Advanced techniques for resection of large polyps

John G. Lee, MD | February 2, 2018
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?

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

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

<table>
<thead>
<tr>
<th>Study size</th>
<th>No. of studies</th>
<th>Successful en-bloc resection, % (95% CI)</th>
<th>Complete cure en-bloc resection, % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100 patients</td>
<td>9</td>
<td>82.60 (66.45–94.22)</td>
<td>71.23 (57.17–83.46)</td>
</tr>
<tr>
<td>&gt;100 patients</td>
<td>5</td>
<td>87.77 (85.55–89.84)</td>
<td>79.67 (76.97–82.25)</td>
</tr>
</tbody>
</table>

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

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

ESD v EMR

- 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?

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

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


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

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