Quality in Endoscopy: Can We Do Better?

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Advanced Therapeutic Endoscopy
Goals of Lecture

- Overview of Performance Targets and Priority Indicators in Endoscopic Procedures
- Improving Quality in Colonoscopy
- Quality Endoscopic Targets in Inflammatory Bowel Disease
Overview of Performance Targets and Priority Indicators in Endoscopic Procedures
American Society for Gastrointestinal Endoscopy (ASGE)/American College of Gastroenterology (ACG) Task Force on Quality in Endoscopy

- Define the elements of high-quality endoscopy
- Facilitate ways to measure it by performance targets
- 2006 - Published first set of quality indicators
- 2009 - GI Quality Improvement Consortium, Ltd (GIQuIC)
- 2015 - Updated published set of quality indicators

Bjorkman DJ, Popp JW. Gastrointest Endosc. 2006 Apr;63(4 Suppl):S1-2
PERFORMANCE TARGETS (INDICATORS) FOR ALL ENDOSCOPIES

- Obtained from benchmarking data available or expert consensus

Priority indicators = High priority subset

Documentation

Rizk MK et al., Gastrointest Endosc. 2015 Jan;81(1):3-16.
<table>
<thead>
<tr>
<th>Pre-Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper indication ***</td>
</tr>
<tr>
<td>Informed consent</td>
</tr>
<tr>
<td>Pre-procedure history and physical, and risk stratification</td>
</tr>
<tr>
<td>Prophylactic antibiotics when appropriate ***</td>
</tr>
<tr>
<td>Sedation plan</td>
</tr>
<tr>
<td>Anticoagulation management ***</td>
</tr>
<tr>
<td>Team pre-procedure pause / credentialed endoscopist</td>
</tr>
</tbody>
</table>

Priority Indicator ***

Rizk MK et al., Gastrointest Endosc. 2015 Jan;81(1):3-16.
<table>
<thead>
<tr>
<th>Intraprocedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photodocumentation</td>
</tr>
<tr>
<td>Patient monitoring during sedation</td>
</tr>
<tr>
<td>Medications (Dose / Route) and reversal agents</td>
</tr>
<tr>
<td>Procedure interruption / termination from sedation issues</td>
</tr>
</tbody>
</table>

Priority Indicator***

Rizk MK et al., Gastrointest Endosc. 2015 Jan;81(1):3-16.
### QUALITY TARGETS

**Postprocedure**

<table>
<thead>
<tr>
<th>Discharge criteria and instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan for pathology follow-up</td>
</tr>
<tr>
<td>Procedure report</td>
</tr>
<tr>
<td>Adverse Events including post-procedure and late events</td>
</tr>
<tr>
<td>Patient satisfaction data</td>
</tr>
<tr>
<td>Communication with referring provider</td>
</tr>
</tbody>
</table>

**Priority Indicator *****

Rizk MK et al., Gastrointest Endosc. 2015 Jan;81(1):3-16.
Performance Targets Specific for type of Endoscopy

Upper Endoscopy / EGD
Colonoscopy
ERCP
Endoscopic Ultrasound (EUS)
Prophylactic antibiotics in cirrhotics with upper GI bleeding

PPI used for suspected peptic ulcer bleeding

Endoscopic treatment in ulcers with active bleeding or with nonbleeding visible vessels

Test for H pylori in patients diagnosed with gastric or duodenal ulcers

Non-priority Indicators not listed

# Priority Quality Indicators in Colonoscopy

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate surveillance colonoscopy intervals in adequate cleansed bowel</td>
<td></td>
</tr>
<tr>
<td>Visualization of the cecum by notation / photodocumentation of landmarks</td>
<td></td>
</tr>
<tr>
<td>Adenomas detected in asymptomatic average-risk individuals (screening)</td>
<td></td>
</tr>
</tbody>
</table>

Non-priority Indicators not listed

<table>
<thead>
<tr>
<th>Priority Quality Indicators for ERCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of deep cannulation of targeted duct in native papillae</td>
</tr>
<tr>
<td>Success of extraction of common bile duct stones &lt; 1 cm in patients</td>
</tr>
<tr>
<td>Success of stent placement for biliary obstruction with obstruction below the bifurcation</td>
</tr>
<tr>
<td>Rate of post-ERCP pancreatitis</td>
</tr>
</tbody>
</table>

Non-priority Indicators not listed

Adler DG et al. Gastrointest Endosc. 2015 Jan;81(1):54-66
### Priority Quality Indicators for EUS

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency all GI cancers are staged with the AJCC/UICC TNM staging system</td>
<td></td>
</tr>
<tr>
<td>Diagnostic rates and sensitivity for malignancy in EUS-guided FNA of pancreatic masses</td>
<td></td>
</tr>
<tr>
<td>Adverse events after EUS-guided FNA</td>
<td></td>
</tr>
</tbody>
</table>

Non-priority Indicators not listed

Improving Quality in Colonoscopy
Adenoma Detection Rate (ADR)

- Primary quality measure of mucosal inspection
- Most important quality measure in colonoscopy

Performance targets:
- ADR for male/female population: > 25%
- Men >30%, Women >20%
Adenoma Detection Rate and Risk of Colorectal Cancer and Death

• ADR and risks of colorectal cancer diagnosed 6 months to 10 years after colonoscopy

• Integrated Health Database: 314,872 colonoscopies performed by 136 gastroenterologists

• ADR ranged from 7.4 % to 52.5%

Adenoma Detection Rate and Risk of an Interval Colorectal Cancer among All Patients

<table>
<thead>
<tr>
<th>Adenoma Detection Rate</th>
<th>Interval Cancer</th>
<th>Hazard Ratio (95% CI)*</th>
<th>Unadjusted Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous rate</td>
<td>712</td>
<td>0.97 (0.96–0.98)</td>
<td>7.7</td>
</tr>
<tr>
<td>Rate quintile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1: 7.35–19.05%</td>
<td>186</td>
<td>1.00 (reference)</td>
<td>9.8</td>
</tr>
<tr>
<td>Quintile 2: 19.06–23.85%</td>
<td>144</td>
<td>0.93 (0.70–1.23)</td>
<td>8.6</td>
</tr>
<tr>
<td>Quintile 3: 23.86–28.40%</td>
<td>139</td>
<td>0.85 (0.68–1.06)</td>
<td>8.0</td>
</tr>
<tr>
<td>Quintile 4: 28.41–33.50%</td>
<td>167</td>
<td>0.70 (0.54–0.91)</td>
<td>7.0</td>
</tr>
<tr>
<td>Quintile 5: 33.51–52.51%</td>
<td>76</td>
<td>0.52 (0.39–0.69)</td>
<td>4.8</td>
</tr>
</tbody>
</table>

Each 1.0% increase in ADR

3.0% decrease in risk of cancer

Improving ADR
Colonoscopic Withdrawal Times and Adenoma Detection during Screening Colonoscopy

• 12 gastroenterologists

• 2053 first time screening colonoscopies

• Compared rates of detection of neoplastic lesions in withdrawal times less than 6 minutes versus 6 minutes or more.

Mean Rates of Detection of Adenomas According to Mean Colonoscopic Withdrawal Times for 12 Endoscopists

- Withdrawal times: 3.1 to 16.8 minutes
- Detection of neoplasia: 28.3% vs. 11.8% (p<0.001)
- Advanced neoplasia 6.4% vs. 2.6%, (p=0.005)

Detection rates of premalignant polyps during screening colonoscopy: Time to revise quality standards?

- ADR and Sessile serrated ADR (SSADR) measures before and after quality improvement/financial incentive.

- Determined retrospectively baseline endoscopist ADR/SSADR, followed by prospective collection of data after informing physicians of baseline detection rates.

Polyp detection rates before and after informing endoscopist of their individual rates as well as the group rates

Both overall ADRs and SSADRs increased, however did not reach statistical significance.

Adenoma detection rate (ADR) by average cecal withdrawal time during normal screening examinations in minutes.

Bowel Prep and ADR
Split-dose preparation for colonoscopy increases adenoma detection rate: a randomised controlled trial in an organised screening programme

- Multicenter, randomized, endoscopist blinded study
- 1:1 randomized (690 patients)
- Low-volume 2-L polyethylene glycol (PEG)-ascorbate solution in a ‘split-dose’ (Split-Dose Group, SDG) or ‘day-before’ regimen (Day-Before Group, DBG)

Proportion of subjects with at least one adenoma, advanced adenoma and sessile serrated polyps (per-patient analysis). SSP, sessile serrated polyp.

Cap-Assisted Colonoscopy and Polyp Detection
The Efficacy of Cap-Assisted Colonoscopy in Polyp Detection and Cecal Intubation: A Meta-Analysis of Randomized Controlled Trials

- 16 randomized controlled clinical trials included
- 8,991 subjects
  - Cap assisted colonoscopy (CAC): 4,501
  - Standard Colonoscopy (SC): 4,490

Forest plot on the proportion of patients with polyps detected.

CAC, cap-assisted colonoscopy; CI, confidence interval; RR, relative risk; SC, standard colonoscopy.

Other Techniques to Increase ADR
Electronic Chromoendoscopy

- NBI (narrow band imaging)
- FICE (Flexible spectral Imaging Color Enhancement)
- i-SCAN
Endoscopes and devices

- Colonoscopes with multiple lenses:
  - Fuse, full-spectrum endoscopy (EndoChoice)

- Short turn radius colonoscope:
  - Retroview (Pentax)
Endoscopes and devices

A. Transparent Cap

B. Endocuff

C. EndoRings

D. G-Eye balloon

E. Third Eye Panoramic device
Quality Endoscopic Targets in Inflammatory Bowel Disease
Increased risk of Colorectal Cancer (CRC):

- UC who have at least left-sided disease (inflammation distal to the splenic flexure)

- CD with colon disease involving more than a third of the colon

ASGE Standards of Practice Committee. Gastrointest Endosc. 2015 May
Frequency of proper interval surveillance in ulcerative colitis (UC) and Crohn’s Disease (CD)

Further Increased risk of Colorectal Cancer (CRC):

- First-degree relative with CRC
- Active inflammation
- Personal history of dysplasia
- Anatomic abnormalities
- PSC (Primary Sclerosing Cholangitis)

ASGE Standards of Practice Committee. Gastrointest Endosc. 2015 May
Surveillance recommendations in ulcerative colitis (UC) and Crohn’s Disease (CD)

• Differ among societies

• U.S. Guidelines
  • Start surveillance 8 years after onset
  • PSC start surveillance on diagnosis
  • Interval 1- 2 years
  • 1 year in higher risk patients

Kornbluth A et al. Am J Gastroenterol. 2010 Mar
ASGE Standards of Practice Committee. Gastrointest Endosc. 2015 May
Endoscopic Surveillance to Detect Dysplasia
Random Biopsies versus Advanced Imaging

• **Random Biopsies:**
  - 4-quadrant biopsies every 10 cm cecum to rectum
  - Minimum of 32 specimens
  - Based on older literature

• **Advanced Imaging:**
  - High-definition (1080) system endoscopy - more pixels
  - Dye based chromoendoscopy

• Random surveillance biopsies sample less than 1% of total colon mucosa

• Estimated detection of only 1 episode of neoplasia in 1266 random biopsies
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Technique</th>
<th>Method</th>
<th>Dilution*</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesion detection</td>
<td>Pan chromoendoscopy</td>
<td>Water jet channel using auxiliary foot pump or biopsy channel using spray catheter</td>
<td>Indigo carmine (0.8%, 5mL ampule): 2 ampules + 250mL water (0.03%)</td>
<td><img src="image1" alt="Indigo carmine" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Methylene blue (1%, 10mL ampule): 1 ampule + 240mL water (0.04%)</td>
<td><img src="image2" alt="Methylene blue" /></td>
</tr>
<tr>
<td>Lesion characterization and delineation of borders</td>
<td>Targeted chromoendoscopy</td>
<td>Syringe spray through biopsy channel</td>
<td>Indigo carmine (0.8%, 5mL ampule): 1 ampule + 25mL water (0.13%)</td>
<td><img src="image3" alt="Indigo carmine" /></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Methylene blue (1%, 10mL ampule): 1 ampule + 40mL water (0.2%)</td>
<td><img src="image4" alt="Methylene blue" /></td>
</tr>
</tbody>
</table>

*Various dilutions ranging from 0.03-0.2% of indigo carmine and methylene blue have been reported for panchromoendoscopy.
A. 3 cm, nonpolypoid, superficial, elevated lesion after chromoendoscopy
B. Area of the lesion before dye spray
C. Same lesion likely photographed 1 year earlier

Procedure Time and the Determination of Polypoid Abnormalities with Experience: Implementation of a Chromoendoscopy (CE) Program for Surveillance Colonoscopy for Ulcerative Colitis

- Surveillance colonoscopy with white light endoscopy (WLE) followed by CE

- 75 patients with long-standing UC

<table>
<thead>
<tr>
<th>Type of Analysis</th>
<th>Lesion Types</th>
<th>WLE</th>
<th>WLE + CE</th>
<th>Absolute Increase in Yield (%)</th>
<th>Relative Increase in Yield (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with dysplasia (%)</td>
<td>All</td>
<td>7 (9.3%)</td>
<td>16 (21.3%)</td>
<td>9 (12%)</td>
<td>129%</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>Flat</td>
<td>1 (1.3%)</td>
<td>7 (9.3%)</td>
<td>6 (8%)</td>
<td>600%</td>
<td>0.011</td>
</tr>
<tr>
<td>Dysplastic lesions (mean per patient)</td>
<td>All</td>
<td>10 (0.13)</td>
<td>22 (0.293)</td>
<td>12 (16%)</td>
<td>120%</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Flat</td>
<td>1 (0.013)</td>
<td>8 (0.107)</td>
<td>7 (9%)</td>
<td>700%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

- Highest relative incremental yield for flat lesion detection with CE

Withdrawal Time in Chromoendoscopy

Median time improved from 31 mins for endoscopists with < 5 procedures to 18 mins for 5 - 14 procedures and 19 mins for > 15 procedures.

SCENIC international consensus statement on surveillance and management of dysplasia in inflammatory bowel disease

Addressed 2 issues:

• How should surveillance colonoscopy for detection of dysplasia be performed?

• How should dysplasia identified at colonoscopy be managed?

SCENIC Recommendations On Surveillance

- High definition rather than standard definition
- Chromoendoscopy is recommended
- White light over NBI (Narrow Band Imaging)

SCENIC Recommendations On Management of Dysplastic Lesion

- After endoscopical resected dysplastic lesions
  - Surveillance colonoscopy is recommended rather than colectomy
  - After resection surveillance - repeat surveillance in 1-6 months then every 1 year
- Endoscopically invisible dysplasia
  - Refer to expert in IBD surveillance using chromoendoscopy with high-definition colonoscopy

Gastrointest Endosc. 2015 May;81(5):1101-21
Priority indicators are the minimum in quality targets

ADR - Most important quality measure in colonoscopy

ADR is dependant on clean prep

Endoscopes and devices along with withdrawal time improve ADR

Surveillance in IBD is a quality indicator

Chromoendoscopy may aid in IBD surveillance
Thank You