



# Polypectomy and EMR

## From the Diminutive to the “Difficult” Polyp

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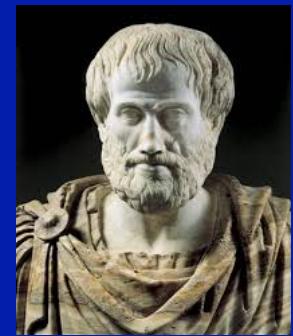
# Disclosures

Consultant: Boston Scientific, Cook Medical, Covidien Medical

# Do we know how to learn?

“What we have to learn to do, we learn by doing...”

*Aristotle*



Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.

*Douglas Adams (Hitchhikers Guide to the Galaxy)*

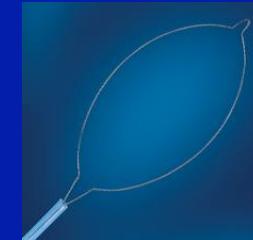


# Objectives

- Demonstrate and utilize proper classification of colon polyps
- Review literature and evidence for current EMR techniques
- Review clinical and technical pearls for advanced polypectomy
- Demonstrate advanced polypectomy techniques using video based learning



# Forceps or Snare That is the question



- RCT to compare complete histologic polyp eradication of SP vs. BF
- Included diminutive polyps (1-5mm)
- 70% tubular adenomas
- BF: 2 bites/pass c LC, SP: mini-snare
- Histologic eradication: SP: 93%, BF:75%
- Conclusion: Cold snare polypectomy is superior for complete polyp eradication than standard LC biopsy forceps

# Large Colorectal Polyps

## Endoscopy or Surgery

- Prospective study of 174 patients with 193 polyps
- Referred for surgical resection (Difficult polyps)
- 173 polyps excised with EMR
  - 58 en bloc, 115 piecemeal
  - 11 patients were referred for surgery due to suspicion of cancer based on appearance
  - 7 pedunculated polyps removed and excluded
  - 2 did not undergo EMR for other reasons
  - 6 patients with CA, 5/6 removed by EMR
- Technical Success: 95% (157/168) treated endoscopically
- No perforation

# Large Polyp Resection

Author(s)/year	Polyps (sessile)	Size (mm)	En-bloc resection (%)	Piecemeal resection (%)	Cancer rate (%)	Bleeding (%)	Perforation (%)	Postpolypectomy syndrome (%)
Stergiou N, et al. <sup>55</sup> 2003.	68 (41)	>30	38	62	12	22	0	0
Church JM. <sup>56</sup> 2003.	263 (all)	>20	30	70	6	6.5	0	0.8
Doniec JM, et al. <sup>57</sup> 2003.	186 (141)	>30	11	89	9	18	0.7	0
Conio M, et al. <sup>31</sup> 2004.	136 (all)	>20	0	100	13	11	0	4
Pérez Roldán F, et al. <sup>58</sup> 2004.	147 (74)	>20	49	51	2.7	5.4	1.3	0
Arebi N, et al. <sup>59</sup> 2007.	161 (all)	>20	0	100	2.5	4	0	2.5
Overhiser AJ, Rex DK. <sup>45</sup> 2007.	184 (all)	>20	15	85	16*	7.3	1.1	0.6
Swan MP, et al. <sup>44</sup> 2009.	193 (186)	10–80	34	66	5.5	3.7	0	6.4

# General Considerations for Polypectomy/EMR

- Size: >2cm
- Morphology: Sessile, depressed (Paris Classification)
- Location: IC Valve, Flexure, Dentate line, Peri-appendiceal, behind folds
- Previous Manipulation: Hot biopsy, Snare (resultant scar)
- Medications: Anticoagulation and antiplatelet

# Preparation for Advanced Polypectomy

- Preparation is critical
- Block out enough time
- Anesthesia if needed
- Use CO<sub>2</sub>
- Pediatric colonoscope with power flush
- Consider use of distal attachment (CAP)
- Gastroscope available
- Understand and know your electrosurgical generator
- Variety of Snares
- Submucosal Injectate (Saline and Dye, +/- Epi)
- Accessories: Clips, Coag Grasper, endoloop, retrieval net, APC
- Patience

# Inspection of Lesion

- Ask yourself “Can I take this ALL out”
- If not, leave it alone! (cold biopsy ok)
- #1 Predictor of failure: Prior attempt (OR 3.8)
  - CARE STUDY 10.1% of polyps incompletely removed)
- Clean the area thoroughly
- Inspect for areas of suspected malignancy
- Palpate the polyp with forceps
- Use NBI
- Mark the borders prior to resection

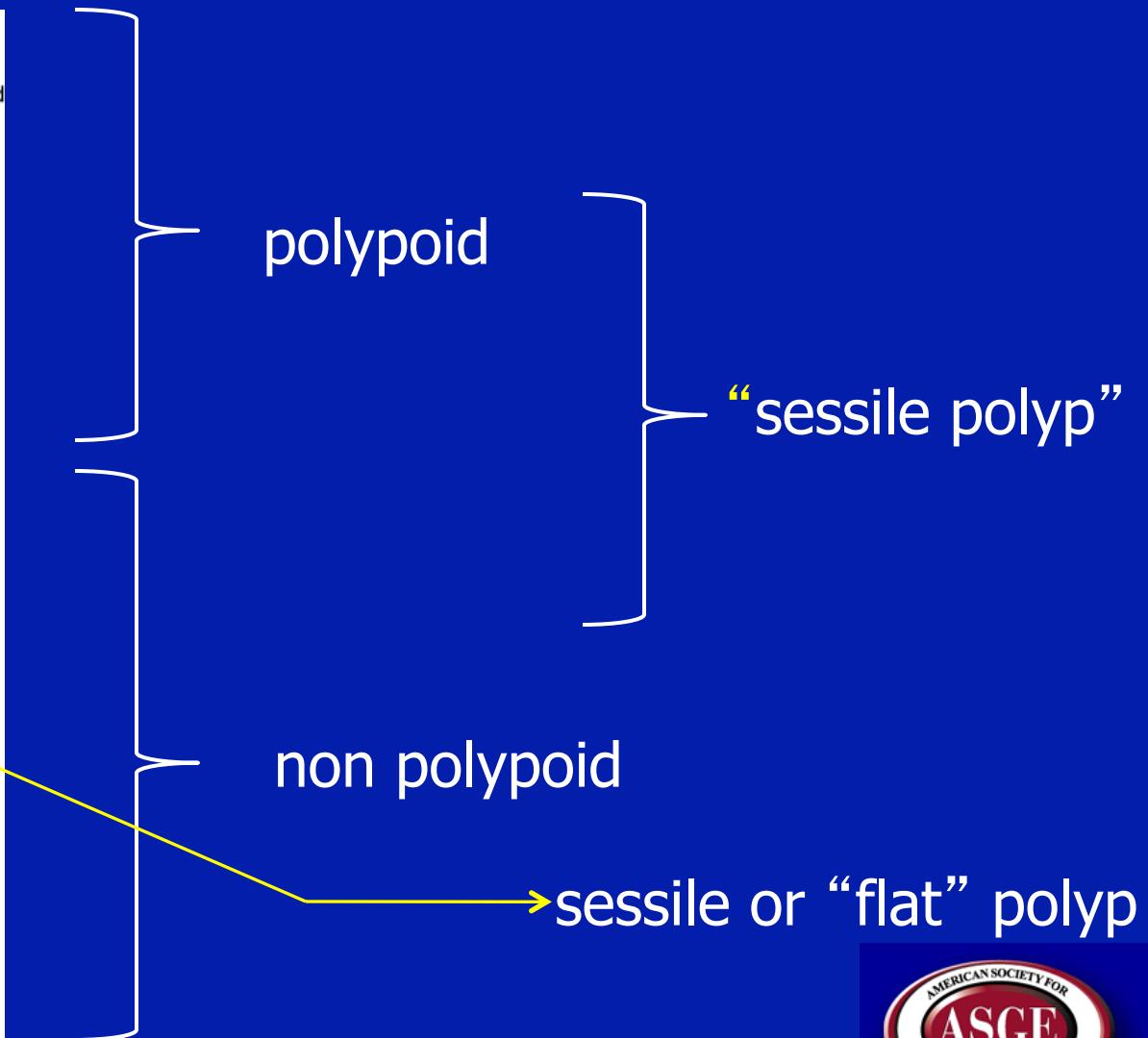
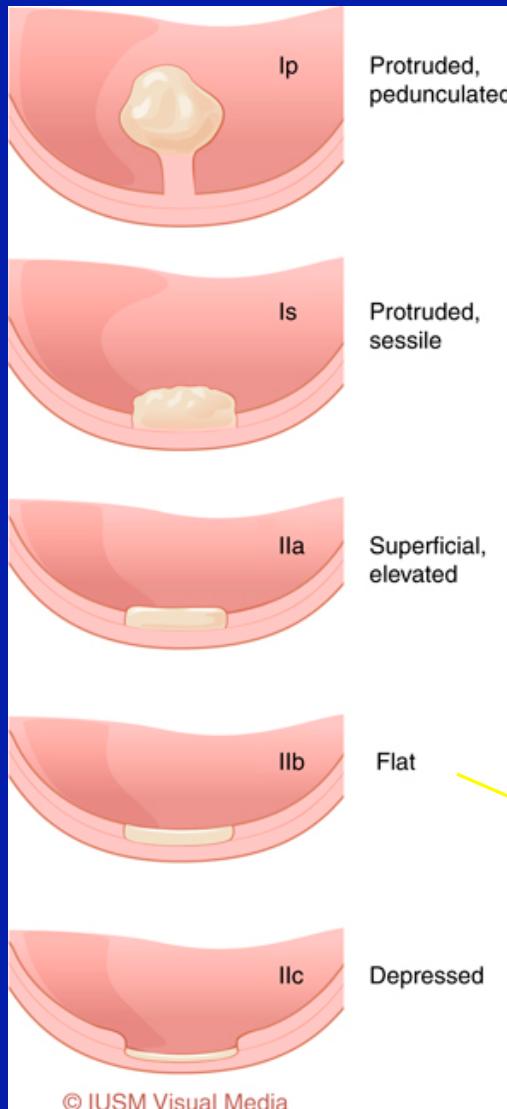
# **Advanced Polypectomy**

## **Technical Pearls for Visualization**

- Difficult Endoscope Position
  - Always 5-6 o' clock as possible
  - Shorten scope as feasible in Right Colon (70-80cm)
  - Consider switching to upper endoscope
  - Retroflexion?
  - Abdominal compression may help
  - Don't be afraid to ask for help holding the scope
- Recognize when you should stay and when you should run!
  - ◆ Central depression
  - ◆ Non-lifting sign
  - ◆ Extension into the appendix or ileum
  - Tattoo site (SPOT: India Ink) mucosally and serosally



# Paris classification of polyps



# Impact of Proper Characterization

Chromoendoscopy	Type	Macroscopic appearance	Rate of submucosal invasion
Not necessary	Protruded type	 Ip  Ips  Is	Pedunculated
			Subpedunculated
			Sessile
Highly recommended	Flat type	 IIb	Flat
		 IIa	Flat-elevated
	Superficial elevated type	 IIa + IIc	Flat-elevated with depression
Highly recommended	Depressed type	 IIc	Slightly depressed
		 IIc + IIa	

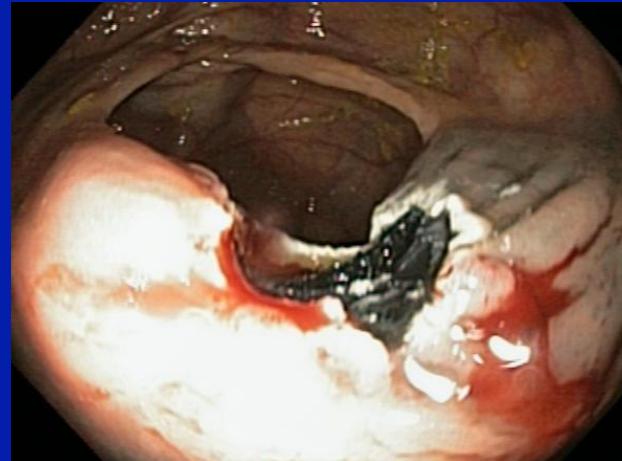
# Case 1



# Advanced Imaging Techniques

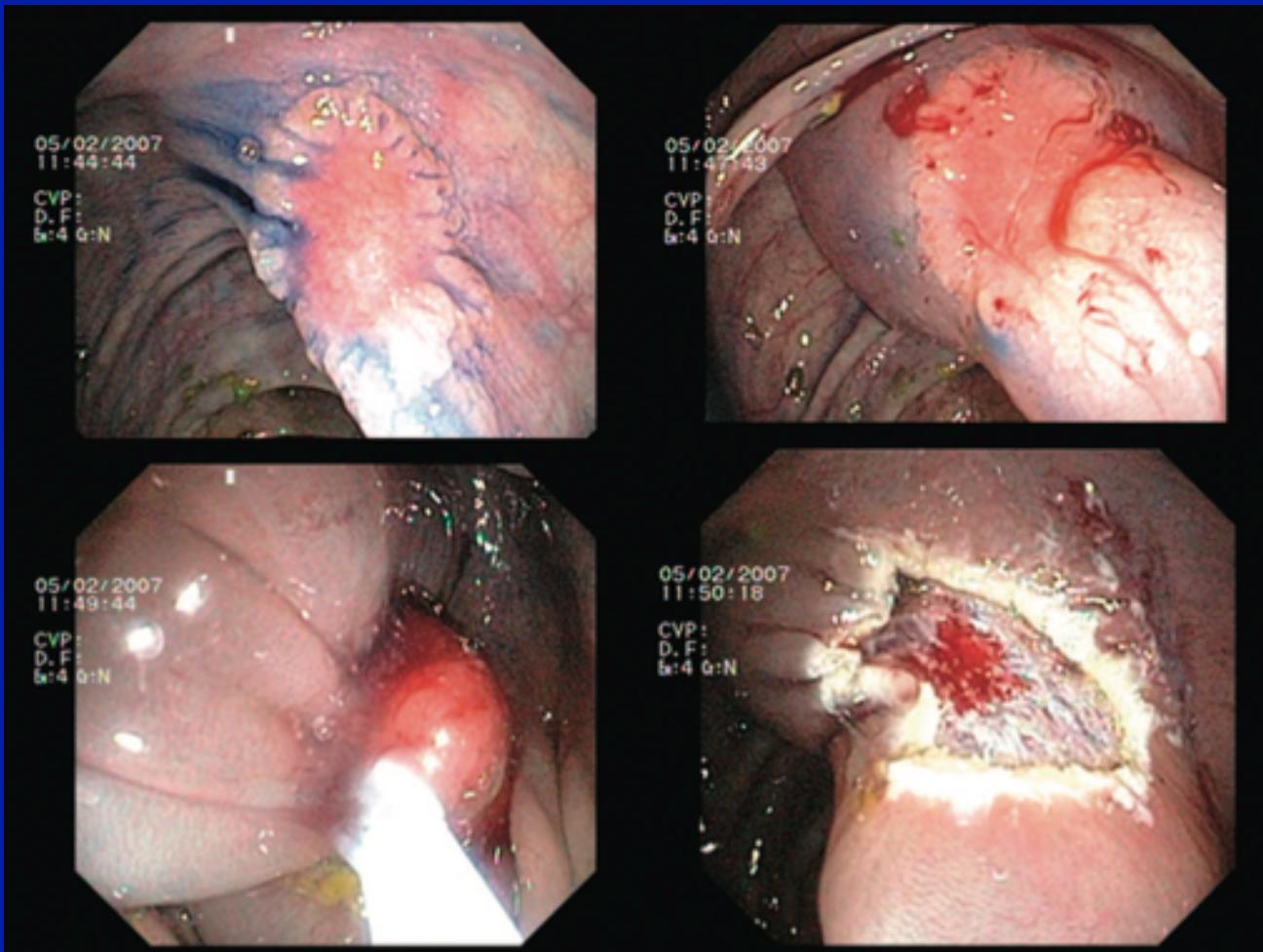
- NBI and chromoendoscopy: The goal is to further enhance mucosal detail (pit pattern)
- Disarranged pit pattern and submucosal capillary network suggest the presence of neoplasia.
- Currently no data to support use of pit pattern or capillary classification in decision-making for polypectomy
- NBI has not been shown to increase polyp detection rate
- NBI can be used to differentiate adenomatous from hyperplastic polyps accurately, but the importance is unclear given that polyps $>10\text{mm}$  are generally removed

# Utility of NBI En Bloc Resection



# Serrated Flat Adenoma

## Just a small polyp?



# Principles of EMR

- “Complete” resection (en bloc preferred)
- Mark your borders
- Submucosal Injection
- En bloc resection
  - Up to 25mm
- Piecemeal resection
  - As few pieces as possible
- Avoid reliance on APC
- Closure of defect

# Advanced Polypectomy Submucosal Injection

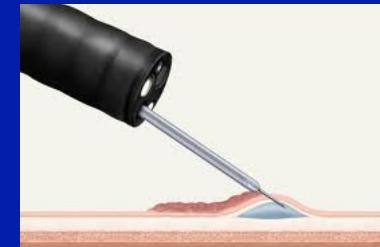


## Steps for appropriate SMI

- Position polyp at 6 o' clock position
- Initiate injection at the proximal side
- Needle should penetrate only just below mucosa
- Needle should enter at 30 degree angle
- No need to always do 4 quadrants
- Begin inject while advancing needle
- Recognize the non-lifting sign!

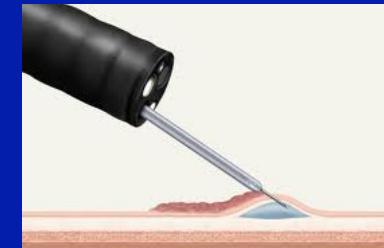
# **Submucosal Injection**

## **What is the purpose of dye?**



- Defines the perimeter of the lesion
- Delineates the extent of the submucosal injection
- Stains the submucosal tissue to ensure you are working in the correct plane

# Advanced Polypectomy Submucosal Injection

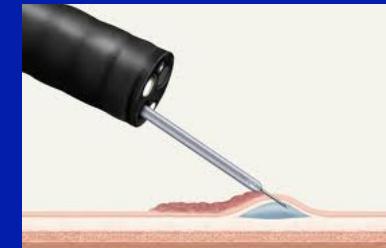


- Saline: validated and simplest
- Saline/Ink: Tattoo and identification of deep margin (Indigo Carmine, Methylene Blue, India Ink)
- Hypertonic Saline: poss tissue damage?
- Dextrose (50%): One study show better en bloc resection
- Sodium Hyaluronidate: longest lasting, but may allow for malignant cell proliferation
- Epinephrine: One study shows less bleeding (>10mm)
  - Consider for Volume reduction for large pedunculated polyps
  - Inject Head and stalk (1:10000) on the way in

# Polyp over a Fold Submucosal Injection



# Case Paris IIa



# Case

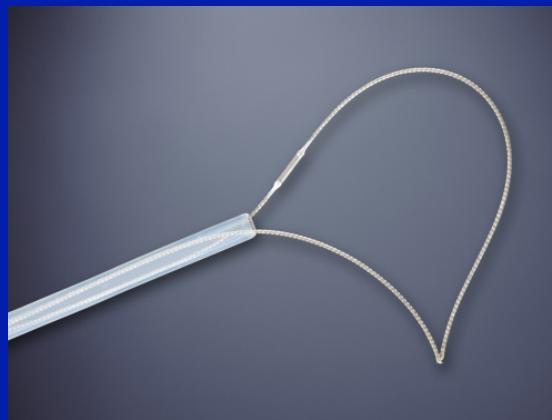
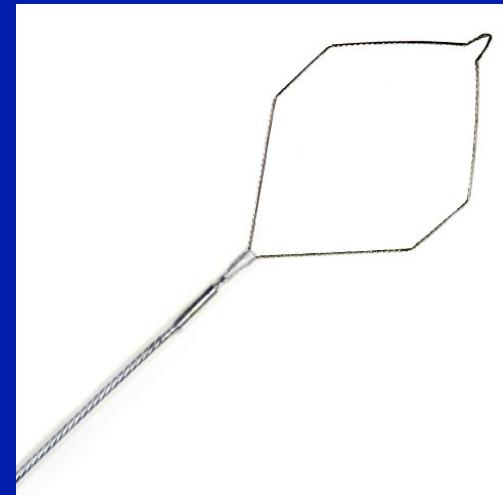
## Non-Lifting Sign



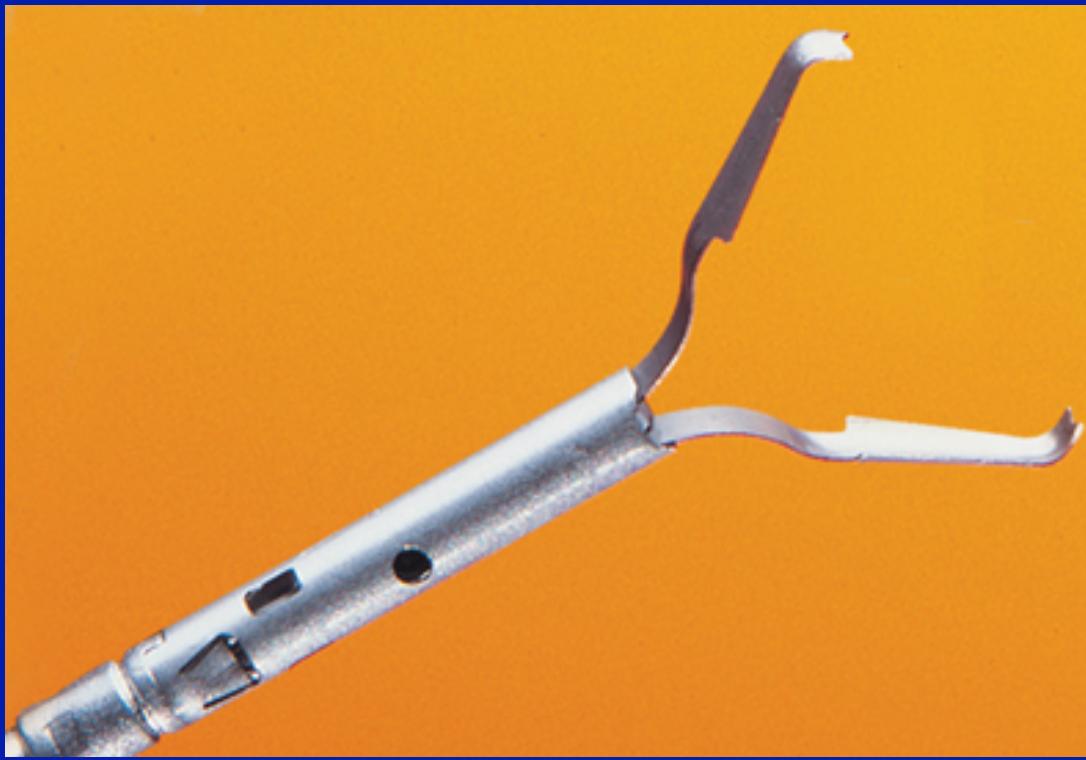
# Considerations for Polypectomy/EMR Resection

- Resection
  - Before you shoot, consider position change (non-dependent)
  - En bloc is ideal, but piecemeal resection is ok
  - Choose your weapon wisely (Snares: size, stiffness, shape)
  - Adjuncts: Utilization of a Cap or Loop (thick stalks)
- Post Resection
  - Consider APC of edges for larger and piecemeal resection
  - Defect closure
  - Tattoo to mark the location
  - Proper specimen handling and communication (Pinning)

# Snares



# Ancillary Devices



# Retrieval Devices



# Electrosurgical Current

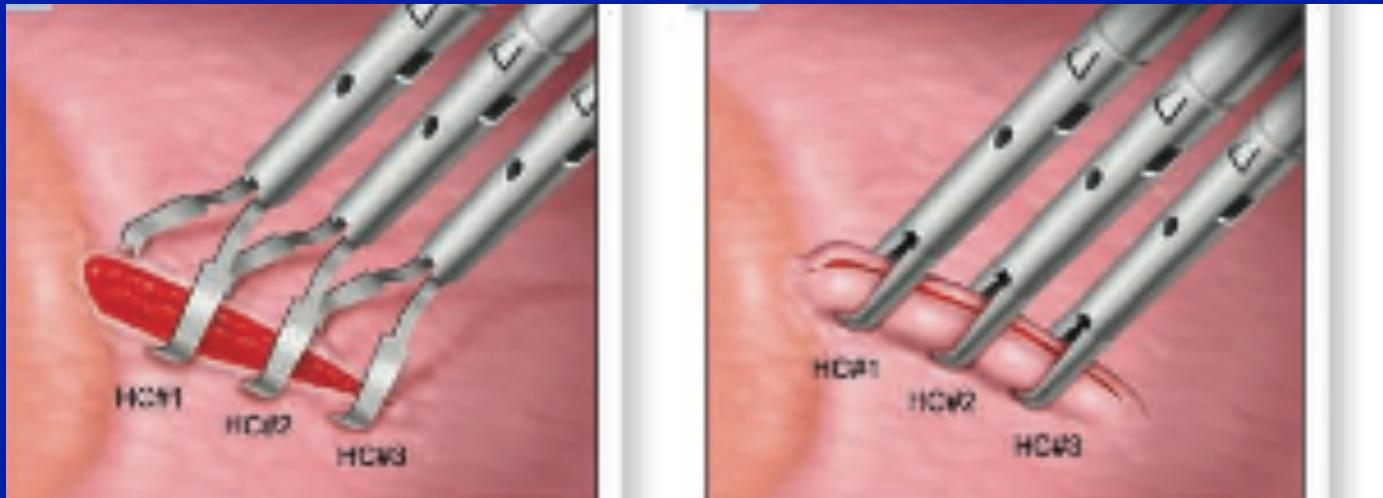
- ASGE: Insufficient data for recommendation
- Cutting
  - less tissue damage (better specimen?)
  - Higher risk of immediate bleed
- Coagulation
  - Postpolypectomy syndrome (transmural burn)
  - Higher perforation risk and delayed bleed
  - Tissue damage?
- Blended cut current appears optimal (e.g. ERBE endocut)

# Large Polyp EMR

## Use of APC

- APC is useful adjunct after EMR of large adenomas
- One study shows residual adenoma present in as many as 46% after EMR
- Another study demonstrates 21.9% recurrence after large polyp EMR
- Addition of APC to any areas suspicious for residual disease and rim of mucosectomy site: 90% eradication
- APC settings:
  - Cecum and right colon: 30 W, left colon: 60 W
  - Flow: 1-2 L/min

# Defect closure Endoclip Technique



# Case



# Advanced Polypectomy Complications

- Bleeding
  - Data ranges: 0.85%-24% (Really: 1%)
  - Delayed bleeding: Up to 14 days
  - Sessile polyps > 10mm and thick stalk = Greater risk
- Perforation
  - 1/1400 (all colonoscopy)
  - 1/1000 (Therapeutic colonoscopy)
  - 5-14% (ESD)
  - Most common in right colon

# **Advanced Polypectomy**

## **Clinical Caveats**

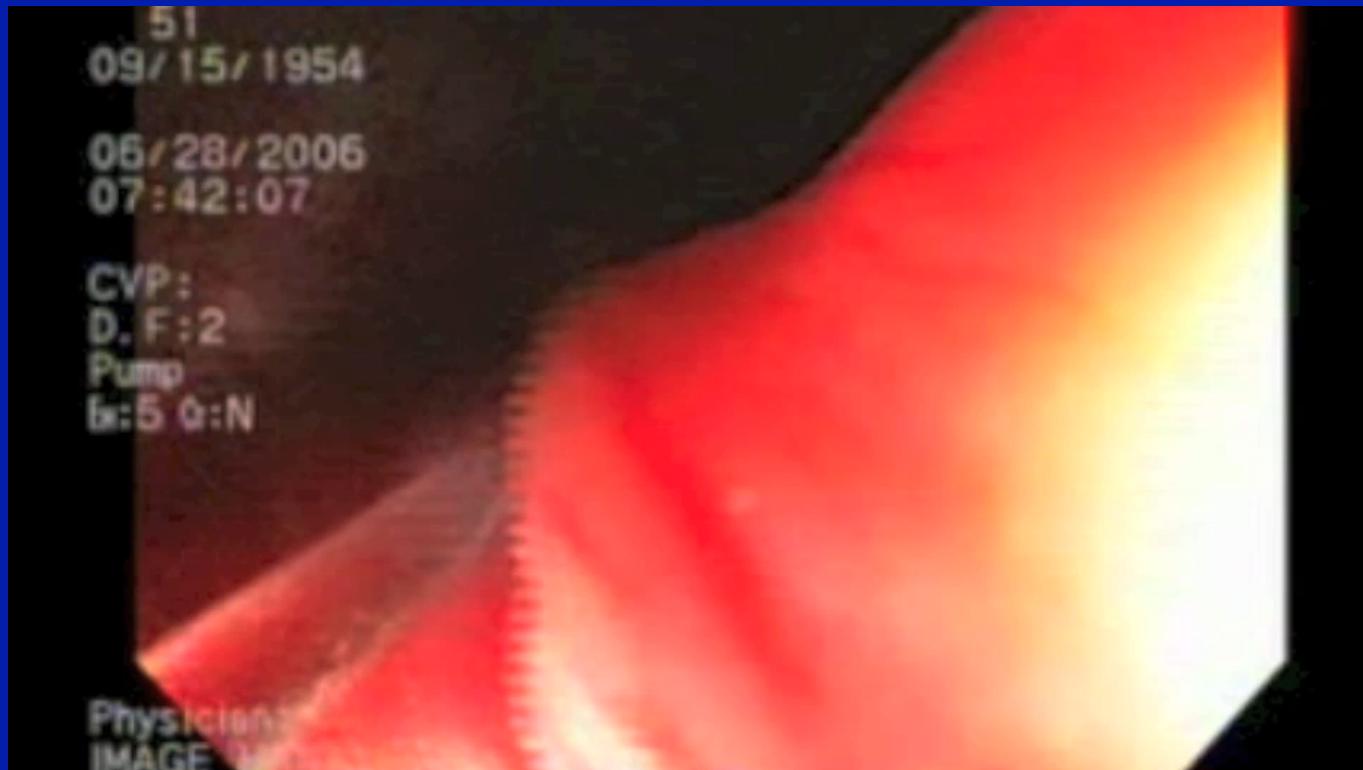
### **Prevention of Bleeding**

- Considered a high-risk endoscopic procedure
- No clear evidence of increased bleeding on ASA, NSAID, or clopidogrel
- Polypectomy appears safe on antiplatelet and anticoagulation therapy
- Utilization of endoclip for closure is optimal for larger polyps
- ASGE guidelines still recommend cessation of antiplatelet and anticoagulation therapy for EMR or removal of a “large polyp”

# Advanced Polypectomy Complications What Next?

- Bleeding
  - Avoid thermal therapy unless very small and superficial lesion
  - Hemoclip is primary choice for hemostasis
  - Consider combination therapy (epi/clip) with brisk bleed
  - Grasp vessel if visible
- Perforation
  - Always worth attempt if defect < 15mm and patient is hemodynamically stable
  - Antibiotics (Broad spectrum)
  - Call the surgeon regardless as endoscopic closure is successful 50% of the time
  - Avoid insufflation of excess air (may need to pop the balloon)

# What we want to avoid...



51  
09/15/1954

06/28/2006  
07:42:07

CVP:  
D. F:2  
Pump  
6x5 0:N

Physician  
IMAGE

# Polypectomy on anticoagulation

- Soetikno et al. performed polypectomy on 123 patients with prophylactic clip placement
- All patients therapeutic on Coumadin
- 0.8% post-polypectomy bleed (1 pt) requiring transfusion
- Polypectomy can be safely performed for lesions <1 cm on anticoagulation therapy with clip assistance

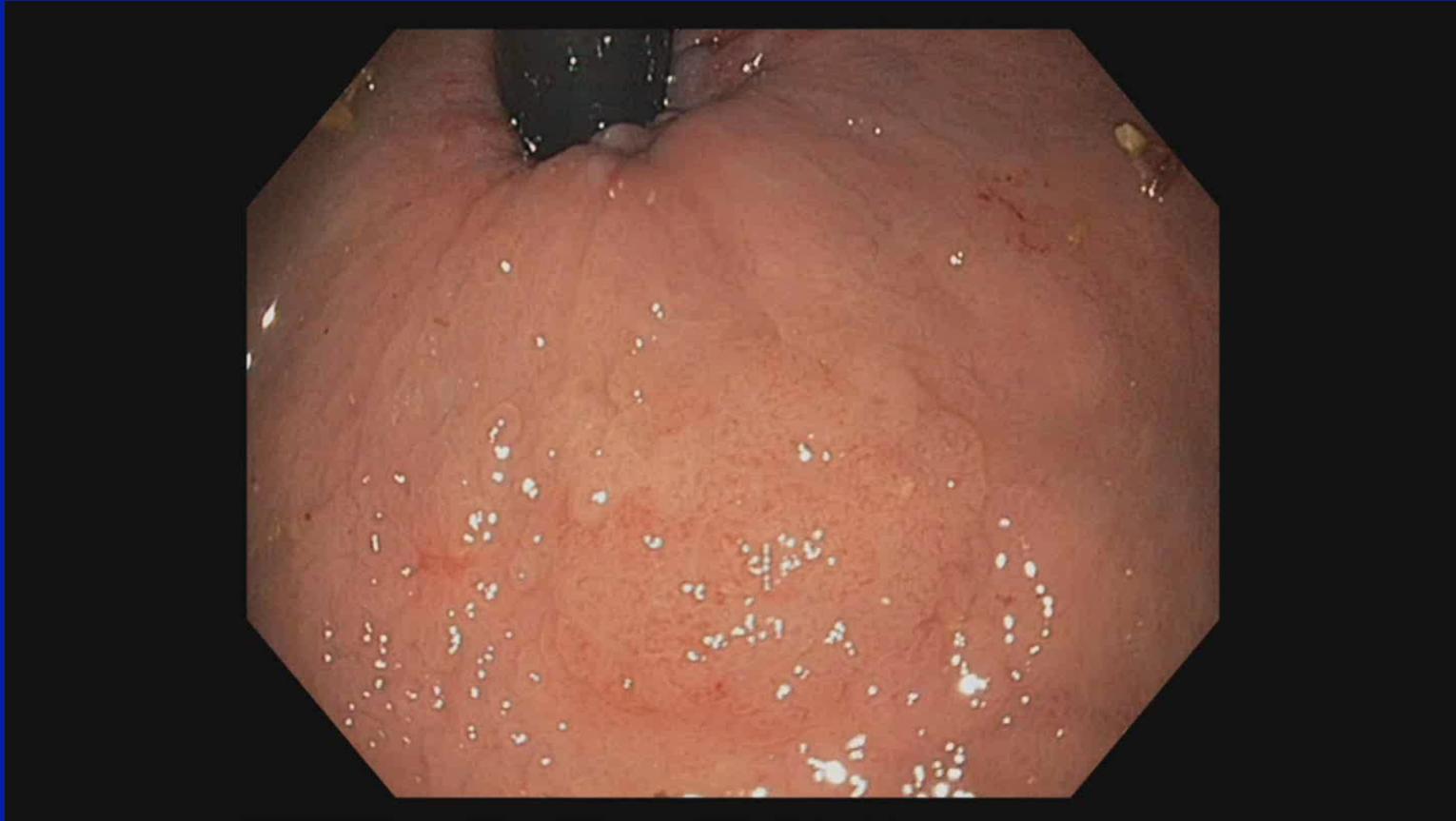
# Case Large Pedunculated Polyp EVR and Clip placement

Colon Polyp

Volume Reduction with Epi Injection

# Case

## Is there a polyp here?



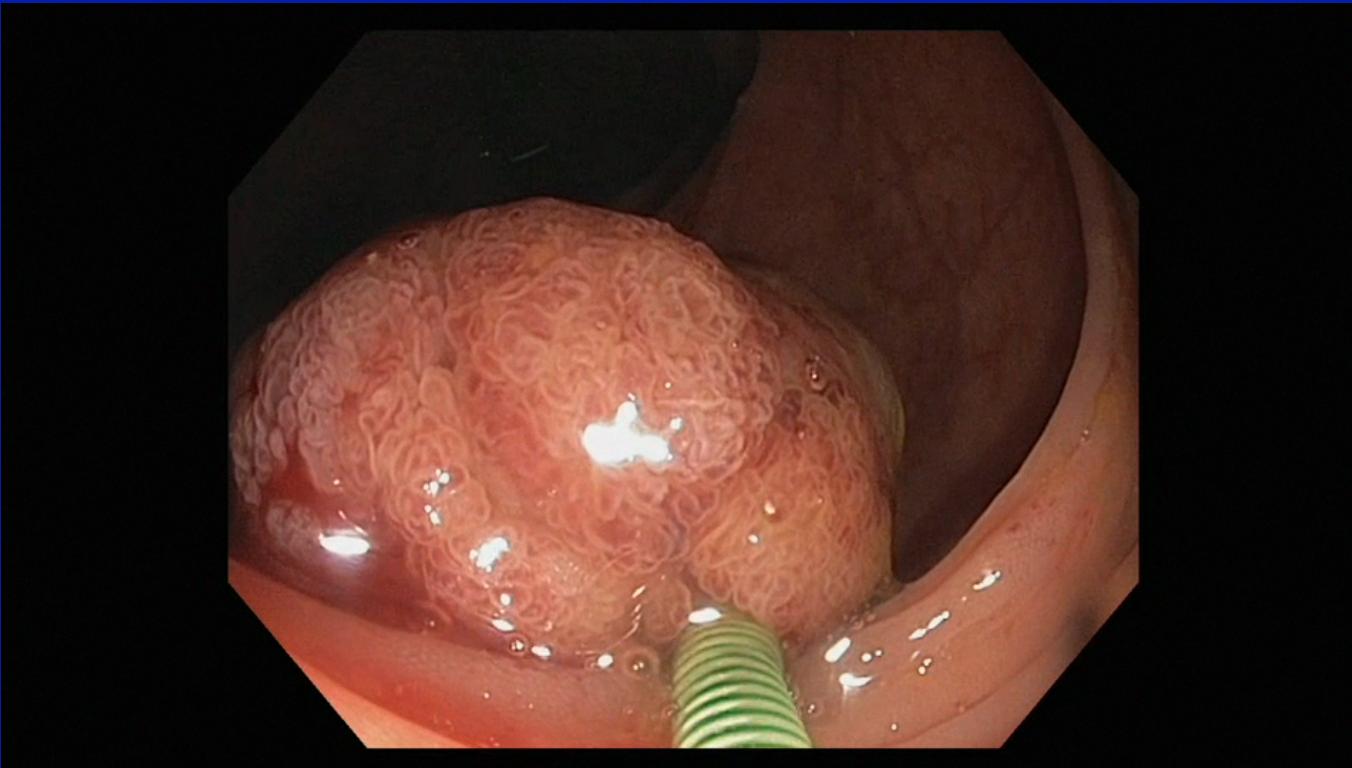
# Case

## Use of clip for anchoring



# Case

## The Difficult Polyp?



# Learning Doesn't End Here...

- Video based learning is key
- All the advice your parents gave you about reading books and not watching TV... forget it
- After all: See One, Do One, Teach One..Not Read one!
- Use Resources: Raju's You Tube Colonoscopy Channel



# Take home points for your toolbox

CO<sub>2</sub>  
thank you:



# **Question 1**

**Q1. The primary goal of “difficult” polyp resection is?**

- A. Avoiding post-polypectomy bleeding**
- B. En bloc resection**
- C. Complete resection**
- D. Avoiding surgery**



# Question 2

Q2. This polyp can be classified as?

- A. Paris I<sup>p</sup>
- B. Paris I<sup>s</sup>
- C. Paris II<sup>a</sup>
- D. Paris II<sup>c</sup>



# Question 3

**Q3. Which of the following is the best reason to not proceed further with EMR?**

- A. Need for piecemeal resection
- B. The polyp is in cecum adjacent to the appendiceal orifice
- C. The polyp crosses a fold and cannot be fully visualized
- D. The center of the polyp does not lift with submucosal injection



# Question 4

**Q4. If you encounter a polyp you cannot remove you should:**

- A. Take a hot biopsy only**
- B. Snare a portion of this for better histology**
- C. Take a cold biopsy and tattoo proximal and distal to the lesion**
- D. Refer for colectomy**





# Thank You!



Northwestern University  
Interventional Endoscopy

