

Advanced techniques for resection of large polyps

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Background

- 1cm - large polyp on screening
- 2cm - large for polypectomy
- 3cm – “giant polyp”
- 10-15% of polyps can't be removed by usual methods
 - 26% of polyps > 1 cm on National Polyp Study
- Around 10% prevalence of cancer in large polyps referred for surgery
- Almost all polyps can be treated endoscopically but is it the right thing to do?

Indications and contraindications

Indications

- Everything else

(Relative) contraindications

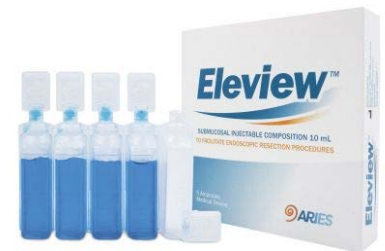
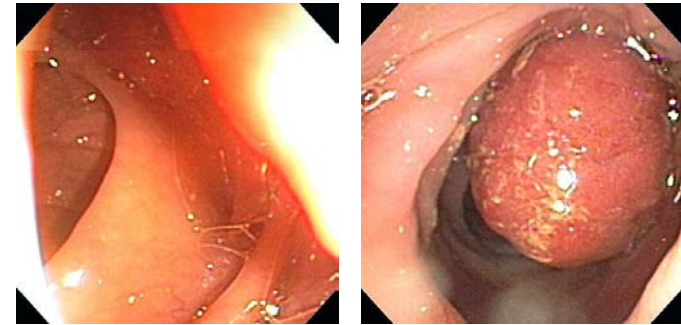
- Known or suspected cancer
 - IBD
 - Prior cancer
- Non surgical candidate
- Circumferential / multiple lesions
- Unclear margins
 - Appendiceal orifice
 - Ileum
 - Diverticulum
 - Stricture

Colorectal cancer

- Planned treatment
 - Tis (intramucosal carcinoma)
 - <1000 μm submucosal invasion
 - Negative CT/EUS/PET
 - Consider surgery
 - Survival for stage 1 is 92% v stage 4 is 11%
 - Must have clear margins, otherwise need surgery
- Unexpected finding on pathology – criteria for surgery
 - Lack of clear margins
 - Poorly differentiated
 - Lymphovascular invasion
 - >1000 μm submucosal invasion
 - Grade 2/3

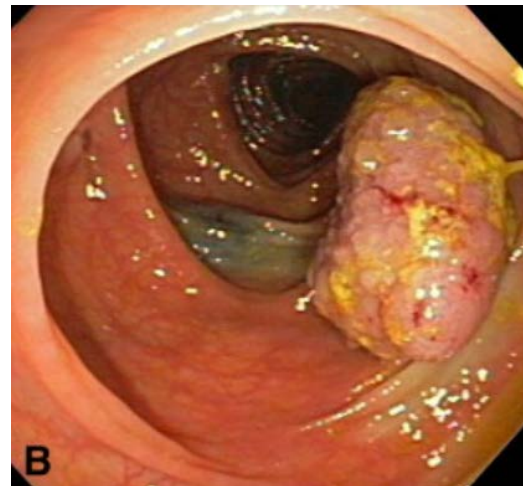
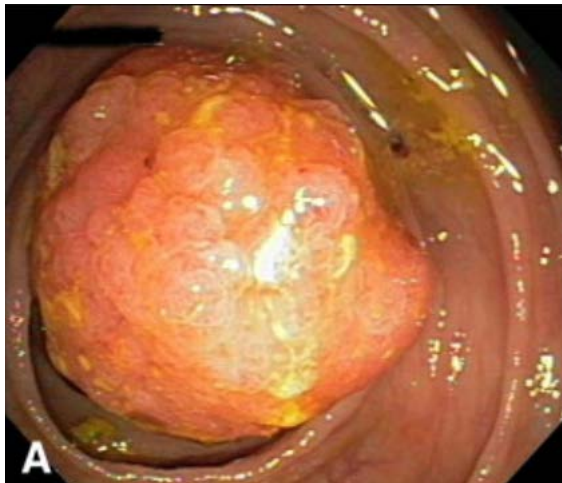
Preparation

- Anesthesia v sedation
 - Length of procedure
 - Potential complication management
- Scope
 - Pediatric or Ultra Slim colonoscope
 - Gastroscope
 - Enteroscope
 - Duodenoscope
- Cuff or ESD cap
- CO2
- Water
- Saline or Eleview
- Various snares, APC, clips, injection



Methods for pedunculated polyp

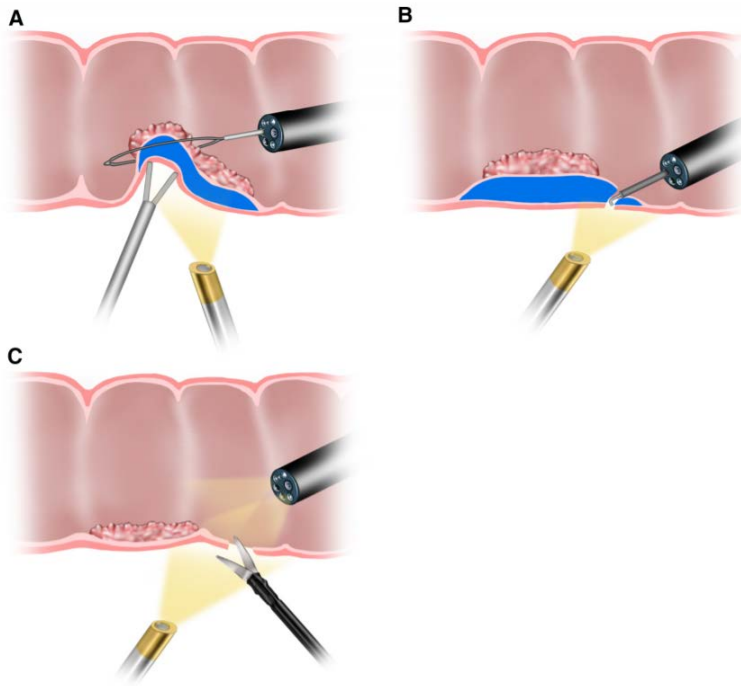
- Snare with loop, clip, injection
- Piecemeal snare
- Epinephrine volume reduction



Methods for sessile / flat polyps

- CELS
- Full thickness resection
- ESD
- EMR
 - Precut / hybrid
 - Submucosal injection
 - Lift and cut
 - Underwater
 - Cold snare
 - Cap – risk of perforation in colon
 - Band ligation – submucosal lesion

Combined endolaparoscopic surgery (CELS)



Advantage

- Avoid bowel resection
- Diagnose / treat perforation
- Localize polyp

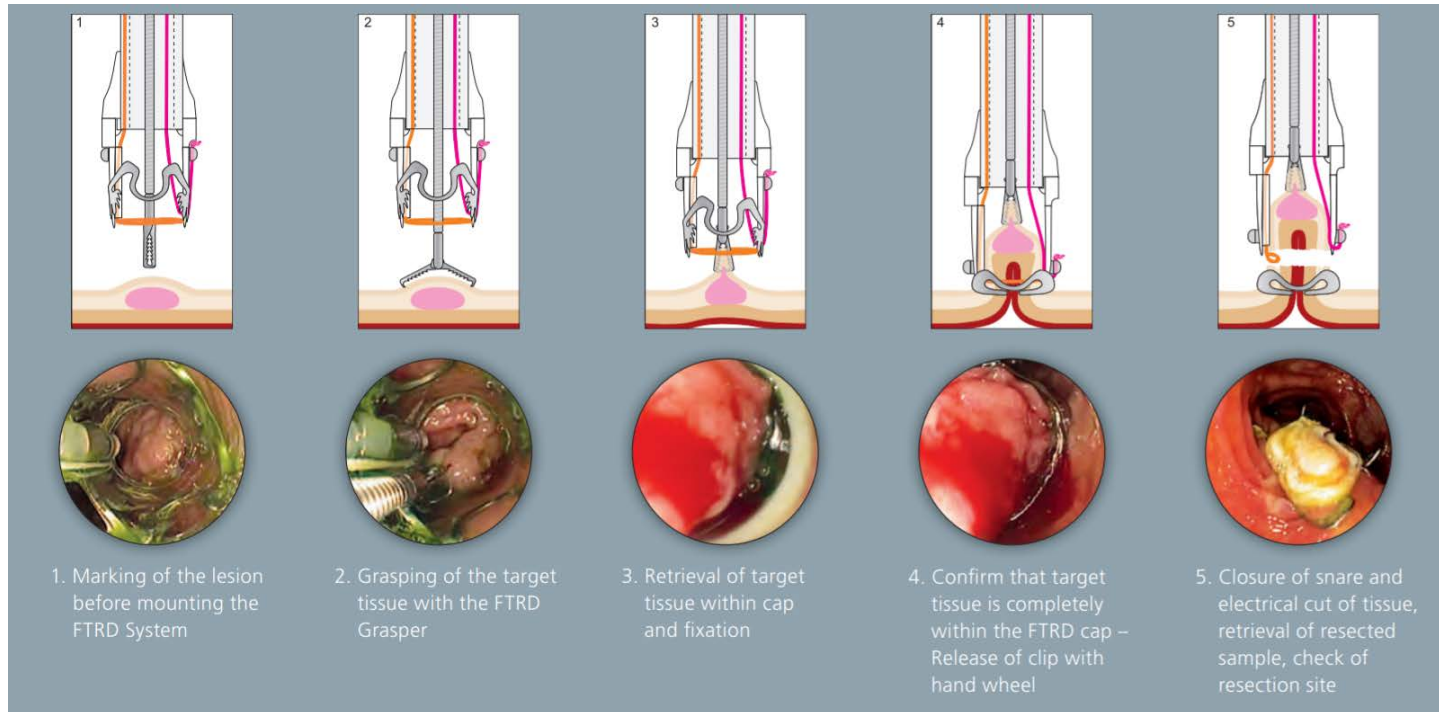
System review of 18 studies with 532 patients

- Median polyp size 1.4-3.7cm
- No comparative studies

Is it better than just endoscopy or laparoscopy?

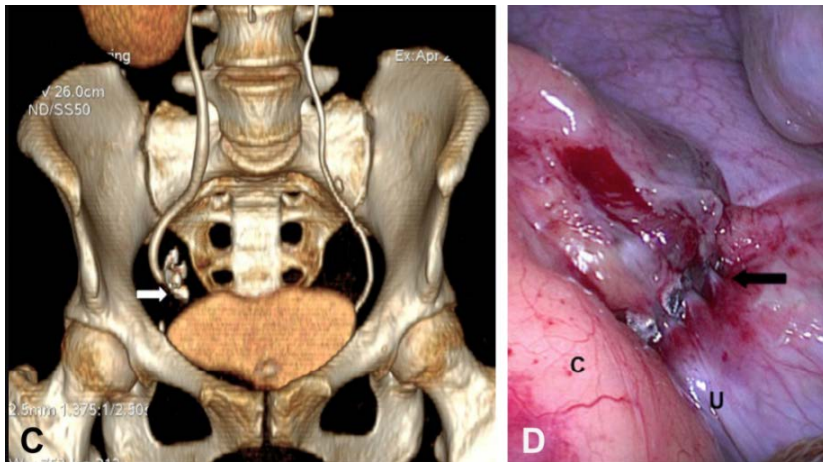
K Nakajima et al. Avoiding colorectal resection for polyps: is CELS the best method? Surg Endosc (2016) 30: 807.

Ovesco full thickness resection device



- Small case series
- FDA approved and coming first to UCI
- 'Holy Grail' of endoscopic R0 resection

Ureteral obstruction after colonoscopic perforation closed with an over-the-scope



Unknown risks

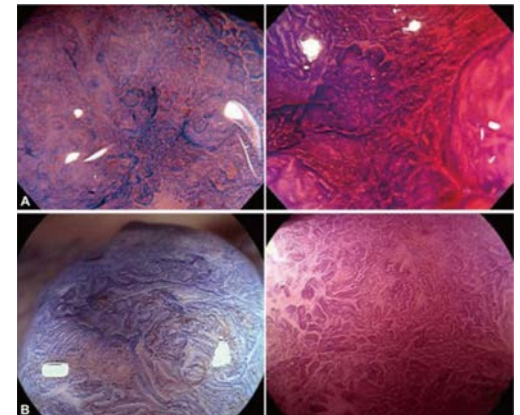
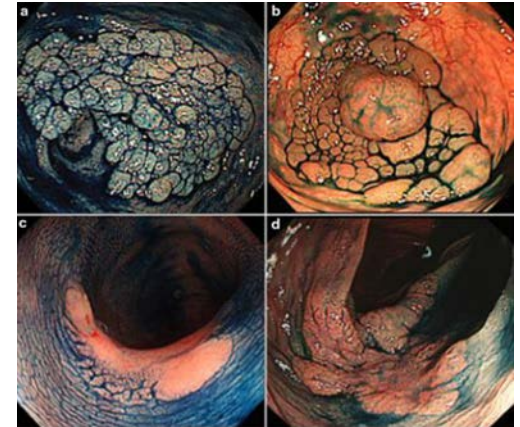
- Clip migration (70% in one series)
- Thermal injury
- Mechanical injury
- Stricture and scarring

Rahmi G et al. Ureteral obstruction after colonoscopic perforation closed with an over-the-scope clip. *Gastrointest Endosc.* 2015 Feb;81(2):470-1

JGES guidelines for en bloc resection

Lesions for which en bloc resection with snare EMR is difficult to apply

- LST-NG, particularly LST-NG (PD)
 - Lesions showing a VI-type pit pattern
 - Carcinoma with shallow T1 (SM) invasion
 - Large depressed-type tumors
 - Large protruded-type lesions suspected to be carcinoma
- 2) Mucosal tumors with submucosal fibrosis
 - 3) Sporadic localized tumors in conditions of chronic inflammation such as ulcerative colitis
 - 4) Local residual or recurrent early carcinomas after endoscopic resection



Pit pattern on magnifying endoscopy






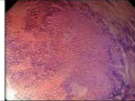

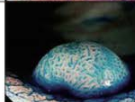

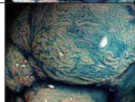




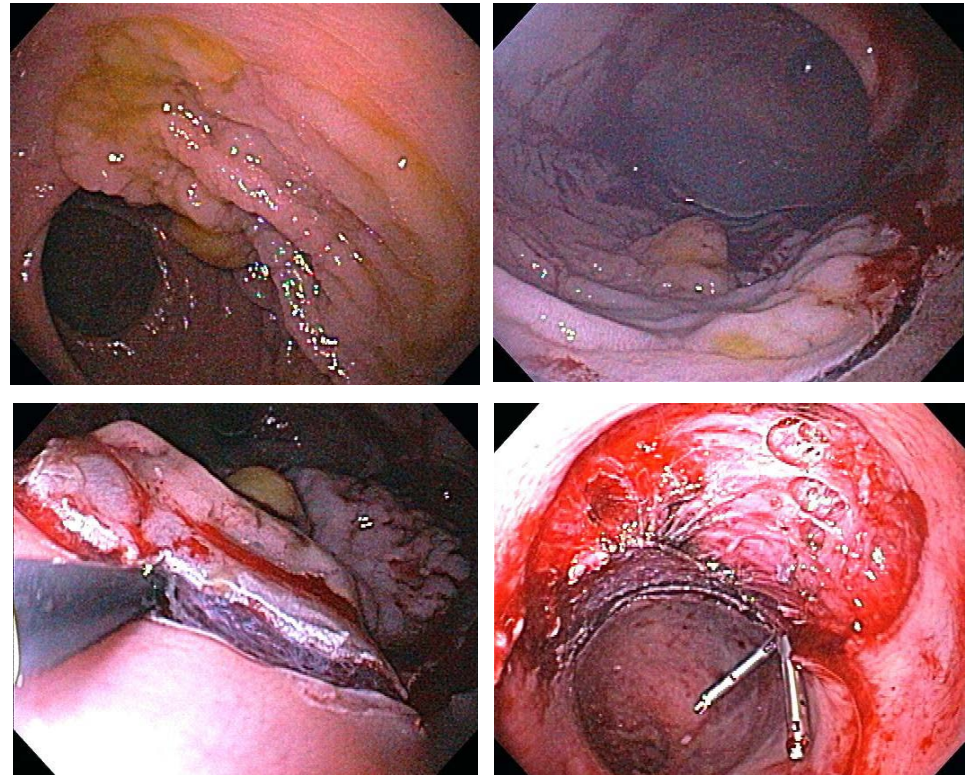
I		Round pit (normal pit)		Normal mucosa
II		Asteroid pit		Type II pit pattern is specific for hyperplasia. Also, superficial type serrated adenoma and SSA/P show this pit like pattern.
III _s		Tubular of round pit that is smaller than the normal pit (type I)		Regular pattern → intramucosal lesion
III _L		Tubular of round pit that is larger than the normal pit (type I)		
IV		Dendritic or gyrus-like pit		Irregular pattern → mucosal-submucosal deep invasion
V _I		Irregular arrangement and sizes of III _s , III _L , IV type pit pattern		
V _N		Loss or decrease of pits with an amorphous structure		Nonstructure pattern → Submucosal deep invasion

Fig. 2. Pit pattern classification of colorectal neoplasia (Adapted from Tanaka et al. Gastrointest Endosc 2006;64:604-613, with permission from Elsevier).

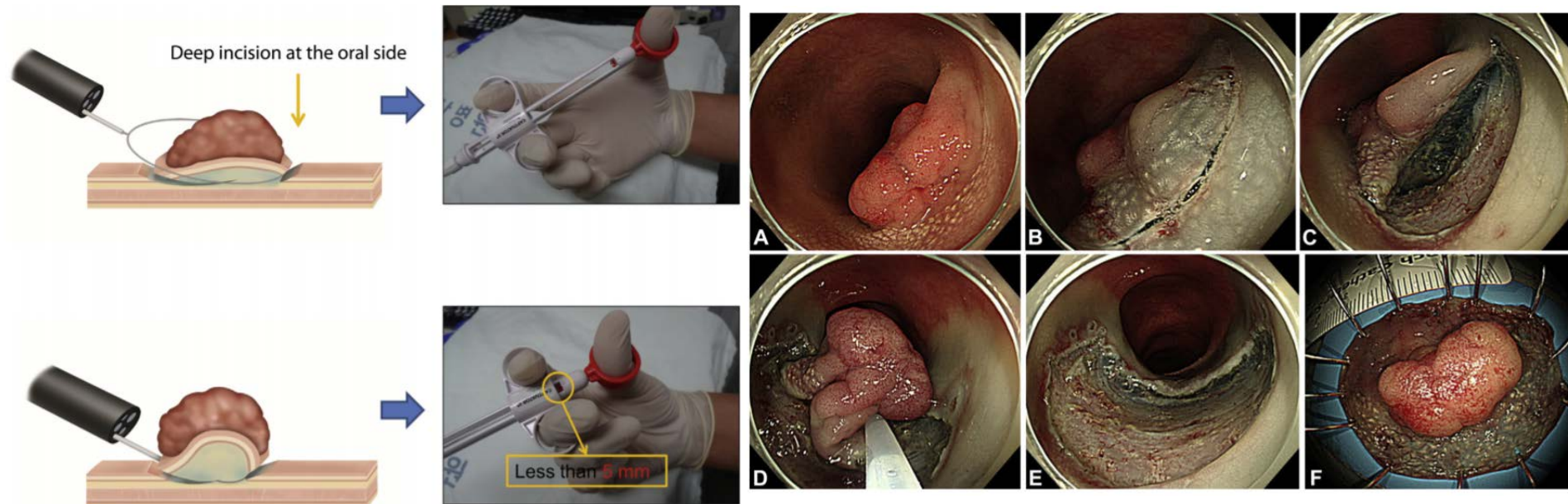
ESD

Study size	No. of studies	Successful en-bloc resection, % (95% CI)	Complete cure en-bloc resection, % (95% CI)
<100 patients	9	82.60 (66.45–94.22)	71.23 (57.17–83.46)
>100 patients	5	87.77 (85.55–89.84)	79.67 (76.97–82.25)



Puli, S.R., Kakugawa, Y., Saito, Y. et al. Ann Surg Oncol (2009) 16: 2147

Hybrid ESD / precut EMR

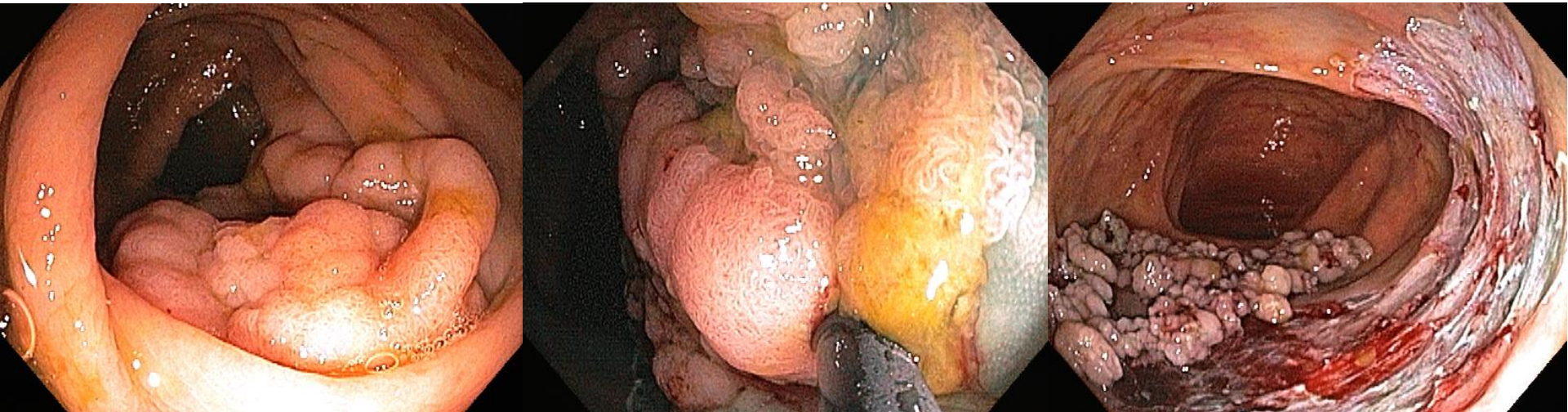


- En bloc resection
- Faster than ESD (27 v 41 m)
- Submucosal dissection to allow snaring

Bae JH et al. Optimized hybrid endoscopic submucosal dissection for colorectal tumors: a randomized controlled trial. *Gastrointest Endosc.* 2016 Mar;83(3):584-92

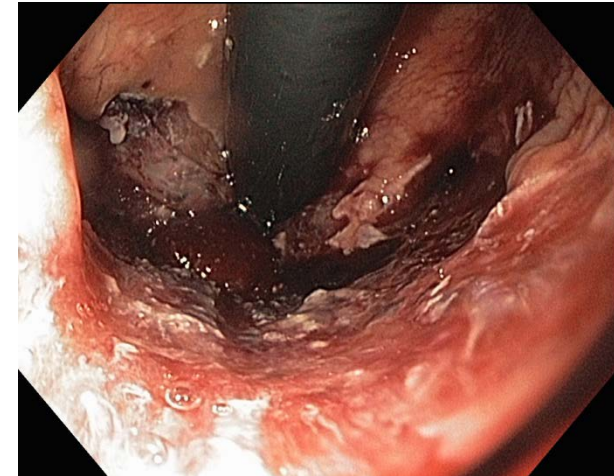
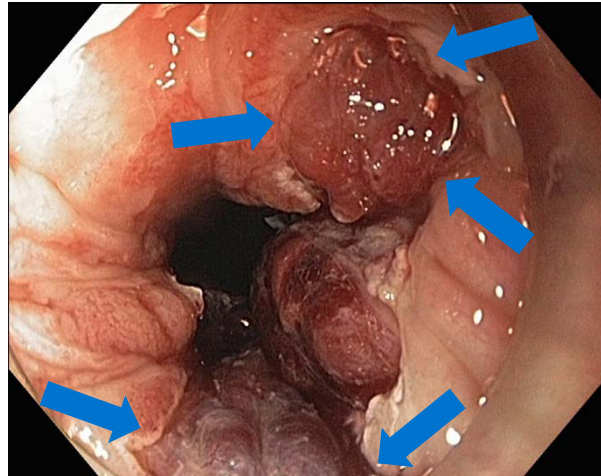
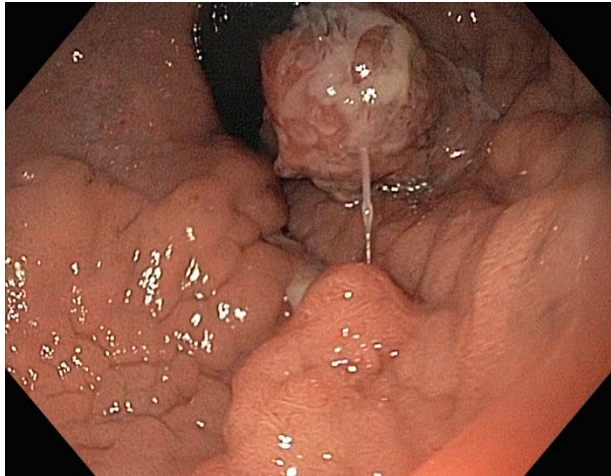
Saline assisted polypectomy

- Inject distal first (retroflex or duodenoscope) at the immediate edge
- Inject only if there is a bleb, otherwise needle is not in right plane or perforated
 - First injection is the most crucial
- Inject on withdrawal of needle
- Inject at the edge of the bleb to dissect the same plane
- Avoid injecting in the polyp
- Inject first then cut



EMR of distal polyp

- Possible for polyps extending to anus, presence of hemorrhoids
- Inject lidocaine + saline



Underwater EMR

- Water filling to float the polyp
 - Suction and position change to water fill
 - Increased risk (?) in scarred colon / tattoo / prior resection
- En block snare

Underwater endoscopic mucosal resection is associated with fewer recurrences and earlier curative resections compared to conventional endoscopic mucosal resection for large colorectal polyps

	EMR	UEMR	Odds ratio [95% CI]	p value
For all polyps (includes sessile serrated polyps)				
Polyps ≥15 mm, n (%)	13/46 (28.3)	4/55 (7.3)	5.0 [1.5, 16.5]	0.008
Polyps ≥20 mm, n (%)	12/27 (44.4)	3/40 (7.5)	9.9 [2.4, 32.4]	<0.01
Only for adenomatous polyps (excludes sessile serrated polyps)				
Polyps ≥15 mm, n (%)	9/30 (30.0)	3/42 (7.1)	5.6 [1.4, 22.8]	0.017
Polyps ≥20 mm, n (%)	9/20 (45.0)	3/29 (10.3)	7.1 [1.6, 30.5]	<0.01

Schenck, R.J., Jahann, D.A., Patrie, J.T. et al. Surg Endosc (2017) 31: 4174

ESD v EMR

Table 2
Review comparing more than 17,900 endoscopically resected lesions by endoscopic mucosal resection and endoscopic submucosal dissection

	EMR, %	ESD, %
En-bloc resection rate	62.8 (6793/10,803)	90.5 (5500/6077)
Complete resection rate	92 (9707/10,560)	82.1 (3743/4558)
Bleeding	2.3 (270/11,873)	2.0 (124/6077)
Perforation	0.9 (109/11,873)	4.8 (296/6077)
Recurrence rate	10.4 (765/7303) overall 12.1 (131/1085) for piecemeal 3.0 (36/1187) for en bloc	1.2 (50/3910) overall 1.2 (30/2562) for piecemeal 0.2 (5/2562) for en bloc

Data from De Ceglie A, Hassan C, Mangiavillano B, et al. Endoscopic mucosal resection and endoscopic submucosal dissection for colorectal lesions: a systematic review. *Crit Rev Oncol Hematol* 2016;104:138–55.

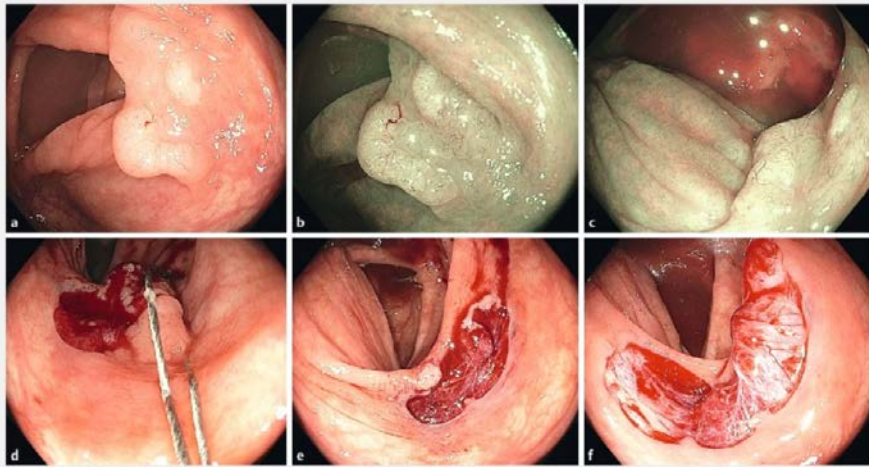
 U.S. National Library of Medicine

ClinicalTrials.gov

EMR Versus ESD for Resection of Large Distal Non-pedunculated Colorectal Adenomas (MATILDA)

- Higher en bloc resection rate
- Similar limitations to EMR
 - Visualize entire lesion
 - Accessible to endoscopy
 - Lesion lifts
- But higher
 - Complication
 - Procedure duration
 - Skill requirement
- Lower recurrence but not zero and thus needs surveillance
- What is the benefit?

Cold snare for large SSA



- Best for sessile serrated polyps
- No injection needed
- No coagulation needed
- Minimal risk
- Fast
- But no margins

Tate DJ et al. Wide-field piecemeal cold snare polypectomy of large sessile serrated polyps without a submucosal injection is safe. *Endoscopy*. 2017 Nov 23

Complication management

- Bleeding
 - Anti platelet agents, anticoagulation, bleeding diathesis
 - Prophylactic clip and loop
 - Treat bleeding and stigmata
 - APC, hemostatic forceps, injection, clips
 - Post procedure – endoscopic, IR, surgery
- Perforation
 - Recognition
 - Hole, target sign
 - Clinical deterioration
 - Xray v CT
 - Treatment
 - Clip, Ovesco, suture?
 - Antibiotics, decompression

Surgery

- Laparoscopic v open
- Benign disease v oncologic surgery
- Cleveland Clinic
 - 439 patients underwent colectomy from 1997-2012
 - Laparoscopic resection in 293 (67%) – 15% conversion to open
 - Mean polyp size 3cm (0.3 -10cm)
 - 8% had cancer; 4/44 with polyp <2cm had cancer
 - 19% had complications within 30 days, mostly minor
 - No death
- Surgery cures early colon cancer
 - Stage 1 survival is 92%
 - Stage 4 survival is 11%

Consider surgery for

- Malignant looking polyp
- Truly non lifting polyp
- Endoscopically indeterminate margins
- Refractory recurrent / residual polyp
- Young age
- Multiple/numerous polyps, especially in short segment
- Desire for definitive single treatment

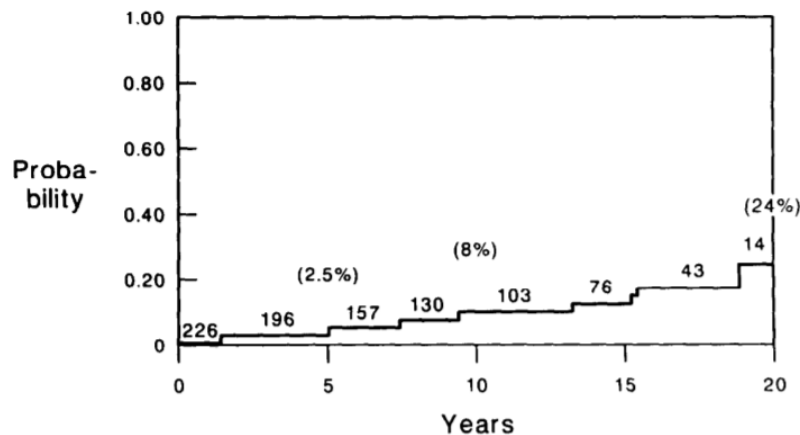
No polypectomy

- Understand the real risk of developing cancer
 - If too old / sick for surgery, it will only be worse in the future
- Need for surveillance?
- Debulking / ablation?

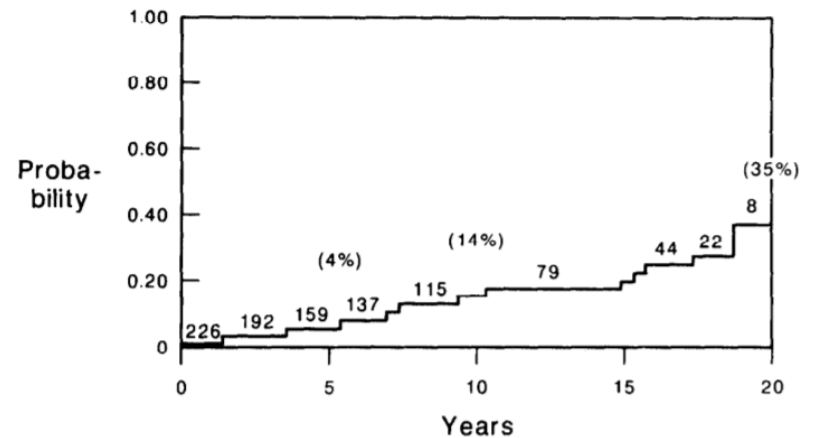


Cancer risk of untreated polyp

- 226 with polyps >1 cm diagnosed on BE at Mayo from 1965-1970
 - 76% had polyp 10-14 mm
 - 4% had polyp > 25 mm
- 37% had polyp growth
 - 9.3% developed cancer at the polyp on mean follow up of 108 m (24-225 m)
 - 4.9% developed cancer at a different site
- What is cancer risk of 2-3 cm polyp?



Cancer risk at the polyp



Cancer risk elsewhere

Stryker, SJ et al. Natural history of untreated colonic polyps. Gastroenterology, 1987 (93), 1009 - 1013

