Endoscopic Recognition and Management Strategies for **Malignant Colorectal Polyps**: Recommendations of the US Multi-Society Task Force on Colorectal Cancer

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Goal: Review endoscopic features of lesions associated with cancer and provide guidance on management of these lesions

What is a Malignant Polyp?

- A colorectal lesion with cancer invading submucosa **but not extending** into the **muscularis propria**
- AKA submucosally invasive lesion, carcinoma in situ, or intramucosal carcinoma
- Should NOT be confused with invasive colon cancer

Optimal management is based on *endoscopic diagnosis*

Before endoscopic resection, every colorectal lesion detected should be assessed based on: *morphology*, *surface*, and *vessel pattern*, to help identify lesions with high risk of deep submucosal invasion or not.

Endoscopic *surface* pattern classifications

1) Narrow Band Imaging International Colorectal Endoscopic Classification (NICE)
-Type 1 (serrated class: either hyperplastic or sessile serrated polyp)
-Type 2 (conventional adenoma)
-Type 3 (lesions with disruption of surface pattern and vessel structure)
-Specific (but not sensitive) for deep submucosal invasive cancer
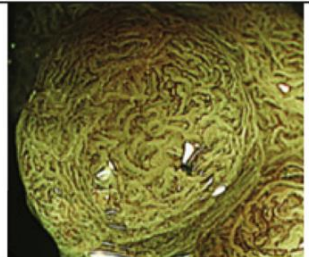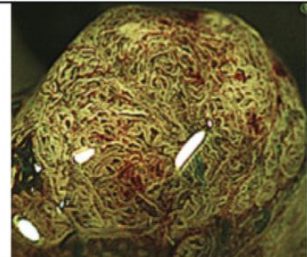
2) JNET classification
-NICE is limited due to difficulty in distinguishing low grade dysplasia, high grade dysplasia, and superficial submucosal invasion in type 2 lesions
-Divides NICE type II into JNET 2a and 2b (assoc with high grade dysplasia and superficial submucosal invasion)

Table 3. Narrow Band Imaging International Colorectal Endoscopic Classification

Variable	Type 1	Type 2	Type 3
Color	Same or lighter than the background	Brown relative to background	Brown or black relative to background
Vessels	None or isolated lacy vessels	Brown vessels surrounding white structures	Has areas of disrupted or missing vessels
Surface pattern	Dark or white spots of uniform size	Oval, tubular, or branched white structures	Amorphous or absence of pattern
Most likely histology	Hyperplastic or serrated polyps (sessile serrated polyp)	Adenoma to superficial submucosal invasion	Deep submucosal invasion

Table 4. Japanese Narrow Band Imaging Expert Team Classification

Characteristics	Colors	Type 2A	Type 2B	Type 3
Vessel pattern	Invisible	Regular caliber Regular distribution	Variable caliber, irregular distribution	Loose vessels areas, interruption of thick vessels
Surface pattern	Regular dark or white spots similar to surrounding mucosa	Regular tubular or branched or papillary	Irregular or obscure	Amorphous areas
Most likely histology	Hyperplastic polyp or sessile serrated polyp	Low grade intramucosal neoplasia	High-grade intramucosal neoplasia/superficial submucosal invasive cancer	Deep submucosal invasive cancer

NBI		Type 2B	
		2B-low	**2B-high**
Vessel pattern		· The thickness and distribution of irregular vessels are uniform	· The diameter and/or distribution of irregular vessels are heterogeneous
Surface pattern		· Irregularly in the pit-like pattern network · Smooth pit-like structure margin without ravaging	· Irregular and destroyed pit-like pattern · Irregular, fluffing, and unclear pit-like structure margin
Examples			

By Andrew Yu

Endoscopic *surface* pattern classifications (*cont.*)

3) Kudo Pit Pattern Classification
-Requires magnification colonoscopy with dye spare and allows for evaluation of malignant polyps through characterization of pits, which are openings for crypts
-6 patterns
-Type I and II: characteristic of normal, serrated, or inflammatory polyps
-Type III – V: considered to indicate dysplastic and malignant changes

I		Round pit (normal pit)
II		Asteroid pit
IIIs		Tubular or round pit that is smaller than the normal pit (type I)
IIIL		Tubular or round pit that is larger than the normal pit (type I)

IV		Dendritic or gyrus-like pit
VI		Irregular arrangement and sizes of IIIL, IIIs, IV type pit pattern
VN		Loss or decrease of pits with an amorphous structure

Endoscopic *morphologic* pattern classifications

1) Paris Classification – Describes 3 superficial morphologies
• polyploid, flat, and excavated
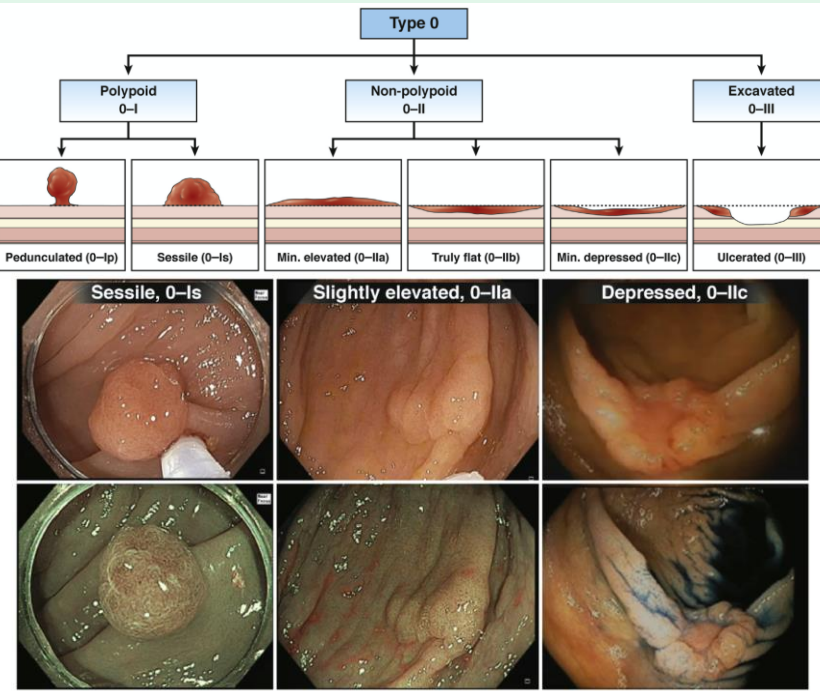
2) Lateral Spreading Tumor (Lesion)
>10 mm, flat, or sessile shape, extend laterally along colonic wall
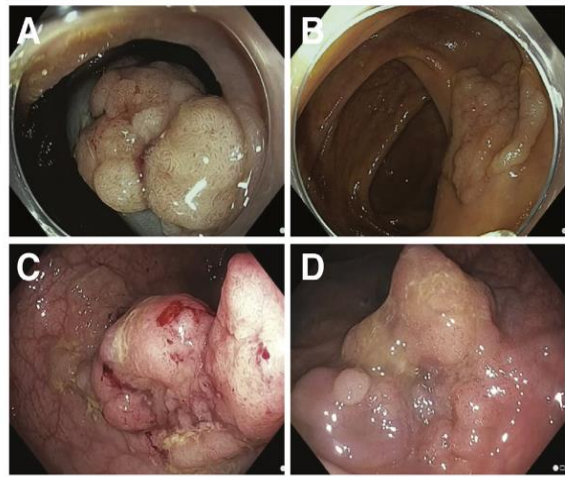Two types: LST-G (nodular) and LST-NG (smooth)

Figure 5. Granular laterally spreading tumors (LST-G). (*A, B*) Nodular surface. (*C, D*) mixed nodular morphology.

LST-G (granular) - Nodular surface
• Either even sized or mixed sized nodules
  •Even sized nodules
    • Low risk of developing submucosal invasion(<2%) or significant fibrosis regardless of size
  •Mixed sized nodules
    • high risk of submucosal invasion
      • 7.1% for lesions <20 mm
      • 38% for lesions >20 mm
      • Try to remove the largest nodule in 1 piece when feasible

LST-NG (nongranular) - Smooth surface
• Flat elevated and pseudodepressed subtypes
•Often have submucosal fibrosis which can make simple snare or EMR challenging
• High risk of submucosal invasion
• Nongraunular depressed
  •27.8% in 10-19 mm
  •41.4% in 20-29 mm
• Nongranular flat
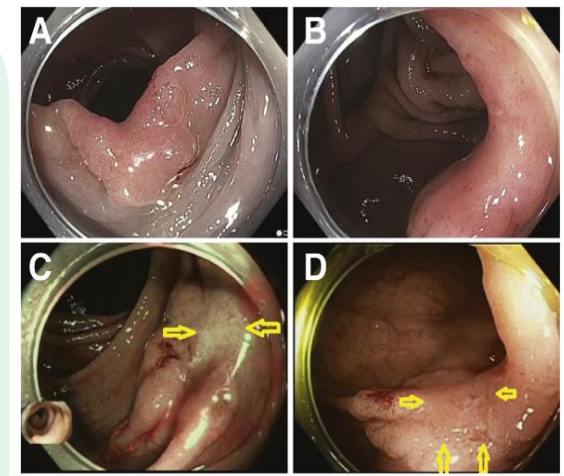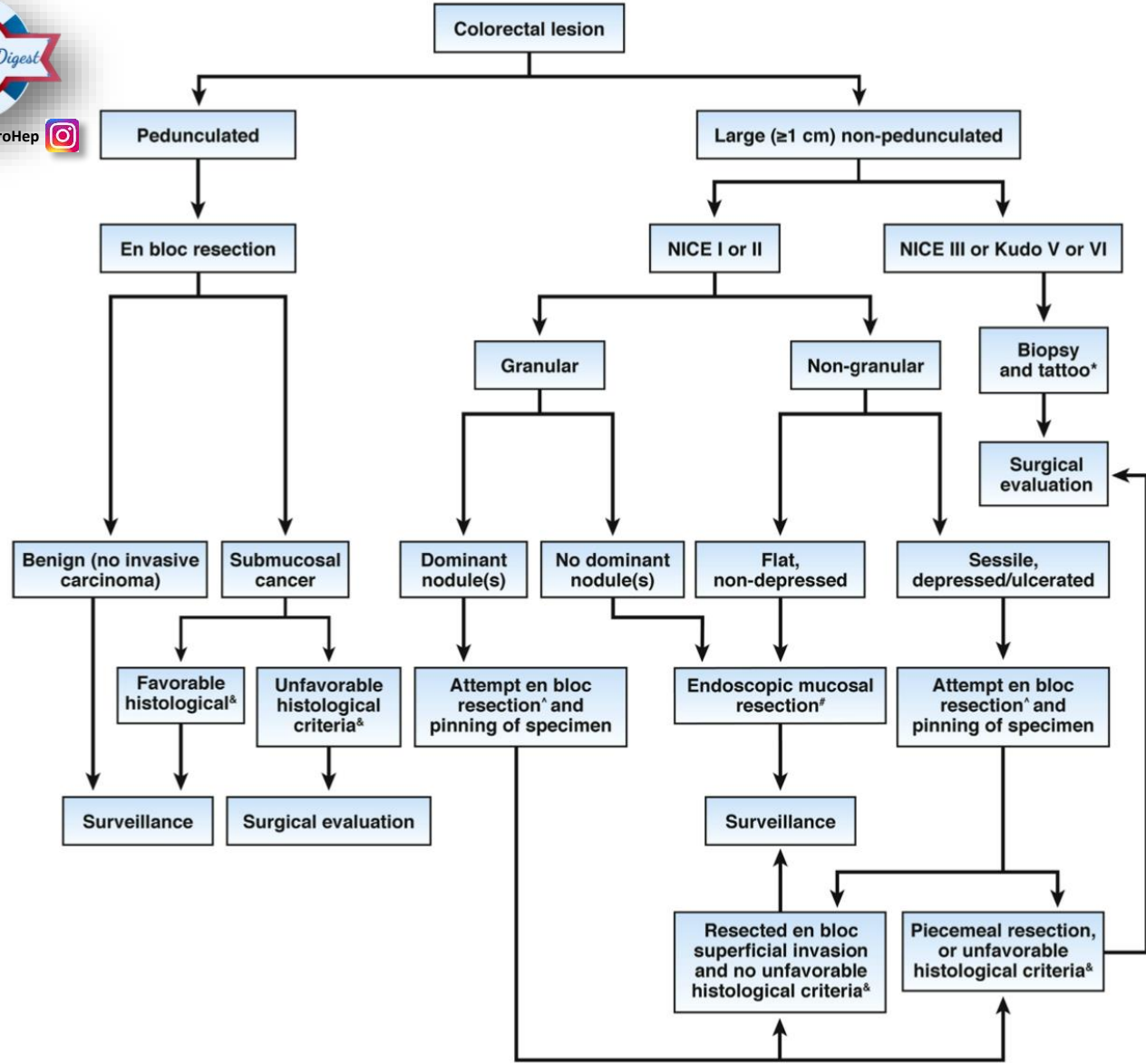 •6.4% in 10-19 mm
  •10.4% in 20-29 mm

Figure 6. Nongranular laterally spreading tumors (LST-NG). (*A, B*) Smooth surface. (*C, D*) Pseudodepressed.

3) Non-lifting Sign
• When Injecting fluid underneath polyp fails to lift it
• Suggests deep submucosal invasion or fibrosis (if there was prior biopsy, cautery, or tattoo)

Figure 9. Algorithm for approach to malignant polyp assessment and management.

Flowchart text:

- Colorectal lesion
  - Pedunculated
    - En bloc resection
      - Benign (no invasive carcinoma)
        - Favorable histological[&] → Surveillance
      - Submucosal cancer
        - Unfavorable histological criteria[&] → Surgical evaluation
  - Large (≥1 cm) non-pedunculated
    - NICE I or II
      - Granular
        - Dominant nodule(s) → Attempt en bloc resection[^] and pinning of specimen
        - No dominant nodule(s)
      - Non-granular
        - Flat, non-depressed → Endoscopic mucosal resection[#] → Surveillance
        - Sessile, depressed/ulcerated → Attempt en bloc resection[^] and pinning of specimen
      - Resected en bloc superficial invasion and no unfavorable histological criteria[&]
      - Piecemeal resection, or unfavorable histological criteria[&]
    - NICE III or Kudo V or VI
      - Biopsy and tattoo* → Surgical evaluation

*Tattoo not required for cecal polyps. Tattoo should be targeted near the base of the polyp as well as to the opposite lumen wall.

[#]Piecemeal if size >20mm.

[^]If low likelihood of complete removal, the areas near the polyp should be tattooed and resection should be referred to endoscopists or centers with more experience at endoscopic mucosal resection.

[&]Unfavorable histologic criteria are: depth of submucosal invasion >1mm, polypectomy margins positive for tumor cells, poor grade of differentiation, tumor budding or lymphovascular invasion.

Question 1: Which endoscopic features in a colorectal polyp predict submucosal cancer?

NICE classification type 3 or Kudo classification type V

Question 2: When deep submucosal cancer is suspected, how should nonpedunculated and pedunculated polyps be managed?

Nonpedunculated lesions:
- Should be biopsied and tattooed, and referred to surgery
- NICE 3 features had 94% accuracy and 96% negative predictive value.

Pedunculated lesions:
- Endoscopic polypectomy, en bloc through stalk

Question 3: Which endoscopic features predict risk of superficial submucosal invasion in a *sessile* polyp?
- LST-NG morphology with sessile shape or depression
- LST-G morphology with dominant nodule

Question 4: What is the optimal endoscopic method of resection for sessile and pedunculated malignant polyps with superficial submucosal invasion?

- En bloc endoscopic resection, instead of piecemeal resection, when feasible
- In LST-G, at least the nodular area should be considered for en bloc resection
- All pedunculated polyps should be resected en bloc.

Question 5: Which histologic features in non-pedunculated malignant polyps are associated with lymph node metastasis and therefore an increased risk of local or regional recurrence?

Poor tumor differentiation, lymphovascular invasion, submucosal invasion depth > 1 mm, tumor involvement of the cautery margin, or tumor budding

Question 6: Which histologic features in pedunculated malignant polyps are associated with lymph node metastasis and therefore an increased risk of local or regional recurrence?

Poor tumor differentiation. lymphovascular invasion, tumor within 1 mm of resection margin