Tips to Improve ADRs during Colonoscopy

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Outline

• Why is quality important?
• Fundamentals of high-quality exam
• Strategies and technology to improve ADR: what works?
Why you should care about quality

• Effective
  – Detection and prevention of CRC
  – Reduce missed CRC
• Safe
  – Reducing complications
• Reimbursement
  – Physician quality reporting system
  – High value practice
• Patient satisfaction

Quality Indicators of colonoscopy

• Adenoma detection rate
• Withdrawal time
• Perforation rate
• Completion rate
• Photo documentation of cecum
• Prep quality documentation
• Appropriate surveillance interval for Ulcerative Colitis
• Appropriate indication
• Appropriate screening interval
• Appropriate surveillance interval


Current PQRS measures also!

- Adenoma detection rate
- Withdrawal time
- Complication rate
- Completion rate
- Photo documentation of cecum
- Prep quality documentation
- Number of colonoscopies that need repeat exams due to poor prep


PQRS Recap

Under the Affordable Care Act, CMS requires reporting PQRS (~284 to choose from)

<table>
<thead>
<tr>
<th>Year</th>
<th>Payment Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.5% Bonus Payment</td>
</tr>
<tr>
<td>2015</td>
<td>1.5% Cut for those EPs unsuccessfully reporting PQRS measures in 2013 No bonus payment for EPs who successfully reported PQRS data to avoid payment cut</td>
</tr>
<tr>
<td>2016 and beyond</td>
<td>2% Cut for those EPs unsuccessfully reporting PQRS measures in 2014 No bonus payment for EPs who successfully reported PQRS data to avoid payment cut</td>
</tr>
</tbody>
</table>

PQRS Recap

- ACA required CMS to create the “Medicare Physician Compare” website
- Will display individual physician performance on quality measures
- Website launched in December 2010
- In 2013 CMS displayed successful participation in the PQRS, electronic prescription (eRx) incentive program, and Medicare electronic health record (EHR) “meaningful use” program
- CMS will report “patient experience” quality measures for groups 25+


Physician Perceptions on Colonoscopy Quality

- Survey of 1500 ACG members, 12% responded
- 38% reported receiving any feedback on their colonoscopy quality

Adenoma detection rate

- ADR during screening colonoscopies in average-risk men and women over age 50

  \[
  \text{# of COL where at least 1 adenoma is found}
  \]
  \[
  \text{Total # of COL performed}
  \]

  In a given time period per endoscopist

- Higher ADR = higher quality exam = fewer missed cancers
- Goal was:
  - >25% for men ≥50 yrs
  - ≥ 15% for women ≥50 yrs


ASGE practice guideline: Measuring the Quality of Endoscopy. Gastrointest Endosc 2006;58:S1-S38

In 2015:

- 30% for men
- 20% for women


Is ADR associated with interval CRC?

- Screening colonoscopy on 45,026 subjects by 186 endoscopists
- 42 interval colorectal cancers over 188,788 person-years.
- Compared to ADR of >20%:
  - ADR <11%: HR 10.9 (1.3 to 87.0)
  - ADR 11-14.9%: HR 10.7 (1.3 to 85.0)
  - ADR 15.0 -19.9%: HR12.5 (1.51 to 103.4)

ADR and interval CRC

- Kaiser Permanente Northern California health plan members
- COL for any indication 1998-2010
- Follow-up: 10 yrs, another COL, CRC diagnosis, Jan 2011, termination of membership
- 139 Gastroenterologists (min>300 COL, >75 screening COL)

Corley D et al. NEJM 2014;370:2539-41
Results

- 316,334 COL, 716 Interval CRC
- Lower ADR associated with higher Interval CRC

<table>
<thead>
<tr>
<th>Physician ADR</th>
<th>Hazard Ratios for Interval CRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20.3%</td>
<td>1.74 (1.36, 2.24)</td>
</tr>
<tr>
<td>20.3%-25.2%</td>
<td>1.52 (1.14, 2.04)</td>
</tr>
<tr>
<td>25.3%-32.0%</td>
<td>1.31 (1.00, 1.73)</td>
</tr>
<tr>
<td>&gt;32.0%</td>
<td>1.00</td>
</tr>
</tbody>
</table>

- No difference by right or left location
- No difference by patient sex

Factors associated with higher ADR

- **Patient level:** Age, gender and family history
- **Procedure level:**
  - Preparation quality
  - Completion rate
  - Withdrawal time
  - Withdrawal technique
- **Physician level:**
  - Training/skill/specialty of endoscopist
  - Central gaze pattern

Almansa et al. AJG 2011;106:1070-1074
Role of technologies to improve ADRs

High definition vs. Standard Video Endoscopes

- 5 studies; n= 4422
- Incremental yield for adenoma detection with HD: 3.5% (95% CI 0.9% - 6.1%)
- No difference in the detection of advanced adenomas, -0.1% (95% CI -1.7% to 1.6%)

HD-NBI vs. HD-white light colonoscopy for detection of adenomas

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Odds ratio M-H, random, 95% CI</th>
<th>Odds ratio M-H, random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adler (2009)</td>
<td>0.74 (0.54, 1.00)</td>
<td></td>
</tr>
<tr>
<td>East (2010)</td>
<td>0.84 (0.59, 1.19)</td>
<td></td>
</tr>
<tr>
<td>Gioune (2005)</td>
<td>7.14 (0.68, 75.22)</td>
<td></td>
</tr>
<tr>
<td>Inoue (2009)</td>
<td>0.82 (0.39, 1.71)</td>
<td></td>
</tr>
<tr>
<td>Kaltenbach (2008)</td>
<td>1.46 (1.00, 2.09)</td>
<td></td>
</tr>
<tr>
<td>Stiffo (2008)</td>
<td>1.17 (0.72, 1.90)</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>1.01 (0.74, 1.37)</td>
<td></td>
</tr>
</tbody>
</table>

- Six studies; n=2,284; OR: 1.01; CI: 0.74–1.37
- No difference in detection of adenoma

HD-NBI vs. HD-white light colonoscopy for detection of flat adenomas

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Odds ratio M-H, random, 95% CI</th>
<th>Odds ratio M-H, random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adler (2009)</td>
<td>0.41 (0.23, 0.74)</td>
<td></td>
</tr>
<tr>
<td>East (2010)</td>
<td>2.01 (1.61, 5.27)</td>
<td></td>
</tr>
<tr>
<td>Inoue (2008)</td>
<td>0.95 (0.37, 2.47)</td>
<td></td>
</tr>
<tr>
<td>Kaltenbach (2008)</td>
<td>1.63 (0.90, 2.94)</td>
<td></td>
</tr>
<tr>
<td>Paigl (2009)</td>
<td>1.66 (0.85, 3.24)</td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td>1.26 (0.82, 1.97)</td>
<td></td>
</tr>
</tbody>
</table>

- Five studies; n=2,200; OR: 1.63; CI: 0.71–3.74;  
- No difference in detection of advanced adenoma
Cap-assisted colonoscopy vs. Standard colonoscopy

- 16 RCTs, n=8991; 6 with ADR reported
- **No difference in detection of adenoma**
  - RR: 1.04; 95% CI: 0.90–1.19
- Reduced the cecal intubation time with CAC by ~40 sec; mean difference -0.64 min; 95% CI: -1.19 to -0.10


Retrograde viewing device

<table>
<thead>
<tr>
<th>Indication</th>
<th>Group A (SC, then TER) n=173</th>
<th>Group B (TER, then SC) n=176</th>
<th>Net additional detection with TER (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SC 1st</td>
<td>TER 2nd</td>
<td>Net Addnl ADR (%)</td>
</tr>
<tr>
<td>All indications</td>
<td>107</td>
<td>49</td>
<td>45.8</td>
</tr>
<tr>
<td>Screening</td>
<td>54</td>
<td>19</td>
<td>35.2</td>
</tr>
</tbody>
</table>

SC screening colonoscopy; retrograde viewing device colonoscopy

- Second look increases ADR
- Benefit of retrograde viewing marginal

Siersema PD. World J Gastroenterol. 2012 14;18:3400-8
Other promising technologies

• Full spectrum endoscopy

Gralnek I et al. DDW 2013

FUSE vs. COL

• Multicenter RCT, n=185
• Same day back-to-back tandem COL with FV colonoscope and FUSE

Results:
• More adenomas detected w FUSE
• No difference in ADR
• ??Impact on clinical outcomes

G-EYE Endoscope

- Case series, n=47
- Cecal intubation: 100%
- ADR 44.7%
- 2 minor adverse events
- Safe and feasible
- Comparative trials underway


Emerging Technologies

- Third Eye Panoramic
- Extra wide angle view colonoscope
What interventions improve ADRs?

**Split prep is superior to other preps**

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Favors 4L split dose</th>
<th>Favors comparator</th>
<th>Odds ratio M-H, random, 95% CI</th>
<th>Odds ratio M-H, random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1: Excellent - good prep</td>
<td>Events</td>
<td>Total</td>
<td>Events</td>
<td>Total</td>
</tr>
<tr>
<td>AbdAl-Badi, H. et al. 2008</td>
<td>92</td>
<td>107</td>
<td>78</td>
<td>193</td>
</tr>
<tr>
<td>Aoun, E. et al. 2005</td>
<td>52</td>
<td>68</td>
<td>41</td>
<td>73</td>
</tr>
<tr>
<td>Corporaal, S. et al. 2010</td>
<td>151</td>
<td>158</td>
<td>135</td>
<td>149</td>
</tr>
<tr>
<td>El C, et al. 2008</td>
<td>147</td>
<td>155</td>
<td>136</td>
<td>153</td>
</tr>
<tr>
<td>El C, et al. 2003</td>
<td>49</td>
<td>59</td>
<td>42</td>
<td>114</td>
</tr>
<tr>
<td>Enestvedt, B. et al. 2011</td>
<td>85</td>
<td>103</td>
<td>59</td>
<td>87</td>
</tr>
<tr>
<td>Heikkinen, M. et al. 2011</td>
<td>49</td>
<td>101</td>
<td>54</td>
<td>302</td>
</tr>
<tr>
<td>Memo R, et al. 2010</td>
<td>100</td>
<td>218</td>
<td>95</td>
<td>215</td>
</tr>
<tr>
<td>SS Peri, et al. 2010</td>
<td>61</td>
<td>80</td>
<td>95</td>
<td>192</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>840</td>
<td>1040</td>
<td>735</td>
<td>1428</td>
</tr>
</tbody>
</table>

Total events

Heterogeneity: Tau² = 0.16; Chi² = 20.81; df = 8 (P = 0.008); I² = 62%

Test for overall effect: Z = 7.04 (P < .00001)

- Compared 4L PEG split prep to all others
- 9 studies; 7 of 9 favored split prep;
- Split prep superior for excellent-good prep:
  OR 3.46 (95% CI: 2.45–4.89)

No difference in patient tolerance between Split dose and others

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Studies, n</th>
<th>N</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable overall experience</td>
<td>4</td>
<td>439</td>
<td>1.58</td>
<td>0.82–3.03</td>
</tr>
<tr>
<td>Bowel preparation compliance</td>
<td>6</td>
<td>718</td>
<td>1.41</td>
<td>0.65–3.05</td>
</tr>
<tr>
<td>Willingness to repeat</td>
<td>4</td>
<td>870</td>
<td>0.79</td>
<td>0.43–1.45</td>
</tr>
<tr>
<td>Bloating</td>
<td>3</td>
<td>851</td>
<td>0.69</td>
<td>0.13–3.64</td>
</tr>
<tr>
<td>Nausea</td>
<td>6</td>
<td>1587</td>
<td>0.92</td>
<td>0.61–1.39</td>
</tr>
<tr>
<td>Abdominal cramping</td>
<td>5</td>
<td>1391</td>
<td>0.98</td>
<td>0.75–1.27</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>2</td>
<td>373</td>
<td>0.91</td>
<td>0.58–1.45</td>
</tr>
</tbody>
</table>


Split prep = higher ADR

Withdrawal time and ADR

- **Withdrawal time:**
  - Should be at least 6 minutes in colonoscopies without biopsy or polypectomy

- **Withdrawal technique:**
  - Adequate distention
  - Washing and clean up
  - Looking behind folds
  - Segmental inspection and subjective timing

ASGE practice guideline: Measuring the Quality of Endoscopy. Gastrointest Endosc 2006;58:S1-S38
Rex DK. Colonoscopic Withdrawal technique is associated with adenoma miss rate. Gastrointest Endosc 2000;51:33-6

Withdrawal Time alone

- Mandating longer WD time does not increase PDR

![](image1)

Sawhney MS et al Gastro 2008;135;1892
Segmental withdrawal time plus enhanced inspection technique

• Setting:
  – 12 GI, community-based practice setting, Rockford, IL
• Intervention:
  – Adopted an 8-min withdrawal time (2 min per colonic segment) using an audible timer
  – Reviewed inspection techniques
• Results: ADR improved from 23.5% to 34.7% ($P < 0.0001$)


Video recording colonoscopists improves quality of exam

<table>
<thead>
<tr>
<th></th>
<th>Pre-awareness Score Mean (SD)</th>
<th>Post-awareness Score Mean (SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall quality index (1-5)</td>
<td>2.9 (0.9)</td>
<td>3.8 (0.9)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Fold examination (1-5)</td>
<td>2.5 (1.0)</td>
<td>3.5 (0.8)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Luminal distention (1-5)</td>
<td>3.4 (1.0)</td>
<td>4.2 (0.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Clean-up (1-5)</td>
<td>3.0 (0.8)</td>
<td>3.9 (0.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Adequacy of inspection (1-5)</td>
<td>2.6 (1.0)</td>
<td>3.7 (0.8)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Measured inspection time (min)</td>
<td>4.9 (2.2)</td>
<td>7.3 (1.8)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Video recording improves ADR

- ADR improved from 33.7% to 38.5%
- Individual GI physicians:
  - 5/6 had numerical increases
  - One physician increased from 22.6% to 57.7%

Multiple interventions: “Endoscopic Quality Improvement Project” (EQUIP)

- 15 Endoscopist; half received training
- 2 Educational sessions (1-1.5 hrs each)
  - Techniques to improve detection
  - Techniques to distinguish adenoma vs hyperplastic
  - Videos of highest ADR doctors pullback methods
- Monthly feedback on ADR and WD time
  - Results posted on ASC wall (de-identified)

<table>
<thead>
<tr>
<th></th>
<th>Phase I ADR (baseline)</th>
<th>Phase II ADR</th>
<th>Phase III ADR (5 mo later)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQUIP</td>
<td>36%</td>
<td>47%</td>
<td>46%</td>
</tr>
<tr>
<td>Control</td>
<td>36%</td>
<td>35%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Endoscopist report card

- 6 Endoscopists in Indianapolis
- Quarterly report card on quality measures starting 2009
- Compared ADR and cecal intubation rate before and after intervention

<table>
<thead>
<tr>
<th></th>
<th>Before (95% CI)</th>
<th>After (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR</td>
<td>44.7% (39.1%-50.4%)</td>
<td>53.9% (49.7%-58.1%)</td>
<td>0.013</td>
</tr>
<tr>
<td>Cecal intubation rate</td>
<td>95.6% (92.5%-97.5%)</td>
<td>98.1% (96.7%-99.0%)</td>
<td>0.027</td>
</tr>
</tbody>
</table>


Other Interventions

- Retroflexion in the cecum versus re-examining right colon during withdrawal
- Left versus right lateral decubitus position during withdrawal
- Changing patient position during withdrawal

- Mixed Results
  - Seem to benefit low performers

Ball AJ et al. Gastrointest Endosc. 2015;82(3):488-94
Multiple interventions: mixed results

• 2 studies
• Setting: Como, Italy (8 GI) and Seattle, WA (10 GI)
• Interventions: Performance discussed, less-skilled examiners counseled periodically
• Low detectors met with unit head to review data and technique
• Received periodic (every 3-6 mo) confidential and then group-level communication on withdrawal times, detection rates, and patient satisfaction
• Results:
  – No change in ADR
  – PDR improved from 33.1% to 38.1% (P <0.04) in one.
  – Range of PDR narrowed in the other.


Multiple interventions

• Setting: 43 GI, community setting Minneapolis, MN
• Interventions:
  – Reviewed ADRs blinded then un-blinded
  – Reviewed quality measures including prep quality and withdrawal time.
  – Leadership met with poor performers
  – Imposed 1% financial penalty for not achieving 6 min withdrawal time for 95% of examinations
• Result: No change in ADRs

Multiple Interventions and persistence

ADR and Interval cancers

WT and Interval cancer

Physicians’ average annual withdrawal times were inversely associated with interval cancers (p <0.0001)

WT and ADR are correlated

Estimated slope 2.5% per min, 95% CI 1.9 to 3.1; p < 0.0001
Results

• Shorter withdrawal times were independently associated with an increased risk of interval colorectal cancer
• Longer withdrawal time is associated with higher ADR


Changing landscape

• Look for it!
• Complete exam
• Excellent Prep quality
• Careful segmental inspection
• Think beyond ADR
Summary

• Good technique is essential
  – Careful segmental inspection
  – Look behind folds
  – Segmental and timed withdrawal
  – Look for flat lesions

• Technology can help but is no substitute

• ADR is a valid quality measure
  – Can be improved in practice

• Split dose prep improves quality and tolerance

Quality improvement tools

– High frequency or continuous feedback
– Compensation related: positive or negative
– Second examiner (video recording)
– Courses on improving quality indicators
– Videos on techniques to increase quality indicators
– Continuous feedback
– Eye exams for low performers
– Proctoring
– Persistence