New Colonoscopy Techniques to Improve Adenoma Detection Rates

2016 PSG Annual Scientific Meeting

John M. Levenick, MD
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• I have no conflicts of interest.
Adenoma Detection Rate

- Most important quality indicator in colonoscopy
  - ADR <20% = 10x higher interval cancer rate compared to someone w/ ADR >20%
  - Every 1% increase in ADR, 3% decrease in subsequent colon cancer and 5% in death from CRC

Kaminski MF. N Engl J Med. 2010

A Simple Concept

- The more mucosa you see, the higher chance of recognizing and removing adenomas
  - Better prep
  - More time
  - Better visualization of hard to see areas
  - Improved identification of abnormal tissue
What is effect of bowel prep on ADR

• Poor Prep:
  – missed adenoma rate of 43%!
  – Repeat exam reveals a 34% ADR in patients with negative initial exam
  – 6.5% missed advanced polyp rate
  – 45-51% missed rate of flat or depressed polyps

• Fair Prep:
  – No clear detriment of ADR from fair to good/excellent

Single vs Split Dosed Prep

• More and more evidence showing split dose prep improves:
  – Patient satisfaction
  – Prep quality
  – ADR/SSPDR

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Split</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDR%</td>
<td>55.1</td>
<td>58.7</td>
<td>0.50</td>
</tr>
<tr>
<td>ADR%</td>
<td>31.7</td>
<td>36.6</td>
<td>0.34</td>
</tr>
<tr>
<td>SSPDR%</td>
<td>2.4</td>
<td>9.9</td>
<td>0.004</td>
</tr>
</tbody>
</table>
Communication is Paramount!

- Almost every communication method is better than no communication
  - Videos
  - Online education including videos
  - Phone calls
  - Office visit
  - Pictures

Effect of education on prep

<table>
<thead>
<tr>
<th>Study</th>
<th>RR (95% CI)</th>
<th>% Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millin J 2013</td>
<td>3.16 (1.89, 5.27)</td>
<td>12.65</td>
</tr>
<tr>
<td>Subtotal (p-value): 0.007</td>
<td></td>
<td>0.36</td>
</tr>
</tbody>
</table>

Effect of education on ADR

<table>
<thead>
<tr>
<th>Study</th>
<th>RR (95% CI)</th>
<th>% Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li X. et al. 2013</td>
<td>1.34 (0.71, 2.51)</td>
<td>35.82</td>
</tr>
<tr>
<td>Tu et al. 2012</td>
<td>1.00 (0.83, 1.21)</td>
<td>21.05</td>
</tr>
<tr>
<td>Habib et al. 2011</td>
<td>1.09 (0.82, 1.44)</td>
<td>17.13</td>
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<tr>
<td>Subtotal (I-squared = 79.34%, p&lt;0.001)</td>
<td></td>
<td>100.00</td>
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</table>

Procedural Aspects

- Cecal Intubation
- Withdrawl time
- Second look and/or retroflexion
- Water infusion
- Digital chromoendoscopy/chromoendoscopy
- Accessories and different scopes
Cecal Intubation

• Obvious – You have to see the whole colon to not miss lesions

• Complete colonoscopy is strongly associated with fewer deaths from cancer of the LEFT colon

• Incomplete colonoscopy is not clearly associated with increased death from proximal cancers

Withdrawal Time

• ASGE quality guideline is ≥6 min withdrawal
• More data showing longer may be better

<table>
<thead>
<tr>
<th>Median withdrawal time (m)</th>
<th>PDR %</th>
<th>ADR %</th>
<th>SDR %</th>
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<tbody>
<tr>
<td>3.5</td>
<td>38.7</td>
<td>20.1</td>
<td>3.9</td>
</tr>
<tr>
<td>6</td>
<td>42.6</td>
<td>23.8</td>
<td>5.0</td>
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<tr>
<td>7</td>
<td>50.8</td>
<td>30.2</td>
<td>8.3</td>
</tr>
<tr>
<td>8</td>
<td>52.0</td>
<td>30.4</td>
<td>10.2</td>
</tr>
<tr>
<td>9</td>
<td>53.1</td>
<td>33.6</td>
<td>9.5</td>
</tr>
<tr>
<td>&gt;10</td>
<td>47.8</td>
<td>20.8</td>
<td>11.8</td>
</tr>
</tbody>
</table>
Withdrawal Time

- ASGE quality guideline is ≥6 min withdrawal
- More data showing longer may be better

Polypectomy on way in?

- Some small polyps are hard to re-find on way out
- But, no difference for ADR with polypectomy on way in and out compared to just withdrawal
Right sided exam

- Retroflexion after initial exam shows a 9.3% miss rate
- Repeat second forward view exam of right colon is equivalent to retroflexion, with similarly increase in ADR (about 10% increase in ADR for segment)

Insertion technique – water exchange

- Still uncertain!
- Infuse water while advancing scope in an airless lumen with removal of water on insertion to “exchange” residual feculent water with clean water
- 3 studies show WE improves:
  - Bowel prep score
  - Decreases poor prep %
  - Improves ADR compared to either water immersion or air insufflation
Digital Chromoendoscopy (NBI, FICE, i-Scan)

- Attempts to accentuate changes in mucosa through filters to see different areas better
- No increase in ADR with any modality*
- Does help with borders and histology identification

Chromoendoscopy

- Topical application of stains or dyes to enhance visualization
- In high risk individuals, increases ADR
- Cochrane recently showed significant increase in ADR in all comers
- No improvement in ADR in average risk screening (and time consuming)
Cap-assisted colonoscopy

- Transparent cap allows you to “peel back” the fold to see proximal aspect
- Largest US study shows no clear benefit (helped some, hindered others)
- Does increase TI intubation rates and reduces cecal intubation time

<table>
<thead>
<tr>
<th>Endoscopist</th>
<th>Patients</th>
<th>ADR, %</th>
<th>Delta</th>
<th>P</th>
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<tbody>
<tr>
<td>Standard</td>
<td>Cap-assisted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>36</td>
<td>55</td>
<td>20</td>
<td>0.704</td>
</tr>
<tr>
<td>B</td>
<td>197</td>
<td>43</td>
<td>10</td>
<td>0.773</td>
</tr>
<tr>
<td>C</td>
<td>77</td>
<td>52</td>
<td>9</td>
<td>0.813</td>
</tr>
<tr>
<td>D</td>
<td>16</td>
<td>40</td>
<td>7</td>
<td>0.499</td>
</tr>
<tr>
<td>E</td>
<td>136</td>
<td>42</td>
<td>2</td>
<td>0.463</td>
</tr>
<tr>
<td>F</td>
<td>248</td>
<td>27</td>
<td>3</td>
<td>0.657</td>
</tr>
<tr>
<td>G</td>
<td>56</td>
<td>29</td>
<td>1</td>
<td>0.876</td>
</tr>
<tr>
<td>H</td>
<td>54</td>
<td>38</td>
<td>5</td>
<td>0.557</td>
</tr>
<tr>
<td>I</td>
<td>49</td>
<td>76</td>
<td>15</td>
<td>0.732</td>
</tr>
<tr>
<td>J</td>
<td>172</td>
<td>72</td>
<td>15</td>
<td>0.088</td>
</tr>
<tr>
<td>All</td>
<td>1113</td>
<td>42</td>
<td>2</td>
<td>0.452</td>
</tr>
</tbody>
</table>

EndoCuff

- Increased ADR from 42% to 56% over unassisted colonoscopy
  - Sigmoid 15 to 32%
  - Cecum from 4 to 7%
- Increased ADR by 67% in a new unpublished cohort
EndoRings

- Duel layers of soft rings to mechanically stretch colonic folds upon withdrawal
- Adenoma miss rate in tandem study:
  - EndoRings: 10.4%
  - Conventional: 52.8%

G-EYE

- Mounted, integral reusable balloon at deflection area of scope
- Inflated on withdrawal to peel back folds and stabilize

<table>
<thead>
<tr>
<th></th>
<th>Colonoscopy</th>
<th>G-EYE</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ADR</strong></td>
<td>33.8%</td>
<td>49.2%</td>
<td>45.6</td>
</tr>
<tr>
<td><strong>Adenoma / patient</strong></td>
<td>0.57</td>
<td>0.93</td>
<td>63.2</td>
</tr>
<tr>
<td><strong>Diminutive adenoma</strong></td>
<td>67</td>
<td>105</td>
<td>56.7</td>
</tr>
<tr>
<td><strong>&gt;10 mm</strong></td>
<td>26</td>
<td>51</td>
<td>96.2</td>
</tr>
<tr>
<td><strong>Advanced adenoma</strong></td>
<td>32</td>
<td>63</td>
<td>96.9</td>
</tr>
</tbody>
</table>
FUSE

- 330° imaging of the colon
- Helps view “behind” folds without additional maneuvers
- In tandem study: FUSE had a decreased adenoma miss rate of 7% vs 41% for conventional colonoscopy
- New study: FUSE vs standard in FIT+ patients: No difference in ADR though
Third Eye Panoramic

- Next generation from old through the scope retrospectascope
- Reusable attachment placed on top of scope giving a 330°

https://youtu.be/p3xb4zXztww

Self-improvement

- Education / Qualitlity improvement increases ADR
  - EQUIP study
  - EQUIP II
    - The increase in ADR is durable
  - EQUIP III (epub only)
    - Multicenter: education increases ADR in participating sites (but ADR went up in other sites too so effect is unclear)

Wallace MB Am J Gastroenterol 2013
Wallace MD Am J Gastroenterol 2015
Rex DK Gastrointest Endosc 2016
My take home points

• The longer you look at more mucosa, the higher ADR you reach

• This requires:
  – Adequate bowel cleanse
  – Improved techniques to visualize mucosa
  – Technologies, whether mechanical or visual, to see more area, better
  – Better recognition of abnormal areas