ESD, EMR and Advanced Polypectomy

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Colonoscopy with Polypectomy Prevents Colon Cancer

1993 Study N=1418
Polypectomy reduces the incidence of Ca by 90%

Colonoscopy with Polypectomy Prevents Deaths from Colon Cancer


2012 Study N=2602

Polypectomy reduces mortality from Ca by 53%

Types of Polyps

Histology
- Adenomatous: neoplastic
- Serrated
  - Hyperplastic: non-neoplastic
  - Traditional serrated adenoma: neoplastic
  - Sessile serrated adenoma: neoplastic
- Hamartomatous
  - Juvenile: neoplastic
  - Peutz-Jeghers: neoplastic
- Inflammatory (pseudopolyps)
- Carcinoid
Detection of Sessile Serrated Adenomas (SSA)

- 32 hospitals
- 7215 screening colonoscopies with polypectomy
- Detection rate of proximal SSA differed significantly among hospitals (p <0.0001)
- OR for SSA detection range: 0-0.79 !!!!
- In some hospitals pathologist never identified SSA

Payne SR, Gastroenterology 2014;12:1119

Sessile Serrated Adenomas

Quadruple treat for interval cancer
- Rapidly progressive
- Evade endoscopic detection
- More prone to incomplete resection
- Misdiagnosed by pathologist

Burgess, Gastrointest Endosc 2014;80:307
## Types of Polyps

### Shape
- Pedunculated
- Sessile
- LST
  - Granular (LST-G)
  - Non-Granular (LST-NG)

### Size
- Small (diminutive) <6 mm
- Medium 7-20 mm
- Large >20 mm

## Polyp Removal Techniques

- Cold biopsy forceps
- Cold snare excision
- Hot snare excision
- Hot biopsy forceps
- Endoscopic mucosal resection (EMR)
- Endoscopic submucosal dissection (ESD)

Fyock CJ, Draganov PV. Colonoscopic polypectomy. World J Gastroenterol. 2010;16:3630
Type of Polypectomy Technique

- No uniform consensus
- Based on expert opinion

Small (diminutive) Polyps <6 mm

- Cold forceps
  - Standard
  - Jumbo

Randomized control trial of standard versus jumbo forceps

<table>
<thead>
<tr>
<th></th>
<th>Standard (151)</th>
<th>Jumbo (154)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual Eradication</td>
<td>50%</td>
<td>79%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Residual Adenoma</td>
<td>23%</td>
<td>18%</td>
<td>=0.62</td>
</tr>
</tbody>
</table>

Draganov PV. Gastrointest Endosc 2012;75:118
Small (diminutive) Polyps <6 mm

No Electrocautery: bleeding, post-polypectomy syndrome, perforation

- Cold forceps
  - Easy
  - Immediate device availability
  - Resected tissue is easy to retrieve
  - Multiple bites may be required
  - Residual adenomatous tissue is common
- Cold snare
  - Technically more demanding
  - No need of multiple bites
  - Resected tissue more difficult to retrieve or may be lost
  - May need special snare
  - Complete resection
- No definitive answer which is better

Draganov PV. GIE 2012;75:118
Repici A. Endoscopy 2012;44:27

Medium Sized Polyps 7-20 mm

- Hot snare
  - Technically more demanding
  - Requires coordination between physician and assistant
  - Resected tissue more difficult to retrieve or may be lost
  - Type of electrocautery not well established
  - Complications related to electrocautery: delayed bleeding, post-polypectomy syndrome, perforation, pacemaker and defibrillator interference

Fyock CJ, Draganov PV. Colonoscopic polypectomy. World J Gastroenterol. 2010;16:3630
Medium Sized Polyps 7-20 mm
Pedunculated or Protruding Sessile

Medium Sized Polyps 7-20 mm
Flat Sessile
Medium Sized Polyps 7-20 mm
Flat Sessile

[Image of endoscopic views of medium sized polyps 7-20 mm flat sessile]
Medium Sized Polyps 7-20 mm
Flat Sessile

Cap EMR
Rectal Carcinoid
Peter V. Draganov, MD, FACG

Large Polyps >20 mm

- Confusing terminology: saline assisted polypectomy vs. piecemeal polypectomy vs. EMR
- En-block resection usually not possible

Fyock CJ, Draganov PV. Colonoscopic polypectomy. World J Gastroenterol. 2010;16:3630
Colon EMR: Piecemeal

Large Polyps >20 mm
EMR - Saline Assisted Polypectomy
Hot Biopsy Avulsion

Colonic EMR

• Prospective in 479 pts: complete resection 89%
• Predictors of incomplete resection
  – Prior attempt of EMR
  – “Difficult” polyp position
  – Ileocecal valve involvement
• Complications 8%
  – bleeding 3%
  – perforation 1.3% (3 pts treated w/endoscopy, 3 with surgery)
• Recurrence 20.4%
• Predictors of recurrence
  – Size >40 mm
  – Use of APC

Moss A. Gastroenterology. 2011;140(7):1909
Colonic EMR

- Retrospective cohort
- 315 defiant polyps
- Mean size 23 mm
- Complete eradication 91% (APC 24%)
- Complications 12%
- F/U available on only 135/258 pts
- Recurrence 27%

Buchner AM, Guarner-Argente C, Ginsberg GG. GIE. 2012;76(2):255

Colonic EMR

- Prospective cohort
- 252 large (>20 mm) sessile polyps “completely” resected
  - Polypectomy with injection/snare
  - APC at endoscopist discretion: 50%
  - F/U at 3, 6, and 12 mo with visual inspection chromoendoscopy and biopsy of the polypectomy site
- Results
  - Residual/Recurrent adenoma at F/U – 40%

Knabe M. Am J Gastroenterol 2014;109;183
Colonic ESD?

- En-bloc resection regardless of size
- Lower recurrence rate/Higher curative rate
- Allows resection when EMR is not feasible
- Allows endoscopic therapy in mucosal and superficial submucosal cancers in flat lesions
- Accurate histopathologic assessment of curative treatment
- Preserves organ integrity with higher quality of life

ESD Has Lower Recurrence and Higher Curative Rate Compare with EMR
ESD Has Lower Recurrence and Higher Curative Rate Compare with EMR

| Study or subgroup | ESD Events | ESD Total | EMR Events | EMR Total | Odds ratio
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight N, fixed, 95%CI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kim Y3 2013</td>
<td>1</td>
<td>115</td>
<td>0</td>
<td>91</td>
<td>5.9%</td>
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<tr>
<td>Kobayashi N 2012</td>
<td>0</td>
<td>28</td>
<td>12</td>
<td>56</td>
<td>6.9%</td>
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<tr>
<td>Lee EJ 2012</td>
<td>2</td>
<td>257</td>
<td>31</td>
<td>177</td>
<td>27.3%</td>
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<tr>
<td>Sakaguchi Y 2010</td>
<td>3</td>
<td>145</td>
<td>33</td>
<td>228</td>
<td>39.5%</td>
</tr>
<tr>
<td>Takahashi N 2011</td>
<td>1</td>
<td>94</td>
<td>16</td>
<td>104</td>
<td>13.7%</td>
</tr>
<tr>
<td>Terasaki M 2011</td>
<td>0</td>
<td>83</td>
<td>14</td>
<td>176</td>
<td>7.1%</td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>712</td>
<td>32</td>
<td>832</td>
<td>100.0%</td>
<td>0.09 [0.04, 0.19]</td>
</tr>
<tr>
<td>Total events</td>
<td>7</td>
<td>105</td>
<td>712</td>
<td>106</td>
<td></td>
</tr>
</tbody>
</table>
| Heterogeneity: $I^2 = 16$, df = 5 ($P = 0.31$); $Q = 16$
| Test for overall effect: $z = 6.31$ ($P < 0.00001$) |


ESD Allows Resection When EMR is not Feasible
ESD Allows for Accurate Histopathologic Assessment

ESD Preserves Organ Integrity and Patient Quality of Life
Lynch Syndrome
Why Not ESD?

- It has very limited application in the West
- It takes a long time to perform
- It has high complications rate
- Requires extensive training

ESD Has Limited Application in the West?
ESD Has Limited Applications in the West

Large LST
## ESD Has High Complications Rate

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>ESD Events</th>
<th>Total</th>
<th>ESD</th>
<th>Total</th>
<th>Weight</th>
<th>Odds ratio</th>
<th>Odds ratio</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N, fixed</td>
<td>95% CI</td>
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<tr>
<td>Kobayashi N 2012</td>
<td>5</td>
<td>20</td>
<td>1</td>
<td>56</td>
<td>6.6%</td>
<td>11.96 [1.32, 100.07]</td>
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<tr>
<td>Sato Y 2010</td>
<td>10</td>
<td>145</td>
<td>11</td>
<td>228</td>
<td>37.6%</td>
<td>1.46 [0.60, 3.53]</td>
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<tr>
<td>Tajika R 2011</td>
<td>7</td>
<td>85</td>
<td>3</td>
<td>104</td>
<td>15.3%</td>
<td>3.02 [0.76, 12.06]</td>
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</tr>
<tr>
<td>Terakawa M 2011</td>
<td>9</td>
<td>89</td>
<td>18</td>
<td>178</td>
<td>41.1%</td>
<td>1.60 [0.43, 6.33]</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>347</td>
<td>566</td>
<td></td>
<td></td>
<td>100.00%</td>
<td>1.59 [0.92, 2.73]</td>
<td></td>
</tr>
<tr>
<td>Total events</td>
<td>31</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Heterogeneity: $I^2 = 52.5$, df = 3 ($P = 0.15$); $I^2 = 43$
Test for overall effect: $Z = 1.67$ ($P = 0.09$)

ESD Requires Extensive Training

- Visit to Japan to observe experts
- Can you learn by observing?

ESD times post-observation were significantly shorter (32.7 vs. 63.5 min, p<0.001)

Draganov PV. World J Gastroenterol. 2014;20:4675

ESD Requires Extensive Training

- Self study
- Animal work
- Attend courses
- More animal work
- Observation of experts in action
- Start with easier cases
- More observation of experts in action

***Pitfalls***

- Sending patients for surgery
  - Underestimating success rate
  - Overestimating complications
- Getting aggressive bite on bite biopsies
- Getting partial snare resection to get large tissue sample
- Starting polypectomy/EMR and not able to complete
- Injecting India Ink at the base of the lesion
- Not marking the EMR site with tattoo

***Conclusions***

- Endoscopic polyp removal has revolutionized our approach to colonic polyps
- Polypectomy prevents colon cancer and saves lives
- Most polyps can be removed via endoscopy
- Small polyps - cold (jumbo) forceps or cold snare
- Medium polyps - hot snare ± saline lift
- Large polyps – EMR or ESD
- Even in large lesions Endoscopic polyp removal can be successful and safe