Polypectomy Techniques and Quality Assessment in Colonoscopy

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Polypectomy Has no Quality Metric

- Quality Markers in General In Colonoscopy

- Polypectomy
  - Find it
  - Decide what to do
    - Remove or not
  - Decide how to remove it
    - Piece meal vs. en bloc
    - EMR-define, Lift, Resect
  - Retrieve it
State of The State of the Colon

- Colorectal cancer (CRC) is the 2nd leading cause of cancer-related deaths in the United States
- 3.3 million annual outpatient colonoscopies (2010)
- CRC screening and colon polyp surveillance
  - ½ of all colonoscopy

Current CRC Screening Practices

- Female 65%, Male 64%-total 64%
- 50-65y 59%, 65-75y 76%
- White-66%, AA 64%, Hispanics, 51%

Procedures Done

- FOBT 12%
- Flex Sig 1%
- Colonoscopy 60%

2010 Data from CDC MMWR 2013
Economic Climate for Colonoscopy

- **2013**: CMS offers 1.5%, for reporting quality indicators through Physician Quality Reporting System (PQRS)
- **2014**: CMS will start penalizing -2.0% reduction in procedure reimbursement if QI not reported.
- **2015**: A quality index (formula to be determined) will be implemented to effect reimbursement per colonoscopy
<table>
<thead>
<tr>
<th>Authors (y)</th>
<th>Setting</th>
<th>Study design</th>
<th>Primary measurement</th>
<th>Overall CRC (95% CI)</th>
<th>Left-sided CRC (95% CI)</th>
<th>Right-sided CRC (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baxter et al (2009)</td>
<td>Ontario, Canada</td>
<td>Population based, case control</td>
<td>Exposure to colonoscopy between case patients who died of CRC and controls</td>
<td>OR 0.63 (0.57-0.69)</td>
<td>OR 0.33 (0.28-0.39)</td>
<td>OR 0.99 (0.86-1.14)</td>
</tr>
<tr>
<td>Mulder et al (2010)</td>
<td>the Netherlands</td>
<td>Population based, case control</td>
<td>Exposure to colorectal examinations* between case patients with a diagnosis of CRC and controls</td>
<td>OR 0.56 (0.33-0.94)</td>
<td>OR 0.36 (0.17-0.76)</td>
<td>OR 0.98 (0.42-2.25)</td>
</tr>
<tr>
<td>Brenner et al (2010)</td>
<td>Saarland, Germany</td>
<td>Population based, cross-sectional</td>
<td>Prevalence of advanced colorectal neoplasms according to colonoscopy history</td>
<td>PR 0.52 (0.37-0.73)</td>
<td>PR 0.33 (0.21-0.53)</td>
<td>PR 1.05 (0.63-1.76)</td>
</tr>
<tr>
<td>Singh et al (2010)</td>
<td>Manitoba, Canada</td>
<td>Population based, cohort</td>
<td>CRC mortality after colonoscopy compared with general population</td>
<td>SMR 0.71 (0.61-0.82)</td>
<td>SMR 0.53 (0.42-0.67)</td>
<td>SMR 0.94 (0.77-1.17)</td>
</tr>
<tr>
<td>Brenner et al (2011)</td>
<td>Rhine-Neckar, Germany</td>
<td>Population based, case control</td>
<td>Odds of CRC associated with previous colonoscopy</td>
<td>OR 0.23 (0.19-0.27)</td>
<td>OR 0.16 (0.12-0.20)</td>
<td>OR 0.44 (0.35-0.55)</td>
</tr>
</tbody>
</table>
Priority Indicators in Colonoscopy

- Priority indicators
  - (1) ADR
  - (2) intervals between colonoscopies performed for screening and surveillance
  - (3) cecal intubation rate with photographic documentation.
Adenomatous Polyp Removal Prevents Death

- 2602 pts. With adenoma removed followed 15.8 years
- 1246 had died from any cause
- SEER data expect 25 CRC deaths
- 12 had died from CRC
- Standardized Incidence Based Mortality ratio 0.47 [95% CI (0.26-0.80)]
ADR tracks with Interval Cancers

Kaminski et al. NEJM 2010
Limitations of ADR

- Corruptibility-one and done, indication changes
- Detection of Worrisome Lesions
  - Forest for the trees
- Not define removal adequacy
  - Is detection really the key (or only) driver in IC
Is ADR the Only Standard for Polyp Detection

11,049 polyps; 6681 colonoscopies; proximal serrated: 1238, (11%)

The proportion of colonoscopies with at least one proximal serrated polyp was 13% (range 1%-18%).

Proximal serrated polyp odds for endoscopists ranged from 0.05 to 0.67

Kahi et al. CGH 2011;9:42.
Advanced Adenoma Not Correlated to NonAdvanced Adenoma

Figure 2. Nonadvanced vs. advanced adenoma detection rates (ADRs) for all colonoscopists.

Figure 3. Nonadvanced vs. advanced adenoma detection rates (ADRs) adjusting for endoscopic oversizing of adenomas for all colonoscopists.

Flat polyp pathology

- Polypoid (n= 2463)
  - 1155 non-neoplastic
  - 1262 tub. adenoma
  - 33 villous adenoma
  - 13 carcinoma

- Flat (n = 289)
  - 80 non-neoplastic
  - 195 tub. adenoma
  - 5 villous
  - 9 carcinoma

- Depressed, n = 18
  - 12 tubular adenomas
  - 6 carcinomas
  - NO non-neoplastic

Soetikno et al; JAMA 2008
Polyp Detection Strategies

- Look for the signs
  - Mucus Cap
  - Loss of Vascularity
  - Deformity of the Colon Wall

- Use your Tools
  - Magnification
  - Image Enhanced Endoscopy
  - Position Change
    - retroflexion

- Have a good Bowel Prep
Finding Polyps
USE A HIGH QUALITY COLONOSCOPE
Loss of Vascularity
Look for the Mucus Cap
Magnification Chromoendoscopy

Serrated Adenoma
Mucosal Pit Pattern Type II and Type III L

Conventional endoscopy
Magnification chromoendoscopy
Paris shape classification

1p - pedunculated

1s - sessile

2a - flat, slightly elevated

2b - flat, completely flat

2c - flat, depressed

3 - flat, ulcerated

“Flat” polyps: Lesions with < 2.5mm elevation (width of snare catheter/bx cable)
Submucosal Invasion-

- Ulcerated surface
- Pit pattern type V invasive
- Nonlifting sign

Nonlifting Sign - Beware!
Central Ulcerations High Risk of Deep Submucosal Penetration
**Incomplete Polypectomy may be more important than we thought**

<table>
<thead>
<tr>
<th>Polyp Found:</th>
<th>4 (11.1)</th>
<th>32 (88.9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No (0 polyps)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Polyp Frequency (n= 36)</th>
<th>2 (0-9)</th>
</tr>
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<tr>
<td>Mean (range)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Polypectomy at Same Site as CRC</th>
<th>15</th>
<th>17 (53.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polypectomy at Same or Adjacent site as CRC</th>
<th>4</th>
<th>28 (87.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Report of Incomplete Polypectomy</th>
<th>20 (62.5)</th>
<th>12 (37.5)</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>16</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Not Applicable (No Polyp found)</td>
<td>4</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Polyp &gt; 10mm</th>
<th>20 (62.5)</th>
<th>12 (37.5)</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>16</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Not Applicable (No Polyp found)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Polyp Histology (n=25)</th>
<th>8 (32)</th>
<th>14 (56)</th>
<th>8 (32)</th>
<th>4 (16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperplastic polyp</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tubular Adenoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tubulovillous Adenoma</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Adenoma with Highgrade Dysplasia</td>
<td></td>
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More Cautions Relative
Contraindications

- More than 1/3 of the circumference
- Over the appendiceal orifice
- Polyp Bridging Two folds
Incomplete Resection Rate Varies

Pohl et al. Gastroenterology 2013;144:74
How Common is Incomplete Polypectomy (CARE)

<table>
<thead>
<tr>
<th>Neoplastic polyps</th>
<th>All (N = 346), n</th>
<th>Incompletely resected (n = 35) (10.1%), n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Polyp characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size, mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5–7</td>
<td>172</td>
<td>10 (5.8)</td>
</tr>
<tr>
<td>8–9</td>
<td>64</td>
<td>6 (9.4)</td>
</tr>
<tr>
<td>10–14</td>
<td>67</td>
<td>9 (13.4)</td>
</tr>
<tr>
<td>15–20</td>
<td>43</td>
<td>10 (23.3)</td>
</tr>
<tr>
<td>Location in the colon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left colon</td>
<td>135</td>
<td>11 (8.1)</td>
</tr>
<tr>
<td>Right colon</td>
<td>211</td>
<td>24 (11.4)</td>
</tr>
<tr>
<td>Location at fold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between/on a fold</td>
<td>271</td>
<td>25 (9.2)</td>
</tr>
<tr>
<td>Behind a fold</td>
<td>67</td>
<td>6 (9.0)</td>
</tr>
<tr>
<td>Morphology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonflat</td>
<td>158</td>
<td>11 (7.0)</td>
</tr>
<tr>
<td>Flat</td>
<td>153</td>
<td>19 (12.4)</td>
</tr>
<tr>
<td>Histology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adenoma&lt;sup&gt;c&lt;/sup&gt;</td>
<td>304</td>
<td>22 (7.2)</td>
</tr>
<tr>
<td>SSA/P</td>
<td>42</td>
<td>13 (31.0)</td>
</tr>
</tbody>
</table>

Pohl et al. Gastroenterology 2013;144:74
Submucosal Injection

A. Large sessile polyp

B. Injection

C. Polyp removal
Submucosal Injection Tips

- Do it Repeatedly
- Dynamic Injection
- If polyp is across a fold-inject in the valley first
Resection Tips

- Complete in one session
- Resection before ablation
  - APC is not meant for visible lesion
- Define the margins, consider marking edges
- Piece meal Resection is needed sometimes
  - >2cm
- Pick the right snare
  - Stiff snare better for flat

IF YOU ARE REFERRING - DON’T SNARE CHUNKS

Piece Meal vs. En Bloc

A, B, C, Endoscopic technique for piecemeal removal of large polyp with a corresponding endoscopic view.
Injection Defines the Edges
Injection into the submucosa to lift up a flat lesion prior to resection #1

Injection into the submucosa to lift up a flat lesion prior to resection #2

Injection into the submucosa to lift up a flat lesion prior to resection #3

Rigid snare pushed onto a flat polyp
It's all about the Prep

Boston Bowel Prep Scale

0 = Unprepared colon segment with mucosa not seen due to solid stool that cannot be cleared

1 = Portion of mucosa of the colon segment seen, but other areas of the colon segment not well seen due to staining, residual stool and/or opaque liquid

2 = Minor amount of residual staining, small fragments of stool and/or opaque liquid, but mucosa of colon segment seen well

3 = Entire mucosa of colon segment seen well; no residual staining, small fragments of stool or opaque liquid

Clip Tips

- Zipper from one side to the next
- Larger Polyp bases Bleed
  - 2 cm size clip
- Close then Assess then Deploy
- Try to close Defects
Post EMR

- Get Complete eradication
  - Resect then ablate in that order
  - Look for Complications
  - Close the defect if possible
- Medication Management
  - Hold nsaid
- Mark the lesion location
- Surveillance
  - Biopsy the scar
Close the Defect
Polypectomy Site may be normal but...
Small Polyp Forcep vs. Cold Snare
Resect and Discard

- Small Polyps by NBI are hyperplastic in appearance
- Resulted in a savings
  - $25 per person,
  - annual savings of $33 million.
- Unclear how reproducible in practice

_Clin Gastroenterol Hepatol 2010: 8(10): 865-869_
Cautery Margins as a Polypectomy Quality Marker

- Completely excised polyp
- Cauterized base
- Normal mucosa at the edges

- Incompletely excised polyp
- Cauterized base
- Adenomatous mucosa at the edges
Small Polyp Removal (<6mm)

- Complete removal <6mm
  - 93.2% by cold snare polypectomy (CSP)
  - to 75.9% cold forceps polypectomy (CFP).\(^1\,^2\)
- Failure to Retrieve inherent in CSP
  - Lee et al. reported 6.8% failure to retrieve rate
- Complete removal higher rate in cold snare
- Cold snare is as safe
- Failure to retrieve rate in Cold Snare
- Clinical Significance of incomplete removal never been defined.

Polypectomy Summary

- Polypectomy has no quality metric but needs one
- Right sided Polyps are frequently flat and harder to remove
- Define Edges of Flat polyps
- Assess for Clues to submucosal invasion
  - Ulceration
  - Nonlifting Sign
  - Kudo V loss of architecture of crypts
- Resect before Ablate
  - APC for the edges
- Try to close large defects
- Patients with Piece meal resection have early followup
- Surveillance colonoscopy should be with biopsy
- Polyps of 6 mm + snared