New Colonoscopy Techniques to Improve ADR: To Roll, Cap or Retroflex

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Adenoma Detection Rate

- 2002: ADR introduced by MSTF on CRC
  - % of persons age ≥ 50 ≥ 1 adenoma
  - Thresholds: ≥ 25% in men; 15% in women
- 2006: modified by ACG/ASGE Task Force
  - % of first time screening colonoscopies in persons age ≥ 50 with ≥ 1 adenoma
  - Thresholds: unchanged from 2002
- 2015: ACG/ASGE Task Force on Quality
  - Thresholds: ≥ 30% in men; 20% in women
New thresholds for ADR

- **Men**: 30%
- **Women**: 20%
  
  - Rex et al AJG 2015;110:72-90
  - Rex et al GIE 2015;81:31-53

Definition of ADR

- Fraction of patients age ≥ 50 y undergoing first time screening colonoscopy who have ≥ conventional adenoma(s) (adjusted only for gender)
- **Why?**
  - Surveillance examinations run 5-7% higher
  - Sessile serrated adenomas (SSA/P)
    - Are not adenomas
    - Cannot be reliably identified by pathologists
  - No other factors require adjustment
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Reliable Colon Polyp Pathology?

Not reliable
- Conventional adenomas
  - Dysplasia grade
  - Tubular vs tubulovillous
- Serrated class lesions
  - SSP vs hyperplastic
  - Identifying TSA

Reliable
- Placing lesions into the conventional adenoma class vs serrated class
- Identifying cancer

Pathologic differentiation of SSA/P from HP

MVHP

SSA/P
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  - Jensen et al CGH; 2015; 13:739-46

ADR: Strengths and Weaknesses

- Strengths
  - Reliable measure of endoscopist performance in examining colons
  - Validated predictor of cancer protection

- Weaknesses
  - Potentially subject to gaming
  - Requires manual entry of pathology data
    - Recent solutions: software linkages and natural language processing
Impact of ADR on Prevention of Cancer

- For each 1% increase in ADR:
  - 3% decline in incidence of interval CRC
  - 5% decline in incidence of fatal CRC
    - Corley et al. NEJM; 2014; 370: 1298-306
- Increasing ADR is cost-effective
  - Higher cost of more colonoscopies is outweighed by the reduction in cost of cancer care
    - Meester et al. JAMA 2015; 313: 2349-58

Withdrawal time

- Should be recorded in every examination (for medical-legal purposes alone)
- Correlates with ADR in numerous retrospective studies
  - Barclay et al. NEJM 2006; 355: 2533-41
- Correlated with cancer prevention in a recent study
  - Shaukat et al. Gastroenterology 2015; 149: 952-7
- Doesn’t work when used prospectively as a corrective measure
  - Sawhney et al. Gastroenterology 2008; 135: 1892-8
Don’t get sucked in by WT

- If you examine the colon carefully with proper technique you will have WT's that meet the standard
- If you use WT as the sole quality indicator and don’t change technique you will not improve detection

Non-device measures to increase ADR
Non-procedural tools to increase ADR

- Training in lesion recognition and withdrawal technique
  - Barclay CGH 2008;6:1091-8
  - Coe AJG 2013; 107:1265
- Reporting to physicians
  - Kahi GIE 2013;77:335
- Reporting to the public
  - Abdul-Baki GIE 2015;82:668
- Split-dosing bowel preparation
  - Gurudu GIE 2013;76:603

Non-device dependent techniques to increase ADR

- Videorecording
  - Rex AJG 2010;105:2312
  - Madhoun GIE; 2012:75:127
- 8 minute timer (with education!)
  - Barclay CGH 2008;6:1091-8
- Retroflexion
- Rolling (position change)
Retroflexion during colonoscopy

- Essential for some polypectomies
  - Rex GIE;2006;63:144
  - Pishvaian AJG 2006;101:1479

- Overrated in the rectum
  - Cutler AJG 1999;94:1537
  - Saad WJG 2008;14:6503

- Not better than second examination in forward view in the right colon

Retroflexion for right colon detection

- Descriptive studies
  - Hewett GIE 2011; 74: 246
  - Chandran GIE; 2015; 81:608

- Randomized controlled trials
  - Harrison AJG 2004; 99:519
  - Kushnir AJG 2015;110:415
Descriptive studies of right colon retroflexion

<table>
<thead>
<tr>
<th>Study</th>
<th>Number of patients</th>
<th>Success rate</th>
<th>Gain in ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewett</td>
<td>1000</td>
<td>94.9%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Chandran</td>
<td>1351</td>
<td>95.9%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Retroflexion for right colon detection

- Descriptive studies
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RCT of second exam in retro vs forward view (Kushnir)

- 850 patients with right colon clearing
- At least one more adenoma
- Forward view: 10.5% with P=0.13
- Retro view: 7.5%

Retroflexion: Bottom line

- Examine the right colon twice sometimes:
  - First exam shows polyps
  - Older age, male gender
  - Lynch syndrome
- A second exam in the forward view is as good as a second exam in retroflexion
Position change

- Possible mechanisms of action
  - Bowel distention
  - Change in bowel conformation

Mechanism in positive study

- ADR with position change 34% vs 23% with LLD only
- ADR in segments with adequate distention scores 16% vs 7% with suboptimal scores
  - East GIE 2011; 73:456
  - East GIE; 2007;65:263
### RCTs of position change

<table>
<thead>
<tr>
<th>Study</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rex 1997</td>
<td>No effect</td>
</tr>
<tr>
<td>East 2011</td>
<td>Positive (overall 11% gain in ADR)</td>
</tr>
<tr>
<td>Ou 2014</td>
<td>No effect</td>
</tr>
<tr>
<td>Ball 2015</td>
<td>Positive in right colon (8.5% gain in polyp detection; LLD vs supine) No effect in left colon</td>
</tr>
</tbody>
</table>

### Position change: bottom line

- Hard to do with propofol; may not be safe
- Should be able to distend the colon without position change
  - Use CO2
  - Prevent gas from escaping the colon
  - If still unable to fill segment use water
Other Tools and Devices for ADR

Early polyp detection tools and devices

Mucosal exposure
- 170-230 angle of view
- Cap-fitted *
- Third-Eye

Highlighting flat lesions
- Chromoendoscopy*
- High definition*
- Narrow band imaging
- FICE
- i-scan
- Autofluorescence

* some benefit
New effective devices

- FUSE*
- Endocuff*
- Endorings*
- G-EYE

Full Spectrum Endoscopy™
FDA cleared & CE Mark

330° Field of View
Full Spectrum Endoscopy (FUSE)

Endocuff
Endocuff

EndoRing
### Tandem studies

<table>
<thead>
<tr>
<th>Technology</th>
<th>Author</th>
<th>Number of patients</th>
<th>Technology adenoma miss rate (per lesion)</th>
<th>Standard colonoscop y adenoma miss rate</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>FUSE (3 CCD 330 angle of view scope)</td>
<td>Grañek</td>
<td>185</td>
<td>7%</td>
<td>41%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>G-EYE (balloon – Pentax only)</td>
<td>Gross</td>
<td>112</td>
<td>4%</td>
<td>44%</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Endo-rings (OTS fold straightener)</td>
<td>Dik</td>
<td>71</td>
<td>15%</td>
<td>48%</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

### Endocuff RCTs

<table>
<thead>
<tr>
<th>Patients with ≥ 1 adenoma (ADR)</th>
<th>Biecker J Clin Gastro 2014</th>
<th>36%</th>
<th>28%</th>
<th>.043</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total adenomas per patient (APC)</td>
<td>Biecker J Clin Gastro 2014</td>
<td>2.0</td>
<td>1.0</td>
<td>.002</td>
</tr>
<tr>
<td>Total adenomas per patient (APC)</td>
<td>Floer UEGW 2014</td>
<td>0.90</td>
<td>0.54</td>
<td>.014</td>
</tr>
</tbody>
</table>
Third Eye® Panoramic™ Device

- Two side-viewing video cameras with LED light sources supplement colonoscope’s view
- Creates panoramic image (~330°)
- Clips onto exterior of any standard pediatric or adult colonoscope

Panoramic View in Normal Colon

Summary

- ADR is important!!
- Effective methods to improve ADR:
  - Education: lesion recognition and excellent technique (adequate time)
  - Effective bowel preparation
  - Measurement, reporting
  - High definition scopes
  - Chromoendoscopy works (but you probably won’t do it)
  - New devices: FUSE, Endocuff, Endorings