Benchmarking For Colonoscopy

Technology and Technique to Improve Adenoma Detection
Objectives

1. Review the latest data on performance characteristics and efficacy for colon cancer prevention
2. Highlight potential new quality metrics for screening colonoscopy
3. Recognize new techniques and technology to improve polyp detection
Colon Cancer Epidemiology

- 136,830 new cases CRC per year
- 50,310 American deaths from CRC per year
- 9% of all cancer related deaths
- 2-3% decrease per year over the last 15 years
- Increase incidence rates from age 40-44
- Gradual shift toward right sided CRC
Why is there an increase in right sided tumors?

• Is it the prep?
• Is it the endoscopic technique?
• Is it anatomic changes compromising visibility?
• Is it the biology of tumorigenesis i.e. serrated adenoma vs. adenoma?
Performance Characteristics for Colonoscopy

- Canadian study
  - Population based
  - >10,000 case (CRC) patients
  - >51,000 control patients
  - Risk Reduction left sided CRC
    - 60% risk reduction
  - No risk reduction for right sided CRC

<table>
<thead>
<tr>
<th>Model</th>
<th>All Cancer</th>
<th>Right-Sided Cancer</th>
<th>Left-Sided Cancer</th>
<th>Undefined Site of Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attempted colonoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Any</td>
<td>0.69 (0.63–0.74)</td>
<td>1.07 (0.94–1.21)</td>
<td>0.39 (0.34–0.45)</td>
<td>0.90 (0.75–1.08)</td>
</tr>
<tr>
<td>Completeness of colonoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Complete</td>
<td>0.63 (0.57–0.69)</td>
<td>0.99 (0.86–1.14)</td>
<td>0.33 (0.28–0.39)</td>
<td>0.90 (0.73–1.10)</td>
</tr>
<tr>
<td>Incomplete</td>
<td>0.91 (0.78–1.07)</td>
<td>1.35 (1.07–1.69)</td>
<td>0.63 (0.49–0.81)</td>
<td>0.91 (0.61–1.35)</td>
</tr>
</tbody>
</table>

* Conditional logistic regression, adjusted for Charlson Comorbidity Index score.
How can we do better and what quality indicators matter?

- Withdrawal times
- Adenoma detection rate
- Miss rate
- Cecal intubation rates

- Prep Quality
- Interval CRC rates
- Polyp Resection rates
Withdrawal Time

- 12 Gastroenterologists
- 7882 colonoscopies
- Mean withdrawal time >6min had higher adenoma detection rates

28.3% vs. 11.8% P < 0.001

NEJM 2006; 355:2533-41
Quality Indicators
Risk for Interval CRC

• 186 Endoscopists
• 45,026 patients
• End point: development CRC between screening and next surveillance exam
• Adenoma Detection Rate (ADR) of less 20% has 11-12 fold increase for an interval CRC

N Engl J Med 2010;362 1795-803
Important Lesion Missed at Baseline Colonoscopy

• Miss rate
  – Up to 17% of lesions >10mm

• Interval cancer
  – Missed lesions at baseline colonoscopy
  – With a miss rate of 17%
  – 3.5 per 1000 screened persons with developed CRC

• Missed lesions
  – Directly related to the quality of exam
Incomplete Polyp Resection
CARE Study

- 269 patients
- 11 gastroenterologist
- Performed 4 quadrant biopsies post polypectomy
- Residual adenoma found in 10.1% of cases
- Risk increased
  - Difficult location/identification
  - Incomplete resections secondary indiscrete edges
  - Serrated lesions (RR 3.7)

Gastroenterology 2013; 144:74-9
Polyp Biology:
Serrated vs. Adenoma

**Serrated Polyp**  
(right sided and flat)

**Adenoma**

- Hypermethylation & activation of BRAF mutation
- APC mutation, K-ras, p53 mutation
Need for Quality and Benchmarking

- Paradigm shift to quality
- Benchmarking
- Transparency
- Participation
- Goal: Improved patient access, selection, insurer preference and payment
Adenoma Detection Rate (ADR)

• Higher ADR = higher quality exam = fewer missed cancers

• Goal:
  – >25% for men >50yrs
  – >15% for women > 50 yrs

Rex DE et al. Am J Gastroenterol 2002;97:1296-1308
Technologies and Techniques to Improve Quality

- Colon Prep advances
- Water Immersion Technique
- High Definition Endoscopes
- Cap Assisted Colonoscopy
- Retrograde Viewing Device
- Full spectrum endoscopy (Fuse)
Split Prep
Is Superior to Other Preps

- Meta-analysis
- 9 Trials
- Spilt dose is superior for excellent prep OR 3.46

Clin Gastroenterol Hepatol 2012:10:1225-1231
Split Prep = Higher ADR

ADR
ADR <9mm

- Split prep
- Non Split

Alment Pharmacol Ther 2010;32:637-644
Water-aided Colonoscopy

- **Primary end point**
  - Improved pain score
  - No change in cecal intubation
  - Less sedation administered

- **Secondary end point**
  - Significant improvement overall ADR and proximal ADR with $P < 0.05$

![Bar chart comparing Water and Air for ADR and p ADR](Endoscopy 2014;3:2121-218)
HD Scopes: NBI vs. White Light

- No significant difference between NBI and WL
Cap Assisted vs. Standard Colonoscopy

$ 321.00 for box of ten
Fits over the tip of scope and extends 2-4mm
Cap Assisted Colonoscopy vs. Standard Colonoscopy

- Meta analysis
- 16 RCT N = 8,991
- RR 1.04 CI 0.90-1.19

Am J Gastroenterol 2012;107:1165-1173
Third Eye Retrograde Viewing Device

• Group A
  – SC then TER
  – 35.2 % increased ADR

• Group B
  – TER then SC
  – 30.8 %

– Net additional detection with TER 4.4%
Full Spectrum Endoscopy

Fuse™ Full Spectrum Endoscopy™ Footage © EndoChoice®
Forward Viewing vs. Full Spectrum Endoscopy

- Multicenter study
- Randomized prospective
- Same day back to back colonoscopy
- 185 subjects
- Primary endpoint
  - Adenoma miss rate
  - TFV followed by FUSE
    - = 41.7%
  - FUSE followed by TFV
    - 7.6%

Gastrointest Endo 2013
Summary

• Quality over quantity
• New technology is marginally better when compared to standard white light
• Good mucosal inspection is the key