Post-Colonoscopy CRC over the Globe

Prof Matt Rutter
Newcastle University, UK
Disclosures

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- Iosif Beintaris
- **David Beaton**
- Evan Morris
- Roland Valori
- Nick Burr
- WEO PCCRC consensus group
Outline

WEO Consensus Guidelines

- PCCRC definition
- PCCRC rates: QA
- PCCRC risk factors
- PCCRC root cause analysis: QA/QI
PCCRC definition

Cancer appearing after a colonoscopy in which no cancer is diagnosed

• Subcategorised into
  – Interval PCCRC
  – Non-interval PCCRC
PCCRC rates
Methodology is paramount

- Same English NHS CRC data:

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
<th>Bressler method</th>
<th>Cooper method</th>
<th>Singh method</th>
<th>le Clerc method</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>4.5</td>
<td>7.7</td>
<td>7.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Bressler</td>
<td>3.7</td>
<td>6.2</td>
<td>6.0</td>
<td>6.1</td>
</tr>
<tr>
<td>Cooper</td>
<td>4.4</td>
<td>7.7</td>
<td>7.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Singh</td>
<td>3.6</td>
<td>6.8</td>
<td>6.8</td>
<td>2.2</td>
</tr>
<tr>
<td>le Clerc</td>
<td>4.1</td>
<td>7.4</td>
<td>5.2</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Figure 1. Application and results of four previously published methods for determining post-colonoscopy colorectal cancer (POCRC). Note the original le Clerc study calculated POCRC over a 9-12 month time period whereas all other studies used the period of 12-36 months. In the interests of conciseness and to enable more easy comparison of methods, in this particular study, the le Clerc method has been simplified to calculate POCRC covering a period of 12-36 months.
CONSENSUS STATEMENT

World Endoscopy Organization Consensus Statements on Post-Colonoscopy and Post-Imaging Colorectal Cancer

Matthew D. Rutter, 1,2,* Iosif Beintaris, 1,* Roland Valori, 3 Han Mo Chiu, 4 Douglas A. Corley, 5 Miriam Cuatrecasas, 6 Evelien Dekker, 7 Anna Forsberg, 8 Jola Gore-Booth, 9 Ulrike Haug, 10 Michal F. Kaminski, 11 Takahisa Matsuda, 12 Gerrit A. Meijer, 13,14 Eva Morris, 15 Andrew A. Plumb, 16 Linda Rabeneck, 17 Douglas J. Robertson, 18,19 Robert E. Schoen, 20 Harminder Singh, 21 Jill Tinmouth, 22 Graeme P. Young, 23 and Silvia Sanduleanu 24
WEO standardised PCCRC rate methodology

Standardised PCCRC-3y rate

- Denominator = CRCs occurring within 3y of a colonoscopy
  - 3y cut-off pragmatic: balancing capturing most PCCRCs vs KPI reflecting recent performance

- Rates calculated from year of colonoscopy
  - Detected CRC [TP] = CRC diagnosed within 6 months of the colonoscopy
  - PCCRC [FN] = CRC diagnosed 6-36 month after the colonoscopy

- PCCRC-3yr rate = FN / [TP+FN] (i.e. 1 - sensitivity)

- Need large datasets – only suitable for service-level analysis (not endoscopist level)
<table>
<thead>
<tr>
<th>Country</th>
<th>Number of CRCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>126,152 CRCs</td>
</tr>
<tr>
<td>Sweden</td>
<td>19,184 CRCs</td>
</tr>
<tr>
<td>Denmark</td>
<td>39,100 CRCs</td>
</tr>
<tr>
<td>Belgium</td>
<td>63,518 CRCs</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>10,859 CRCs</td>
</tr>
</tbody>
</table>
PCCRC rates over time
Comparative PCCRC rates for same year (2012)

English CRC screening programme: 3.6%
PCCRC risk factors
PCCRC risk factors

Patient factors
- Increasing age
- Hereditary CRC
- Women
- Increasing comorbidity

Colorectal factors
- Diverticulosis
- IBD
- Previous polyps/CRC
- Proximal colon

Endoscopist factors
- Non-GI endoscopist
- Community setting
- Lower PDR/ADR
- Lower CIR
PCCRC-3y rate in IBD

Sweden; WEO methodology
- 27,123 colonoscopies in 14,597 individuals with CD (133 CRCs)
- 51,572 colonoscopies in 26,513 individuals with UC (281 CRCs)

• PCCRC-3y rate
  - 28.3% (CD); RR cf non-IBD 3.82 (95% CI 2.94 to 4.96)
  - 41.0% (UC); RR cf non-IBD 5.89 (95% CI 5.10 to 6.80)

Others
• England: PCCRC-3y rate IBD 35.5%
• Denmark: UC RR 3.4

PCCRC cases: root cause analysis

QA & QI
Individual PCCRC case

WEO recommends that:

• Services have a formal and robust process to identify PCCRC cases

• Each case is reviewed (root cause analysis) to determine most likely cause
<table>
<thead>
<tr>
<th></th>
<th>Robertson (%)</th>
<th>Pabby (%)</th>
<th>Le Clercq (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New cancer</td>
<td>24.1</td>
<td>23.1</td>
<td>13.6</td>
</tr>
<tr>
<td>Missed cancer</td>
<td>51.7</td>
<td>23.1</td>
<td>57.8</td>
</tr>
<tr>
<td>Incomplete polyp removal</td>
<td>19.0</td>
<td>30.8</td>
<td>8.8</td>
</tr>
<tr>
<td>Other</td>
<td>5.2 % Failed biopsy detection</td>
<td>23.1% Failed biopsy detection</td>
<td>19.8% inadequate exam/surveillance</td>
</tr>
</tbody>
</table>

1. (Pabby, Schoen et al. 2005)  
2. (Robertson, Lieberman et al. 2014)  
3. (Le Clerq et al. 2014)
PCCRC aetiology based on WEO categorisation

- Individual case reviews [WEO categorisation] of 107 PCCRCs from English hospital (2010-17)

- PCCRC aetiology – see chart

- 43% PCCRCs were in high-risk patients
  - IBD
  - Hereditary cancer syndrome
  - Previous CRC/large polyp

- 73% PCCRCs affected by technical endoscopic factors
- 7% PCCRCs by administrative factors
- 27% of PCCRCs by decision-making factors

- 89% PCCRCs were avoidable

Summary

2 different aspects to PCCRC

1. PCCRC rate
   - Gives important overview of quality of colonoscopy
   - Standardised methodology key
   - Large datasets & service/national level evaluation
   - Clear room for improvement in quality

2. PCCRC aetiology
   - Confirms most PCCRCs are preventable
   - Commonest cause = missed lesions
   - Certain high-risk cohorts of patients – especially IBD