Taking The Polyp Out

Optimizing Polypectomy During Colonoscopy

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Objectives

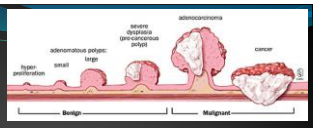
- Review uncomplicated polypectomy
  - Real time assessment/characterization of lesions
  - Best practice polypectomy technique
- Discuss the basics of complex polypectomy/EMR
- Tattooing – basic, but critical tool!
  - How to do it well.

Colonoscopy and Polypectomy

- Polypectomy reduces CRC incidence and mortality.
- Lower quality colonoscopy is associated with interval cancers and death from missed cancers.
- **If you do colonoscopy you must do it well!**
  - Polyp detection, characterization, and resection*

1.Winawer et al. NEJM 1993. 329:1977-1981
2.Zauber et al. NEJM 2012. 366:687-696
3. Corley et al. NEJM 2014. 370:1298-306

Polyps



- > 90% of polyps are < 10mm, do not contain advanced histology and require standard techniques
- ASGE Quality Metric: < 2% of pedunculated polyps and sessile polyps <2 cm should go to surgery
- Polyps demanding advanced skills less common.
- Most of the work can be done by all well trained endoscopists.

- …important to recognize one's limitations
  - Not always skill – time, equipment, assistance, etc.

Lesion Assessment – Standards

- Endoscopy reporting is a key quality metric!
- Location
  - Estimation of region vs. cm from anal verge
  - "polyp found and removed from colon" – NOT adequate!
- Size
  - Use measurements (mm) NOT vague descriptors
    - (e.g.. diminutive, small, large, "gigantic"…)
- Morphology
  - Flat, sessile, pedunculated, depressions, smooth vs. granular
  - More on this…
- Is it amenable to endoscopic resection?

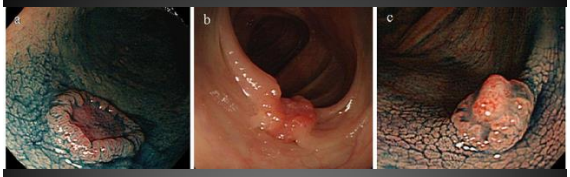
Endoscopy vs. Surgery

- Size is not a factor
  - Extensive colonic lesions limited to mucosa can be removed via EMR
  - Unique absence of lymphatics in colonic mucosa

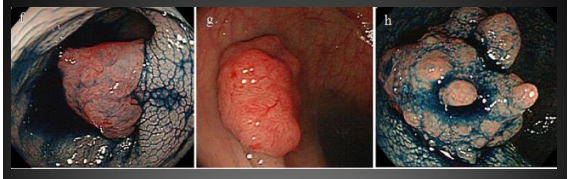
- **Three major questions:**
  - Is there suspicion of submucosal invasion (SMI)?
  - Is the lesion in an area that precludes EMR?
  - Does the patient have comorbidities that preclude even moderate risk procedures like EMR?

High-risk Stigmata of SMI
General Appearance

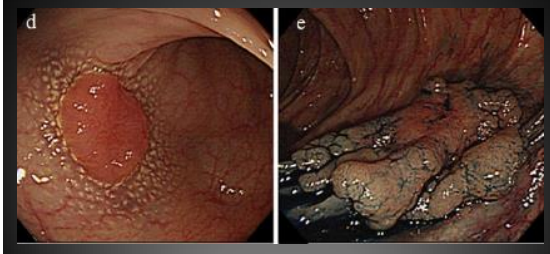
- Deep depression
- Fold convergence
- Irregular bottom of depression surface
- White spots ("chicken skin")
- Erythema
- Expansion
- Firm consistency
- Loss of lobulation
- Thick stalk



Deep Depression | Fold Convergency | Irregular Base

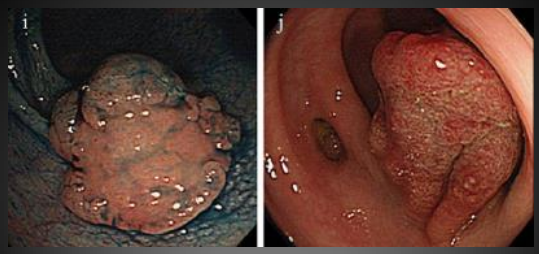


Surface Expansion | Firm Consistency | Irregular Lobulation



Chicken Skin Appearance

Erythema



Loss of Lobulation

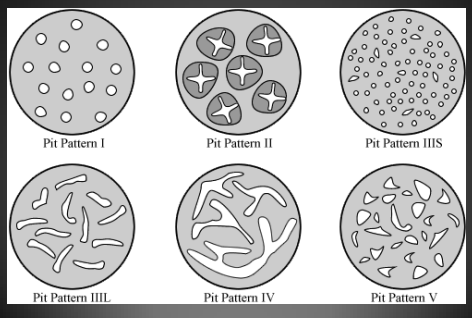
Thick Stalk

Kudo Pit Pattern

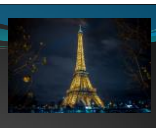
- Classification scheme developed by Kudo et al.
  - Kudo et al. GIE 1996. 44:8-14
- Pit morphology (magnifying colonoscopy) associated with crypt histopathology
- 5 general types of pit patterns

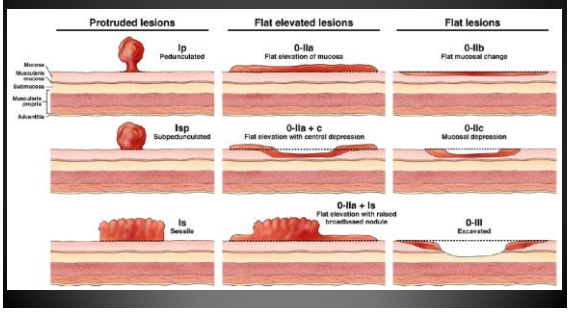
- Type 5 pit pattern associated with invasive cancer

Kudo Pit Pattern



Paris Classification



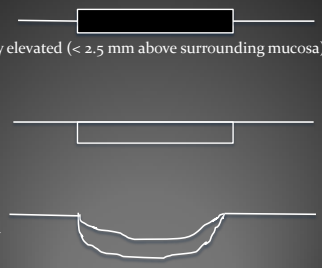


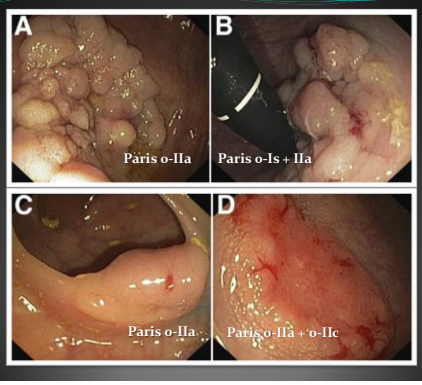
Mucosal Lesions – Polyps

- 0-Ip
  Pedunculated polyp
- 0-Is
  Sessile polyp
  - > 2.5 mm above surrounding mucosa

Flat and Flat Elevated Lesions

- o-II a
  - minimally elevated (< 2.5 mm above surrounding mucosa)
- o-II b
  - flat
- o-II c
  - depressed



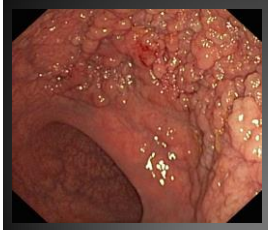


Depressions ("Potholes") Are Bad!

- SMI risk:
  - Flat 3%
  - Depression with/without raised edges ~ 45%

DG MacIntosh MD MSc FRCPC

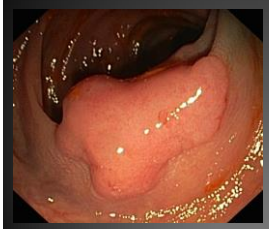
Granular Lesions



- Granules are good!
- Size does not predict SMI
- SMI <5% for granular lesions

- Moss Gastroenterology 2011

Non-Granular Lesions



- More likely to have SMI
- RR ~ 3 (5% vs 18%)
- Add depressions – up to 65%

- Moss Gastroenterology 2011

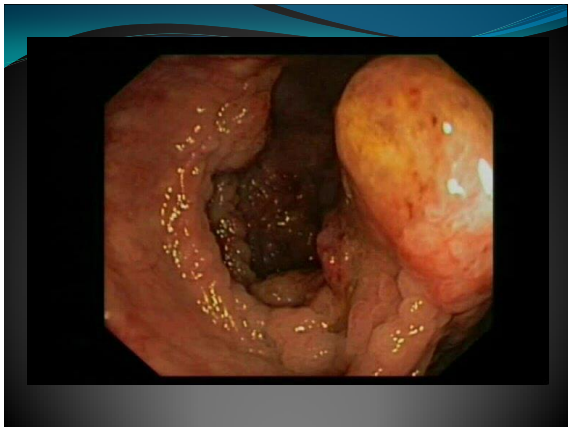
Lesion Assessment - Summary

- Risk of SMI ++ increased with depressed lesions
  - Depressed (0-IIc) or focal depression (0-IIa + c) associated with 15-20% risk of SMI
- >70% of advanced lesions are Paris 0-IIa or 0-IIa + Is, >90% of these are granular
  - 1-5% chance of SMI

What About Location?

"location, location, location"

- **Anorectal Junction**
  - Increased risk of pain with lesions adjacent to dentate line
    - Long acting analgesia injection (Marcaine 1%) or topical lidocaine (1%) may be needed post-procedure.
  - Prophylactic antibiotics
    - Increased risk of systemic bacteremia from repeated SM injections with involvement of porto-systemtic collaterals bypassing portal circulation and reticuloendothelial system
    - Recommended in recent polypectomy technical review.
      - Burgess et al. GIE 2015. 813-35.



- **Periappendiceal**
  - Lesions at this location can usually be resected endoscopically if <50% of circumference is involved and the proximal margin within the appendiceal orifice is visualized and accessible.
  - Limit SM injection to prevent "burying" proximal margin in the orifice.
  - Limit electro-cautery where possible to avoid thermal injury-triggered appendicitis.

- **Ileocecal Valve (ICV)**
  - Advanced lesions here have a higher risk of reoccurrence
    - Factors associated with failure and recurrence: ileal infiltration and involvement of both ICV lips
      - Nanda et al. Endoscopy 2015. [Epub ahead of print]
  - Both antegrade and retroflexed positions often necessary
  - Theoretical risk of ICV stenosis post-resection
    - clinically rare occurrence

Polyp found and characterized … so now what?

Uncomplicated polypectomy

- Polyps < 10mm,
- No high risk stigmata and favorable location
- Wide variety of tools available…
- Choice of the tool based on situation and personal preference
  - As long as it's a snare!

Small Polyp Removal

- **Cold biopsy forceps**
  - Quick, easy to use and cheap
  - Associated with significant rates of incomplete polyp removal, increased recurrence rates and interval CRC
  - Efthymiou et al. conducted en bloc snare resection of surrounding mucosa of 5mm polyps removed with cold biopsy forceps[1]
    - 61% of these sites had residual adenomatous tissue!
- In general DO NOT USE!
  - Only for diminutive (1-2mm) polyps not amenable to snare removal

1. Efthymiou et al. Endoscopy 2011. 43(4): 312-316

Small Polyp Removal

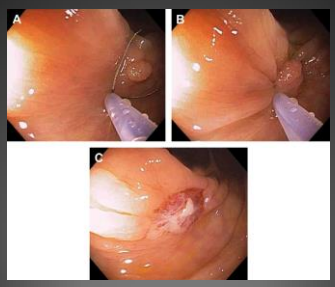
- **Hot Biopsy forceps**
- Once popular, now out of favor.
  - Increased complication rates compared to snares
  - Poor quality of specimen histology due to cautery artifact
  - Same (POOR) quality of polyp eradication as cold biopsy forceps[1,2]
- DO NOT USE

1. Monkemuller,KE et al. Endoscopy. 2004. 36(5) 432-436
2. Paspatis GA et al. Colorectal Dis. 2011. 13 (10): 345-348

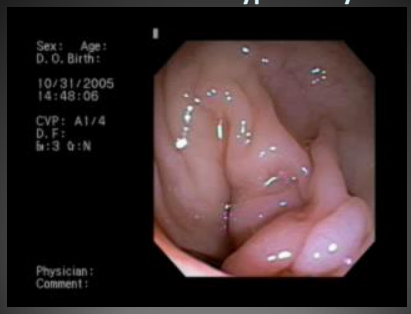
Small Polyp Removal

- Snare polypectomy – gold standard
- Technique:
  - Polyp position → 6 O'clock
  - Aim to capture 1-2mm of normal tissue around polyp
- Hot vs. Cold?
  - No significant difference in removal rate
  - Cold for polyps <8mm, hot snare for larger
  - Increased **non-important** immediate bleeding with cold compared to increased delayed bleeding and post-polypectomy syndrome rates with hot snare.
  - COLD IS BECOMING THE STANDARD

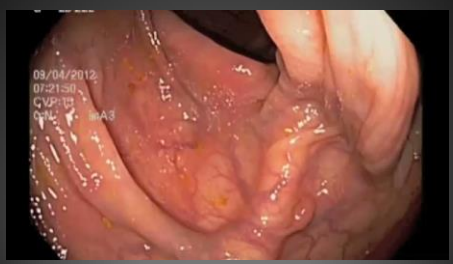
Cold Snare Technique



Cold Snare Polypectomy



Less Optimal Technique



Key points: Small Polyps

- Majority of polyps < 10mm
- Cold forceps biopsy is associated with high rates of incomplete removal - AVOID
- Hot forceps should also be avoided - associated with high complication rates, incomplete removal
- Cold snare polypectomy is gold standard

What if it's Large?

Large Polyps

- **Advanced mucosal neoplasia (AMN)**
  - >10mm, components of villous (tubulovillous or villous) or serrated histology or evidence of high-grade dysplasia (HGD)
  - Can be pedunculated or sessile
  - ~10% of adenomas detected are sessile lesions >10mm[1]
  - Sessile lesions have greater frequency of HGD and early invasive disease compared with polypoid lesions of equivalent size

1. Rotondano et al. Endoscopy. 2011. 43: 856-861

Laterally Spreading Tumors - LST

- Grow laterally along the surface of the bowel
- Size doesn't matter
  - May reach an enormous size before demonstrating invasive features
- Common AMN
  - Paris 0-II (a – minimally elevated & b - flat) and O-Is (elevated) polyps often >20mm in size

Treatment of AMN

- Surgical excision
- Endoscopic mucosal resection (EMR), endoscopic submucosal dissection (ESD)
- **EMR**
  - First described in 1973[1]
  - Multiple prospective multicenter trials have demonstrated that wide field EMR is safe and effective
  - Prospective data demonstrates a net health care savings of US $10,000 and 6 days in hospital per patient in comparison to ideal surgical outcome without complication[1]

1. Swan et al. Gastrointest Endosc 2009;70:1128–1136.

EMR Outcomes

- Large multi-centered, prospective trial (479 patients[1])
  - EMR effective (complete, single session) in 89.2%
    - No associated mortality
  - Risk factors associated with EMR failure:
    - prior attempted EMR (OR 3.8, p = 0.001)
    - ICV involvement (OR 3.4, p = 0.021)
  - Predictors of recurrence:
    - Size >40mm (OR 4.37, p < 0.001)
    - APC of residual tissue (OR 3.51, p = 0.0017).

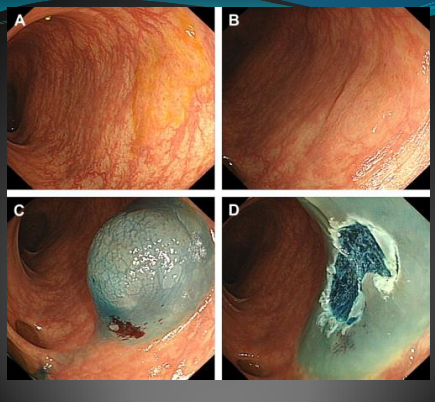
Moss et al. Gastroenterol 2011: 1909-1918.

EMR Technique

- **Submucosal injection**
  - Fluid "cushion" between the mucosa and muscularis propria (MP)
  - Reduces risk of perforation and transmural thermal injury
  - "**Lift sign**" to identify SMI
  - Ideally inexpensive, easy to use while providing sustained, well-circumscribed mucosal elevation
  - Normal saline most common but colloid solutions reported to be superior in studies

EMR Technique

- **Submucosal injection solution**
  - **Methylene blue / Indigo carmine**
    - Biologically inert blue dyes that are avid for loose areolar tissue in the SM layer
    - Confirms resection in the correct tissue plane
    - Helps delineate polyp borders
  - **Dilute epinephrine (1:50-100,000)**
    - Added to injectate by some physicians
    - Bloodless resection field, but higher risk of delayed polypectomy bleeding



Methylene Blue

0.1 ml in 50 cc minibag

EMR Technique

- **Resection Technique**
  - Inject and resect
  - As few pieces as safely possible
  - En bloc resection for lesions up to 20mm right colon and 25mm in the left colon
    - More accurate histology, reduced risk of recurrence
  - Include 2-3mm margin of normal mucosa
  - Exam borders with white light endoscopy and NBI to ensure complete resection of polyp
  - Endocut
    - Electrosurgical current controlled by microprocessor

EMR Technique

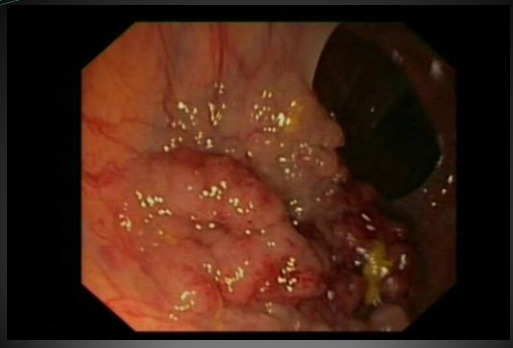
- **Snares**
  - Evaluation of the lesion size, morphology and location allows for the selection of the most appropriate snare

EMR Technique

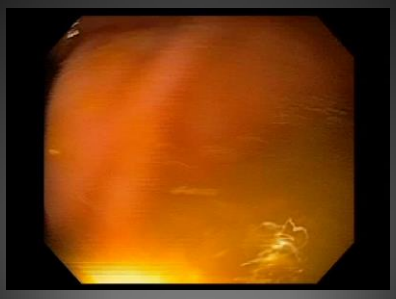
- **Other Important Considerations**
  - Give yourself enough time! (1 hour)
  - Don't do during index procedure – consent?
  - Ensure you have an experienced nurse
    - 2 RNs extremely helpful at times
  - Ensure equipment readily available
    - Injection solution (colloid + dye)
    - Devices for complications – clips, ? Hemospray
  - Cases should be done with CO_2

EMR Technique

- Technique equally applicable to lesions 1-2cm in size
- Proper technique minimizes need for repeat attempts at polypectomy and optimizes patient outcomes



2.5 cm Sessile Polyp - Cecum



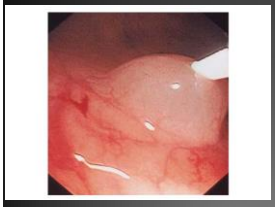
Post-EMR Tattooing

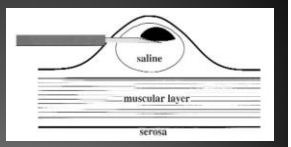
- **When**:
  - Concern re potential malignant polyp, piecemeal resection of polyp for later identification, preparation for surgical resection
- **Where**?
  - Outside of the cecum or rectum
- **What?**: sterile carbon particle suspension (SPOT)

Post-EMR Tattooing

- **How** **Moss et al. GIE 2011. 74:214-18**
  - ~3cm *distal* and inline with site
    - Distal means towards anus
    - NEVER into the lesion
  - If surgery – at <u>least</u> 2 locations
    - 2nd on opposite wall to first
    - Mesenteric vs. anti-mesenteric border
  - Create a saline "bleb" to identify correct plane then inject SPOT into cushion
  - No more than 3cc of SPOT

Post-EMR Tattooing





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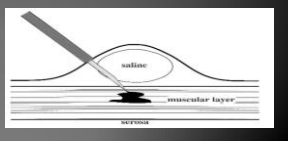
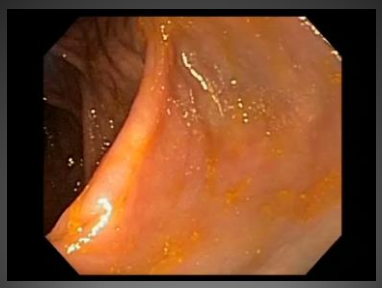
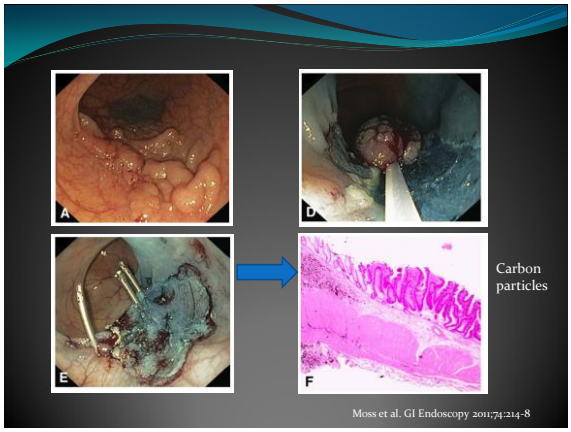


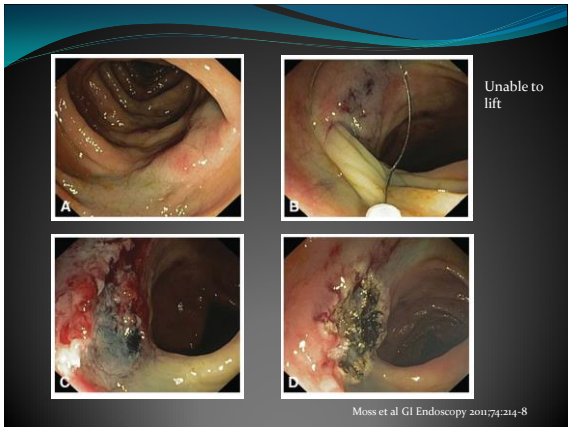
Tattooing Technique Video



Post-EMR Tattooing

- **Complications – when done incorrectly**
  - **Transmural injection**
    - Serosal inflammation, abscess, peritonitis
    - Fibrosis, adhesions
  - **Direct tattooing of polyp site itself**
    - SM fibrosis
      - Difficult to lift, higher risk of perforation
  - **Failure to identify site!**

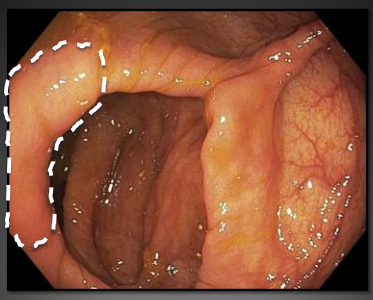


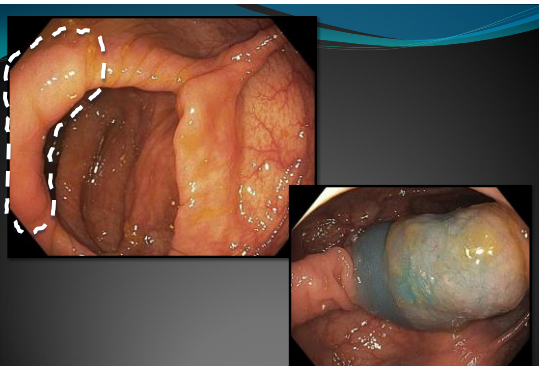


Take Home Points: EMR

- Meticulous evaluation is critical
- Size is not a limiting factor to complex polypectomy
  - Endoscopic appearance and "lift" more significant
- Should be done by trained individuals
  - Only start if YOU can confidently finish
    - High risk of complications/poor outcomes with 2nd attempt
- Have everything you need including consent and time!
- Piecemeal resection mandates an early relook
- Tattooing is critical – so is doing it properly!

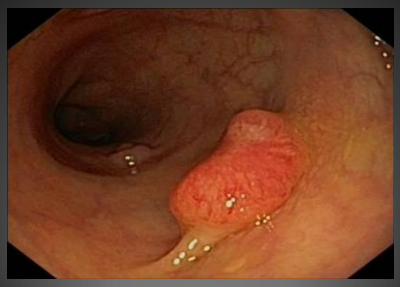
Cases





Dx: Portions of Sessile Serrated Adenoma

What about this?



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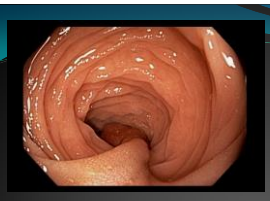
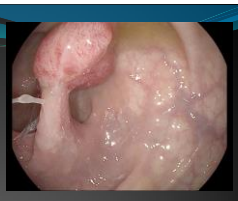
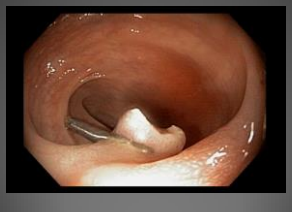
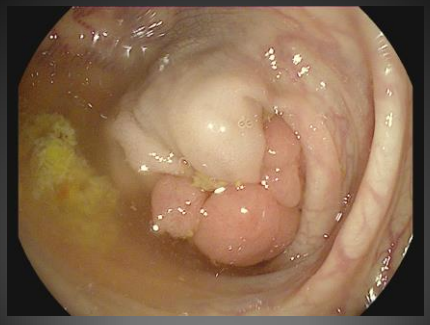
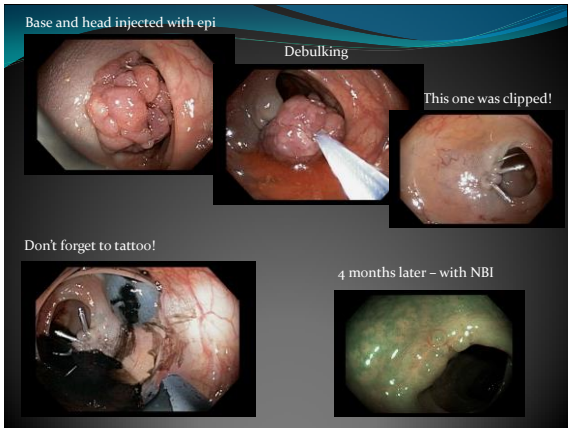


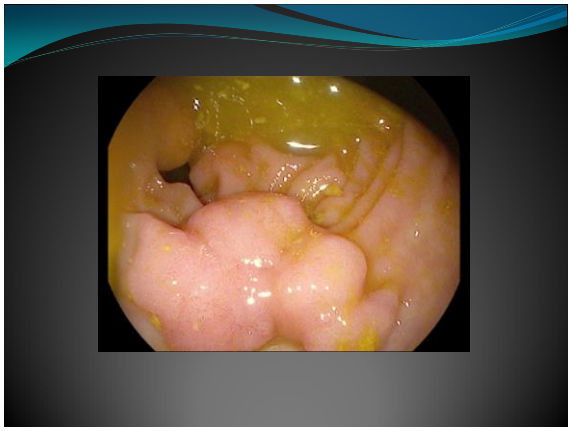


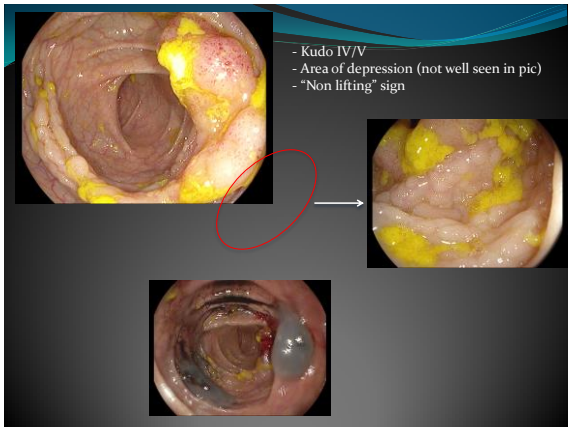


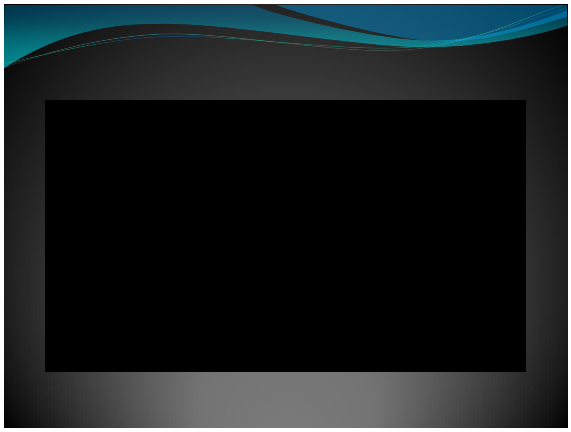
Large Pedunculated Polyp – Descending

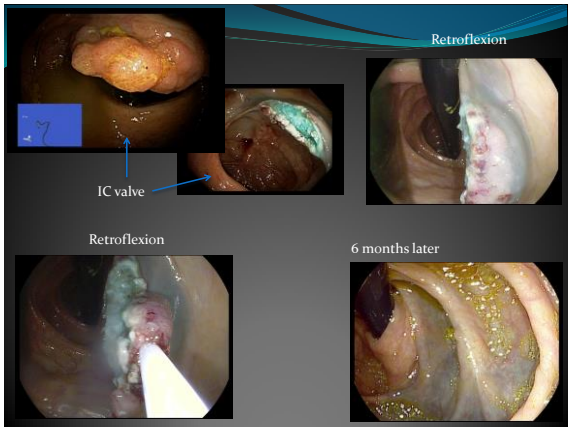


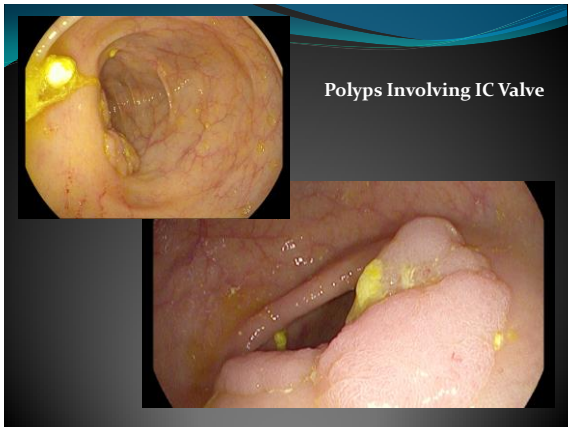

Base and head injected with epi
Debulking
This one was clipped!
Don't forget to tattoo!
4 months later – with NBI




- Kudo IV/V
- Area of depression (not well seen in pic)
- "Non lifting" sign




Retroflexion
IC valve
Retroflexion
6 months later


Polyps Involving IC Valve