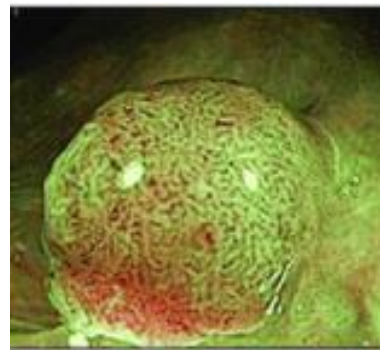
- What is the histology and how deeply does the lesion invade?

Classification	Imaging modality	Evaluates
Kudo	Magnifying chromoendoscopy	Pit pattern
NICE	NBI	Color, vessels and surface pattern
JNET	Magnifying NBI	Vessel and surface pattern

Kudo



NICE

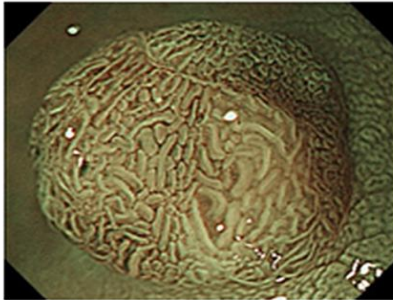
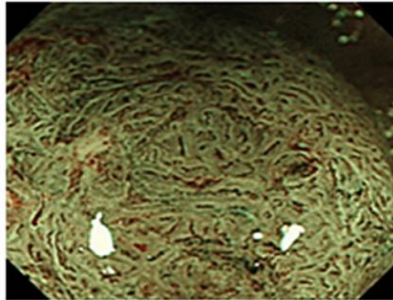
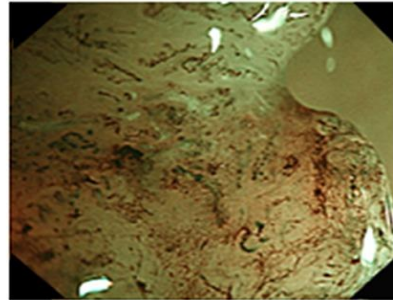


JNET



JNET

Distinguishing Adenoma from Invasive Cancer

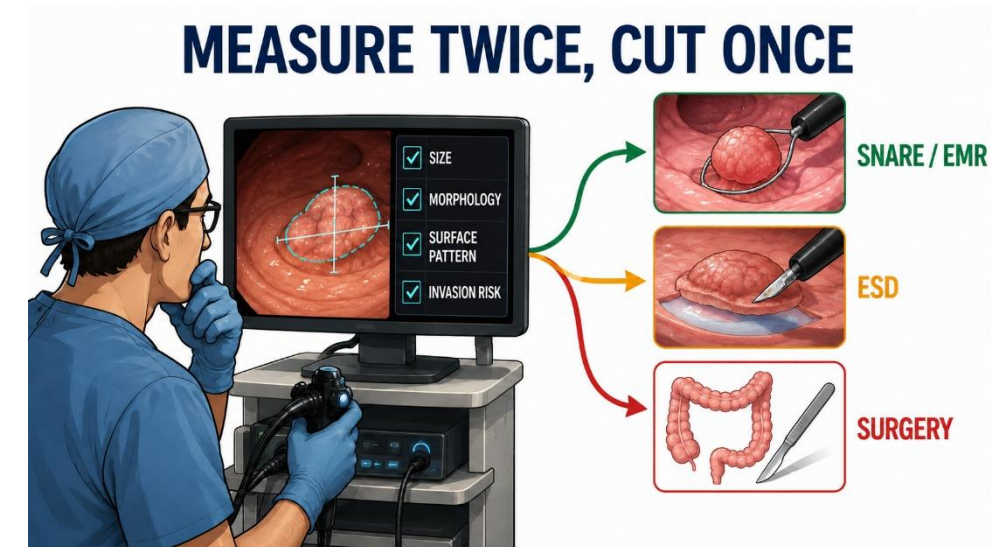
	Type 1	Type 2A	Type 2B	Type 3
Vessel pattern	• Invisible*¹	• Regular caliber • Regular distribution (meshed/spiral pattern)*²	• Variable caliber • Irregular distribution	• Loose vessel areas • Interruption of thick vessels
Surface pattern	• Regular dark or white spots • Similar to surrounding normal mucosa	• Regular (tubular/branched/papillary)	• Irregular or obscure	• Amorphous areas
Most likely histology	Hyperplastic polyp/ Sessile serrated polyp	Low grade intramucosal neoplasia	High grade intramucosal neoplasia/ Shallow submucosal invasive cancer* ³	Deep submucosal invasive cancer
Endoscopic image				

Endoscopic Assessment Guides Resection Strategy

Morphology and surface anatomy predict—but do not diagnose—the presence and depth of submucosal invasion (SMIC)

- Low risk for SMIC
 - LST-G-H, Paris 0-IIa, Kudo I-IV, JNET 1/2A
 - → **Piecemeal EMR appropriate**
- Possible HGD or superficial SMIC
 - LST-G-NM/LST-NG, Paris 0-IIc, Kudo VI, JNET 2B
 - → **En bloc resection for accurate staging: ESD or TAMIS/TEM**
- Features of deep SMIC
 - Paris 0-III, Kudo VN, NICE 3 or JNET 3
 - → **Oncologic surgery generally indicated**

Management determined by the most suspicious area





Do surface morphology and pit pattern have a role in predicting cancer for colon polyps in North America?

Ilker Ozgur¹ · Ipek Sapci¹ · Berke Sengun¹ · Michael A. Valente¹ · Scott R. Steele¹ · David Liska¹ · Conor P. Delaney¹ · Emre Gorgun¹ 

In a North American cohort, low-risk pit patterns reliably excluded cancer (NPV 98.7%), while high-risk features had limited PPV (15.6%).

Accurate for identifying lesions suitable for endoscopic management and those requiring en bloc staging—not for diagnosing cancer.

Table 3 Predictive values of surface morphology, Paris classification, and Kudo pit pattern

Polyp features	Sensitivity	Specificity	PPV	NPV	Accuracy
Polypoid vs Non-polypoid	81.8	21.6	8.3	93.1	26.1
Granular vs Non-granular	54.6	43.3	7.7	91.7	44.2
Kudo I-III vs IV-V	90.9	57.5	15.6	98.7	60.1

PPV positive predictive value, NPV negative predictive value



Colorectal Surgeons are Uniquely Positioned to Manage Advanced Polyps

ASSESS

- Define morphology, invasion risk, location, and technical complexity
- Interpret endoscopic findings in the context of surgical anatomy and patient factors

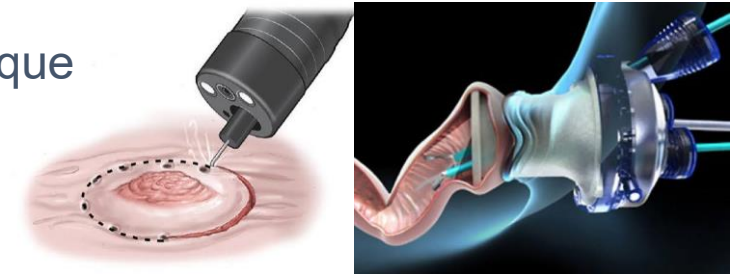
DECIDE

- Select the least invasive oncologically appropriate treatment and technique
- Polypectomy/EMR → ESD or TAMIS → oncologic surgery

EXECUTE

- Perform advanced endoscopic resection when appropriately trained
- Proceed directly to surgery when nodal clearance is required
- Manage complications and rescue failed resections

One clinician can integrate endoscopic resectability, oncologic risk, and the procedural consequences



Colorectal Surgeons are Uniquely Positioned to Manage Advanced Polyps

This requires colorectal surgeons to develop endoscopic expertise—and continue to innovate.

Otherwise...



Endorobotic Submucosal Dissection (ERSD) with DaVinci SP system

History:

59 years old male

Asymptomatic

Screening colonoscopy found large polyp in upper rectum, 9-10cm from the anal verge.

Biopsies showed tubulovillous adenoma

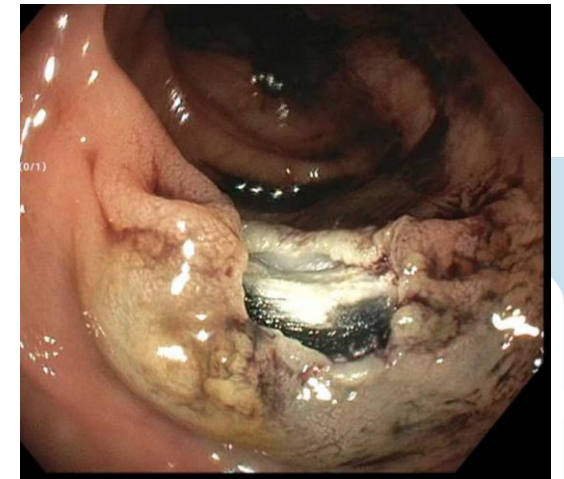
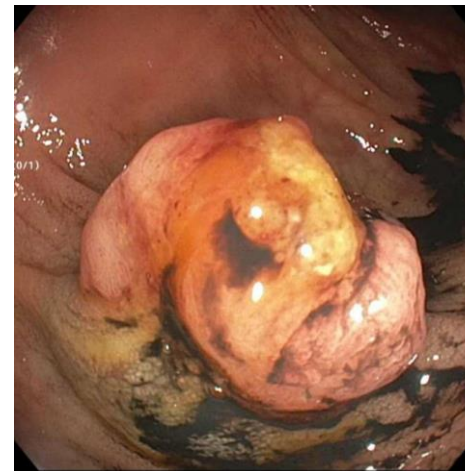


Malignant Polyp

45F, screening colonoscopy

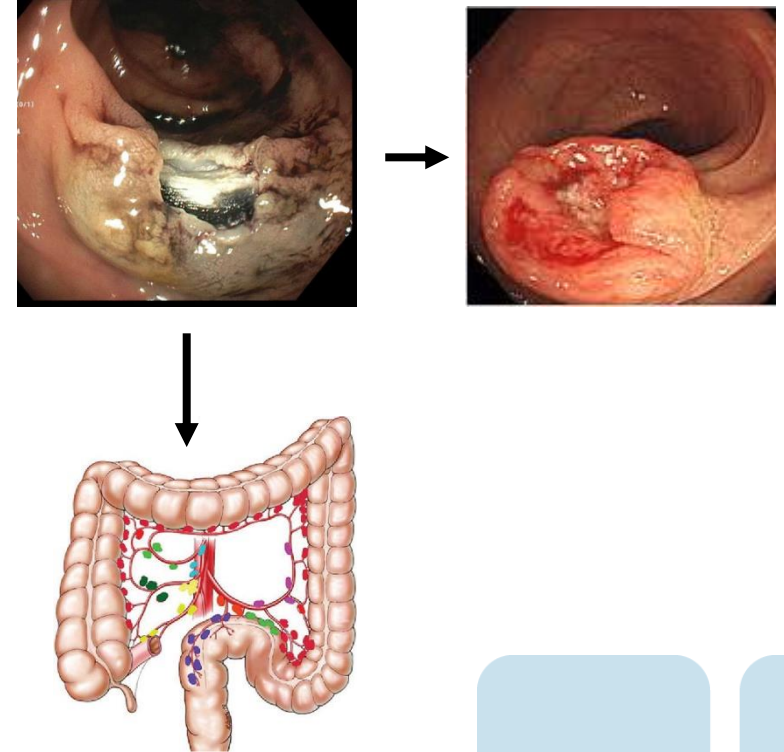
Sigmoid Colon sessile polyp

- Removed with injection-assisted endoscopic mucosal resection (EMR) technique
- Endoscopically “completely removed”
- Path invasive adenocarcinoma
- Now what?



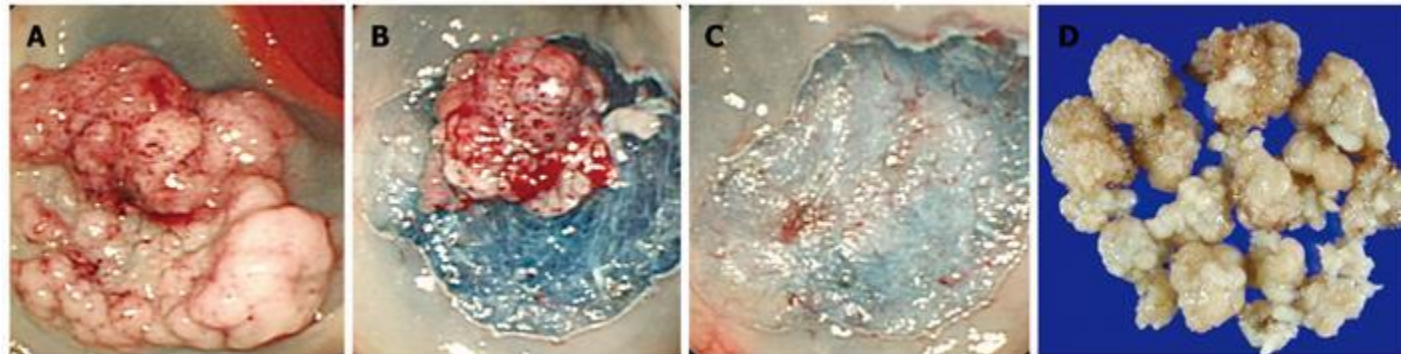
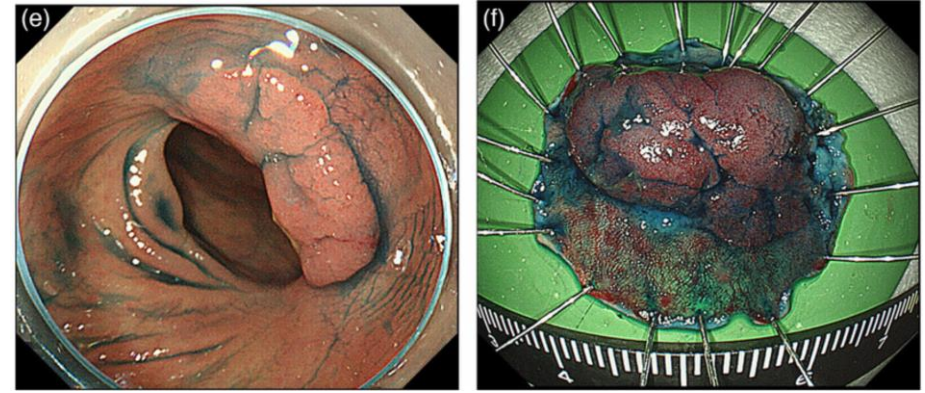
Malignant Polyp

- Definition of Malignant Polyp:
 - Colorectal lesions with neoplastic invasion of the submucosa without extension into the muscularis propria (T1)
- Endoscopically removed
 - Is there any residual cancer?
 - Risk of local recurrence
 - Risk of microscopic metastasis to regional lymph nodes
- Should the patient have a colectomy?
- **Requires comprehensive assessment of histopathology**



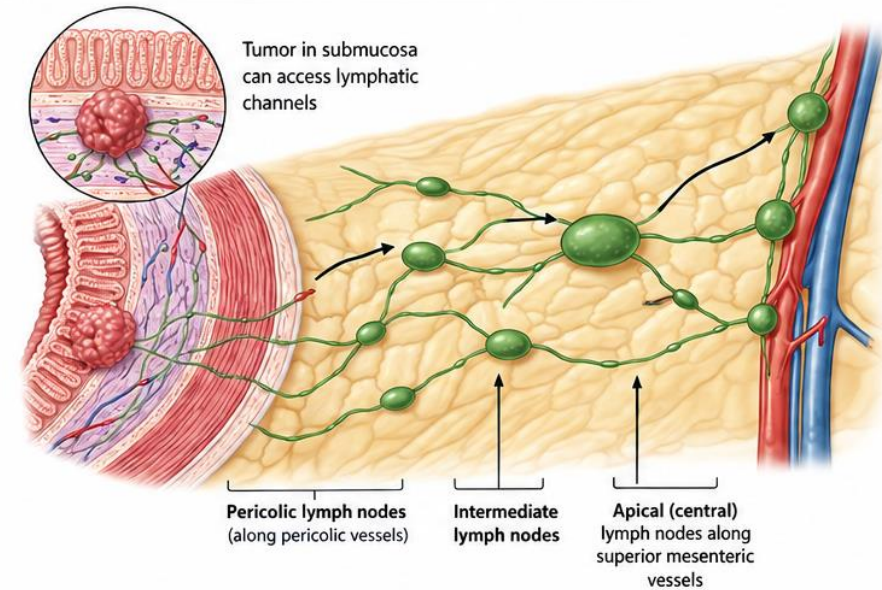
Resection Margins

- Local recurrence is related to incomplete resection
- Microscopic margin assessment is essential in determining completeness of endoscopic resection
- → **En-bloc resection, avoid fragmentation**
- < 1 mm is positive and is associated with significantly higher risk of recurrence



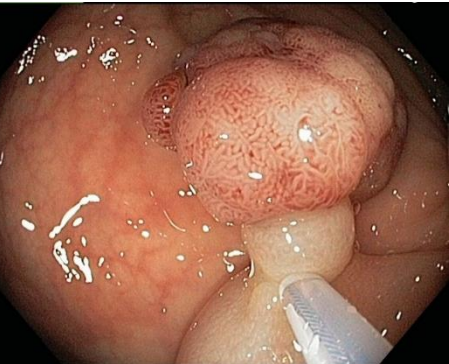
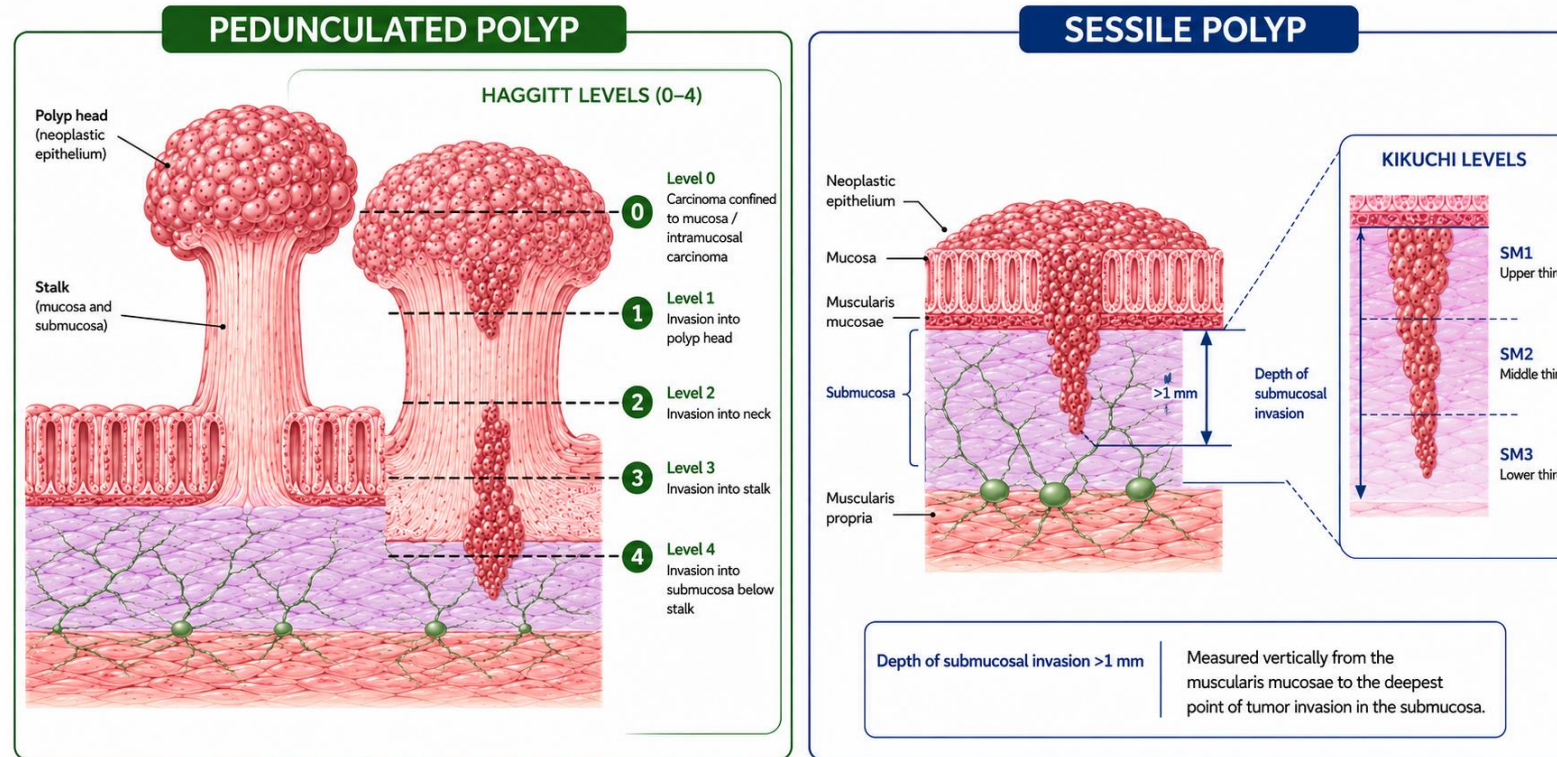
Factors Associated with LNM

- Fragmented specimen / not assessable
- Deep margin positivity
- Depth of submucosal invasion (SMI)
- Histologic grade
- Lymphovascular invasion (LVI)
- Tumor budding
- *Left-sided tumor location and younger age*



Risk of LNM based on depth of SMI

Pedunculated—Haggitt vs Sessile Polyp—Kikuchi



↑ risk for LNM:

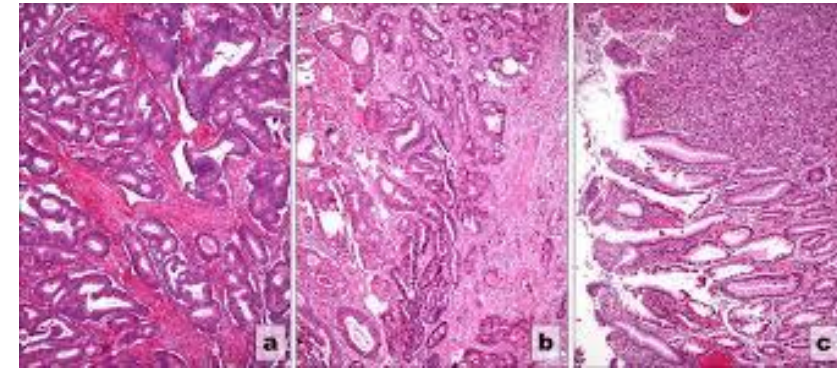
Level 4

> 1 mm SMI

→ Colectomy

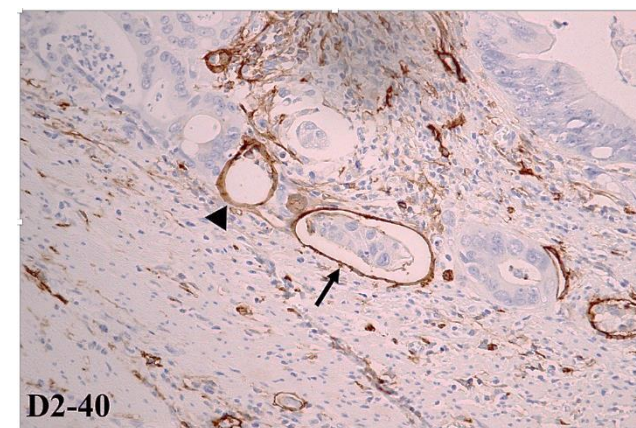
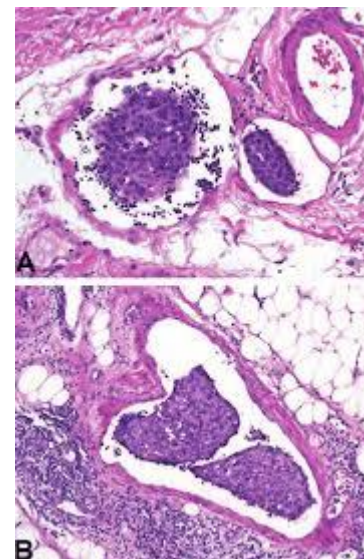
Histologic Type

- Higher LNM and recurrence with
 - Poorly differentiated/undifferentiated (G3/G4)
 - Signet ring cell
 - Mucinous carcinomas
- meta-analysis of 67 studies (n=21,238) independent risk factor for LNM (OR 2.14)
- However, significant interobserver variability, especially with different levels of differentiation in the same specimen
- Current guidelines recommend colectomy with advanced histology



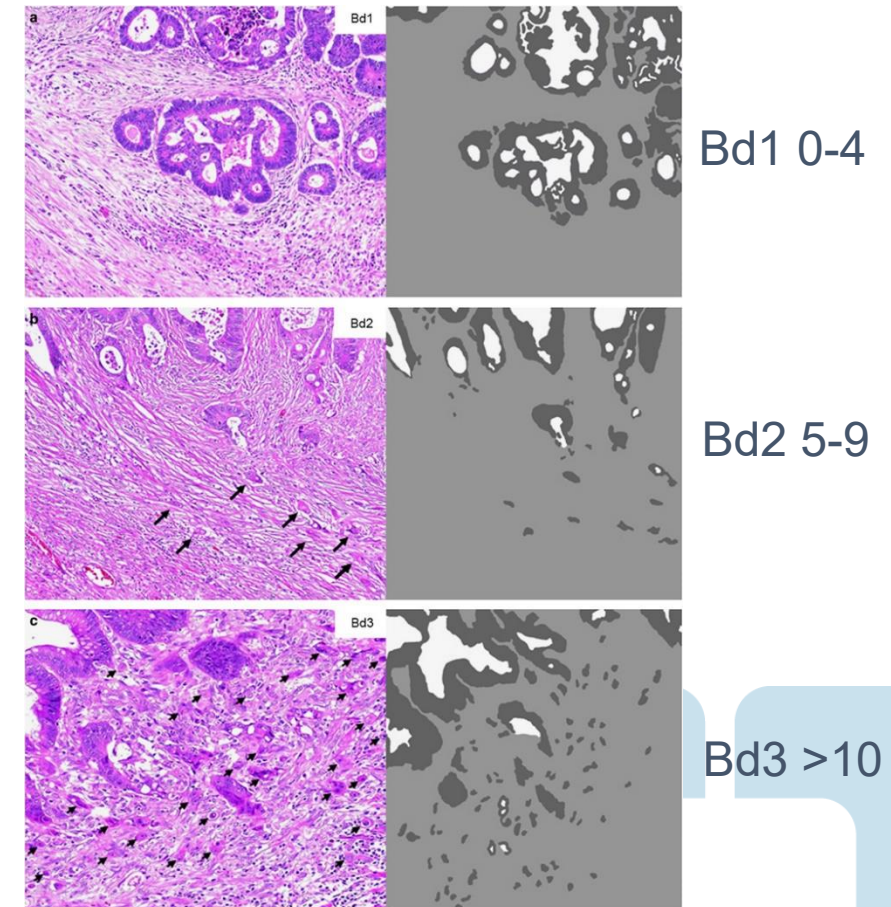
Lymphovascular Invasion (LVI)

- Neoplastic cells in a space bordered by a defined endothelium
- Strongest risk factor for LNM, (RR 5.2)
 - small > large vessel involvement
- Immunostaining enhances detection but significance uncertain
- **Guidelines unanimously recommend colectomy when LVI present**



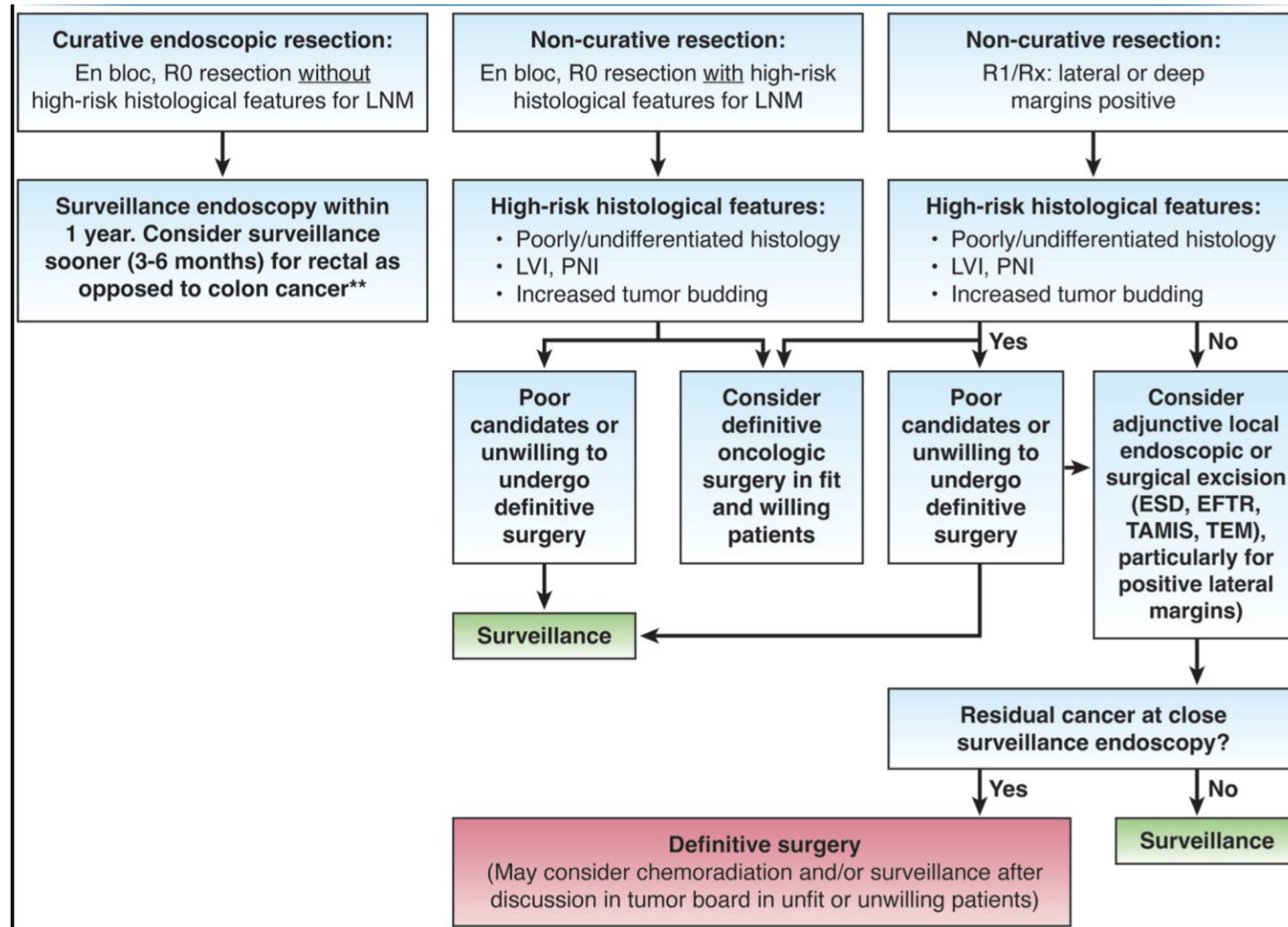
Tumor Budding—Bd 1-3

- Defined as a single tumor cell or a cell cluster consisting of ≤ 4 tumor cells at invasive margin of the polyp
- OR for LNM 2.83
- Guidelines recognize Bd2-3 as significant risk factor for LNM
- More research needed to standardize Bd assessment and reporting



Management

Endoscopically Removed Malignant Polyp



Patient

- 45F with endoscopically completely removed malignant polyp
- In-office flex sig shows scar & tattoo at 20 cm from anal verge (distal sigmoid colon)
- CEA: 2.3
- CT Chest/Abdomen/Pelvis: negative
- Review of pathology:



Path Report

Gross Description:

Colon, Polyp: Received in formalin is a segment of tan-brown polypoid tissue measuring 1.5 x 0.9 x 1.5 cm. No stalk is noted. The line of resection is noted. The specimen is bisected and totally submitted in one cassette.

MARGINS

Margin Status for Invasive Carcinoma	All margins negative for invasive carcinoma
Distance from Invasive Carcinoma to Deep / Stalk Margin	0.1 cm
Distance from Invasive Carcinoma to Peripheral / Lateral Mucosal Margin	0.3 cm
Margin Status for Non-Invasive Tumor	All margins negative for adenoma

Sessile malignant polyp completely removed with negative margins, but high risk for LNM due to + LVI and 2mm SMI (also young and L-sided)

→ Recommendation for oncologic segmental colectomy

SPECIMEN

Procedure Excisional biopsy (polypectomy)

TUMOR

Tumor Site	Sigmoid colon
Histologic Type	Adenocarcinoma
Histologic Grade	 G2, moderately differentiated
Size of Invasive Carcinoma	Greatest dimension (Centimeters): 0.5 (maximum dimension as measured on slide) cm
Tumor Extent	 Invades submucosa
Depth of Sub-mucosal Invasion	 2 mm
Lymphatic and / or Vascular Invasion	 Small vessel
Perineural Invasion	 Not identified
Tumor Budding Score	 Low (0-4)
Type of Polyp in which Invasive Carcinoma Arose	Tubulovillous adenoma
Polyp Size	Greatest Polyp Dimension (Centimeters): 1.5 cm
Polyp Configuration	Sessile
Tumor Dimension(s)	Greatest dimension (Centimeters): 0.5 (maximum dimension as measured on slide) cm

MMR Interpretation

Proficient (Microsatellite Stable)

45F with Malignant Polyp

Laparoscopic Sigmoid Resection

FINAL DIAGNOSIS

A. Colon, Sigmoid, Resection

- Segment of colon with focal submucosal fibrosis, consistent with prior polypectomy site changes (see comment)
- Negative for dysplasia and adenocarcinoma
- Foreign pigment consistent with localization tattoo
- Negative for metastasis in thirty-four of thirty-four lymph nodes (0/34)

B. Lymph Node, Apical IMA, Excision

- Negative for metastasis in one of one lymph node (0/1)

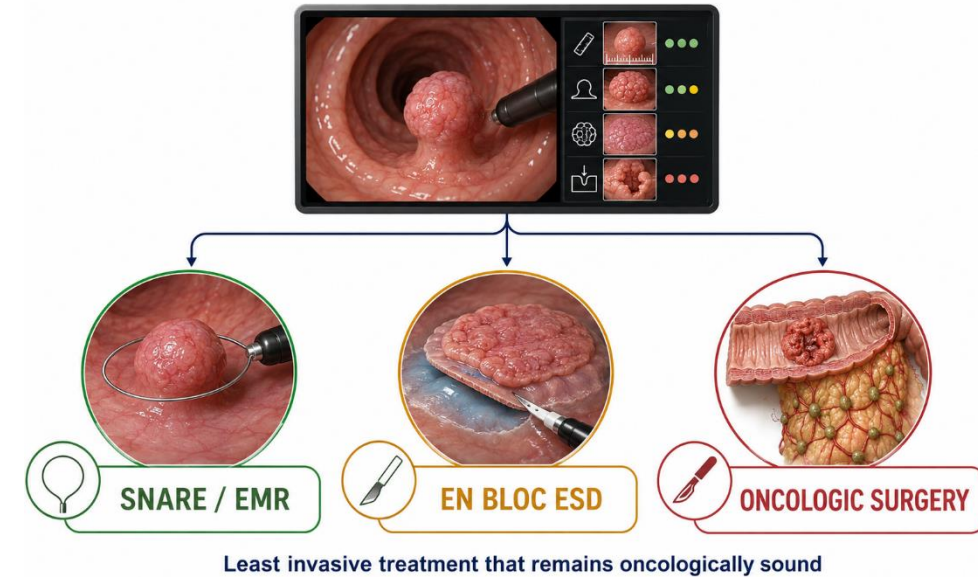
- Majority of colectomy specimens (60-80%) have no residual disease following complete endoscopic resection of malignant polyps, even when high-risk features present.
- → Concern about overtreatment
- → Highlights the need for novel diagnostic modalities to improve risk stratification and selection for surgery

Take Home Message

Precision Management of Colorectal Polyps

Optimal Treatment Requires Optimal Assessment

- Before resection
 - Comprehensive endoscopic lesion characterization
 - →Least invasive oncologically sound resection technique
- After Resection of Malignant Polyp
 - Comprehensive histopathologic assessment
 - Margin, SMI depth, differentiation, LVI, tumor budding
 - Risk stratification and patient centered discussion



Shukran!



Cleveland Clinic

Every life deserves world class care.