Quality of Screening Colonoscopy

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Purpose of Screening Colonoscopy

**Prevention**

**Early Detection**

- Chromosomal instability - mutations TSGs/oncogenes, LOH, aneuploidy
- Normal epithelium
- Small tubular adenoma
- Intermediate adenoma
- Advanced adenoma
- Adenocarcinoma aneuploid microsatellite stable

Screening colonoscopy

FIT/FOBT
3 easy steps

1. Find the polyp
2. Remove the polyp
3. Appropriate follow up

Survveillance interval:
- 0
- 3
- 5 years
Quality of colonoscopy

Polyps are often missed

Incomplete resection

We don’t know appropriate f/u
### Adenoma Miss Rate 22%

<table>
<thead>
<tr>
<th>Study</th>
<th>Miss Rate</th>
<th>Miss Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hixson, 1991</td>
<td>24 / 221</td>
<td>11%</td>
</tr>
<tr>
<td>Rex, 1997</td>
<td>89 / 378</td>
<td>23%</td>
</tr>
<tr>
<td>Rex, 2003 (I)</td>
<td>23 / 102</td>
<td>22%</td>
</tr>
<tr>
<td>Rex, 2003 (II)</td>
<td>10 / 26</td>
<td>38%</td>
</tr>
<tr>
<td>Harrison, 2004</td>
<td>23 / 80</td>
<td>29%</td>
</tr>
<tr>
<td>Pooled</td>
<td></td>
<td>31%</td>
</tr>
</tbody>
</table>

Miss Rate 35-48%

Van Rijn, AJG 2006
Reasons?

Technology!
Image Enhanced Endoscopy

HD-WL

NBI

HD-WL

FICE

HD-WL

iScan
Image Enhanced Endoscopy

**HD-WL**
- **↑ADR**

**NBI**
- 5 Meta-analyses, 11 RCTs

**HD-WL**
- **↑ADR**

**FICE**
- 4 RCTs

**HD-WL**
- **↑ADR**

**iScan**
- 2 RCTs

Subramanian, Endoscopy 2011
Pohl, GastroClinNAm 2013
Surface Exposing Technology

Cap  EndoCuff  EndoRing  Balloon

Third Eye

FUSE
EndoCuff Vision
Surface Exposing Technology

Cap    EndoCuff    EndoRing    Balloon

Third Eye

FUSE
## EndoCuff Vision RCTs

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>ADR</th>
<th>Benefit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floer 2014</td>
<td>492</td>
<td>35 vs. 21%</td>
<td>+ 14%</td>
</tr>
<tr>
<td>Bieker 2015</td>
<td>498</td>
<td>36 vs. 27%</td>
<td>+ 9%</td>
</tr>
<tr>
<td>Wada 2016</td>
<td>446</td>
<td>55 vs. 40%</td>
<td>+ 15%</td>
</tr>
<tr>
<td>Van Doorn 2017</td>
<td>1063</td>
<td>52 vs. 52%</td>
<td>0</td>
</tr>
<tr>
<td>De Palma 2017</td>
<td>247</td>
<td>28 vs. 28%</td>
<td>0</td>
</tr>
<tr>
<td>Bhattacharyya 2017</td>
<td>531</td>
<td>61 vs. 63%</td>
<td>+2</td>
</tr>
<tr>
<td>Triantafylou 2017</td>
<td>200</td>
<td>MR: 15 vs. 39%</td>
<td>+ 14%</td>
</tr>
<tr>
<td>Gonzalez-Fernandez 2017</td>
<td>337</td>
<td>39 vs. 22%</td>
<td>+ 17%</td>
</tr>
</tbody>
</table>
Reasons?

Technology

Patient
Prep Quality

High (or intermediate) vs. low quality: OR 1.4
• Segment score ≤1 is inadequate:
  • 10% higher Adenoma miss rate
  • 44% wrong surveillance interval
Meta-analysis 47 trials (Martel 2016):

• **Split-dose**
  – High quality independent of prep (PEG, NaP, PicoSulfate)
  – Better excepted

• **High volume** is better (3L PEG)
Reasons?

Technology
Patient
Endoscopist!
Get to the cecum!

% Completeness for endoscopist
- <80%
- 80%–84%
- 85%–89%
- 90%–94%
- 95%+

Prox. CRC (OR)
- 1.00 (referent)
- 1.16 (0.86–1.56)
- 0.69 (0.51–0.93)
- 0.66 (0.50–0.87)
- 0.72 (0.53–0.97)
Endoscopists and Adenoma Detection

Barclay, NEJM 2006
Just take more time! ….withdrawal time?

**Figure 2.** Mean Rates of Detection of Adenomas According to Mean Colonoscopic Withdrawal Times for 12 Endoscopists.
Variation of incomplete resection among Endoscopists

- CARE study: n=346 neoplastic 5-20mm polyps

<table>
<thead>
<tr>
<th>Endoscopist</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Incompletely resected neoplastic polyps</td>
<td>5%</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Pohl, Gastro 2013
Guide to Resection

1) Don’t use a forceps!
Guide to Resection

1) Don’t use a forceps!
2) Use a cold snare (<10mm)!
# Guide to Resection

## Cold Snare Studies of LARGE POLYPS

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients, n</th>
<th>Size</th>
<th>Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barros 2014</td>
<td>124</td>
<td>4-20mm</td>
<td>0</td>
</tr>
<tr>
<td>Munirai 2015</td>
<td>30</td>
<td>≥10mm</td>
<td>0</td>
</tr>
<tr>
<td>Choksi 2015</td>
<td>15</td>
<td>≥10mm</td>
<td>0</td>
</tr>
<tr>
<td>Piraka 2017</td>
<td>73</td>
<td>≥10mm</td>
<td>0</td>
</tr>
<tr>
<td>Tutticci 2017</td>
<td>98</td>
<td>≥10mm</td>
<td>0</td>
</tr>
</tbody>
</table>
Guide to Resection

1) Don’t use a forceps!
2) Use a cold snare (<10mm)!
3) Submucosal injection (≥10mm?)
## Surveillance recommendations

<table>
<thead>
<tr>
<th></th>
<th>1st colo in &lt;5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO adenoma</td>
<td>26% (instead of 0%)</td>
</tr>
<tr>
<td>HIGH RISK</td>
<td>58% (instead of 100%)</td>
</tr>
</tbody>
</table>

Surveillance after screening, N=3876

Overuse & Underuse!
1. Adenoma Detection (M 30%, W 20%)
2. Cecal intubation ≥95%
3. Withdrawal time ≥ 6 min
4. Bowel prep ≥85% adequate
5. Surveillance Interval ≥90%
(6. Complete Resection)
Quality Assurance Programs

- UK: part of the “National Bowel Screening Programme”
- Poland, Australia, Canada

Monitoring → Auditing → Acting

- Feedback
- Education
- Hands-on training
- “Train the Trainers”

→ Improved ADR, cecal intubation
→ Individual and unit level
→ Lower n of interval cancers

Gavin GUT 2013
Morris GUT 2015
Kaminski GUT 2016
Summary

1. The most important factor in affecting quality in screening colonoscopy is the endoscopist

2. Quality metrics to assist achieving high quality (ADR, Prep, CIR, Surveillance interval)

3. Quality assurance programs have shown to improve quality