IMPROVEMENT OF QUALITY OF THE NATIONAL CANCER SCREENING PROGRAMMES IMPLEMENTATION (CRO SCREENING)
Quality indicators for colonoscopy and colonoscopist

Mirjana Kalauz
Clinical Hospital Center Zagreb
Why is quality monitoring important in CRC screening programme?

• Quality adjustment in all endoscopic centers
• Better outcomes measures of programme (decreased incidence of CRC, decreased mortality from CRC)
• Quality standards implementation and monitoring is important for accreditation process
• Improving quality in endoscopy in symptomatic patients
OBJECTIVES

- Review protective effect of colonoscopy against CRC
- Review factors associated with interval cancers
- Discuss colonoscopy quality measures
- Propose quality indicators parameters in screening programme in Croatia (and to be included in new guidelines)
Colonoscopy is the best test for polyp & adenoma detection

- The gold standard for colorectal cancer screening/surveillance
- Outperforms CT and MR colonography
## Colonoscopy prevents CRC and CRC mortality

<table>
<thead>
<tr>
<th>Author year</th>
<th>Country</th>
<th>Design</th>
<th>Primary endpoint</th>
<th>Residual risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kahl 2009</td>
<td>U.S.</td>
<td>Cohort</td>
<td>Incidence</td>
<td>0.33</td>
</tr>
<tr>
<td>Baxter 2009</td>
<td>Canada</td>
<td>Case-control</td>
<td>Mortality</td>
<td>0.63</td>
</tr>
<tr>
<td>Mulder 2010</td>
<td>Netherlands</td>
<td>Case-control</td>
<td>Incidence</td>
<td>0.56</td>
</tr>
<tr>
<td>Singh 2010</td>
<td>Canada</td>
<td>Cohort</td>
<td>Mortality</td>
<td>0.71</td>
</tr>
<tr>
<td>Brenner 2011</td>
<td>Germany</td>
<td>Case-control</td>
<td>Incidence</td>
<td>0.23</td>
</tr>
<tr>
<td>Baxter 2012</td>
<td>U.S.</td>
<td>Case-control</td>
<td>Mortality</td>
<td>0.40</td>
</tr>
</tbody>
</table>
Interval colon cancer occur

- Reduction of mortality to far from zero
- Diagnosed after colonoscopy, within interval until next colonoscopy (PCCRC)
- N=727 (0.27%)
- Corley NEJM 2010
Interval CRC

- 3.4% to 9% of all CRC cases
- primarily in the right colon
- Endoscopist-related variables are the most important risk factor for interval CRC
- 71% to 86% attributable to missed or incompletely resected polyps

Bressler et al. Gastroenterology 2007; 132:96-102
Farrar et al. CGH 2006: 4:1259-64
Cooper et al. Cancer 2012; 118: 3044-52
Robertson et al. Gut 2014; 63: 949-56
Pohl et al. CGH 2010; 8: 858-64.
# Lower Protection in the Right Colon

<table>
<thead>
<tr>
<th>Author, year</th>
<th>Outcome</th>
<th>Overall CRC (95% CI)</th>
<th>Left-sided CRC (95% CI)</th>
<th>Right-sided CRC (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baxter, 2009</td>
<td>CRC Mortality (OR)</td>
<td>0.63 (0.57-0.69)</td>
<td>0.33 (0.28-0.39)</td>
<td>0.99 (0.86-1.14)</td>
</tr>
<tr>
<td>Ontario, Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singh, 2010</td>
<td>CRC Mortality (SMR)</td>
<td>0.71 (0.61-0.82)</td>
<td>0.53 (0.42-0.67)</td>
<td>0.94 (0.77-1.17)</td>
</tr>
<tr>
<td>Manitoba, Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brenner, 2011</td>
<td>CRC Incidence (OR)</td>
<td>0.23 (0.19-0.27)</td>
<td>0.16 (0.12-0.20)</td>
<td>0.44 (0.35-0.55)</td>
</tr>
<tr>
<td>Rhine-Neckar, Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baxter, 2012</td>
<td>CRC Mortality (OR)</td>
<td>0.40 (0.37-0.43)</td>
<td>0.24 (0.21-0.27)</td>
<td>0.58 (0.53-0.64)</td>
</tr>
<tr>
<td>SEER-Medicare</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Baxter et al. Ann Inter Med 2009; 150: 1-8*

*Singh et al. Gastroenterology 2010;139:1128–37*

*Brenner et al. Ann Inter Med 2011;154: 22–30*

Incomplete Resection: CARE study

- 346 polyps 5-20 mm, margins biopsied
- IRR for neoplastic polyps: 10.1%
- more common for:
  - Large vs. small neoplastic polyps 
    (17.3% vs 6.8%; \(P=0.003\))
  - SSA/P vs other neoplastic polyps 
    (31.0% vs 7.2%; \(P<0.001\))
- Nearly half (47.6%) of all large (10–20 mm) SSA/P incompletely removed.

Factors affecting right-sided protection

- **REVERSIBLE:**
  Bowel prep (split is now standard of care)
  Operator Dependent
    - Cecal Intubation
    - Withdrawal time and technique
    - Adenoma detection
    - Detection of flat and depressed (non-polypoid) neoplasms
    - Detection of serrated lesions
    - Complete polypectomy
    - Operator specialty

- **IRREVERSIBLE:**
  Tumor Biology

*Rex. Gastroenterology* 2011; 140: 19-21
Colonoscopy quality measures

**Preprocedure**

1. Frequency with which colonoscopy is performed for an indication that is included in a published standard list of appropriate indications, and the indication is documented  
   Process $>80\%$

2. Frequency with which informed consent is obtained, including specific discussions of risks associated with colonoscopy, and fully documented  
   Process $>98\%$

3. Frequency with which colonoscopies follow recommended post-polypectomy and post-cancer resection surveillance intervals and 10-year intervals between screening colonoscopies in average-risk patients who have negative examination results and adequate bowel cleansing (priority indicator)  
   Process $\geq 90\%$

4. Frequency with which ulcerative colitis and Crohn's colitis surveillance is recommended within proper intervals  
   Process $\geq 90\%$
Colonoscopy quality measure
Intraprocedure

5. Frequency with which the procedure note documents the quality of preparation (priority indicator)  
   Process $>98\%$

6. Frequency with which bowel preparation is adequate to allow the use of recommended surveillance or screening intervals  
   Process $\geq 85\%$ of outpatient exams

7. Frequency with which visualization of the cecum by notation of landmarks and photodocumentation of landmarks is documented in every procedure (priority indicator)  
   Cecal intubation rate with photography (all examinations) $\geq 90\%$
   Cecal intubation rate with photography (screening) $\geq 95\%$

8. Frequency with which adenomas are detected in asymptomatic average-risk individuals (screening)  
   (priority indicator)  
   Adenoma detection rate for male/female population $\geq 25\%$
   Adenoma detection rate for male patients $\geq 30\%$
   Adenoma detection rate for female patients $\geq 20\%$

9a. Frequency with which withdrawal time is measured  
7b. Average withdrawal time in negative-result screening colonoscopies  
   Process $>98\%$
   Process $\geq 6\text{ min}$

10. Frequency with which biopsy specimens are obtained when colonoscopy is performed for an indication of chronic diarrhea  
    Process $>98\%$

11. Frequency of recommended tissue sampling when colonoscopy is performed for surveillance in ulcerative colitis and Crohn’s colitis  
    Process $>98\%$

12. Frequency with which endoscopic removal of pedunculated polyps and sessile polyps $<2\text{ cm}$ is attempted before surgical referral  
    Outcome $>98\%$
Colonoscopy quality measures

Postprocedure

13. Incidence of perforation by procedure type (all indications vs colorectal cancer screening/polyp surveillance) and post-polypectomy bleeding

- Incidence of perforation—all examinations $<1:500$
- Incidence of perforation—screening $<1:1000$
- Incidence of post-polypectomy bleeding $<1$

14. Frequency with which post-polypectomy bleeding is managed without surgery Outcome $≥90$

15. Frequency with which appropriate recommendation for timing of repeat colonoscopy is documented and provided to the patient after histologic findings are reviewed. Process $≥90$
Review of selected colonoscopy quality measures

- Cecal Intubation Rate
- Withdrawal Time
- Adenoma Detection Rate
Cecal Intubation Rate

• Fundamental step to assess colonoscopy completeness and quality

• Effective endoscopists should be able to achieve rates of ≥ 90% in all cases, and ≥ 95% in screening colonoscopies

• Risk of interval CRC decreased if CIR ≥ 95% compared to < 80%

Withdrawal Time

• Detection of lesions is increased when average withdrawal time is \( \geq 6 \) minutes

• UK study with > 31,000 colonoscopies:
  - Colonoscopists with WT < 7 min had ADR 42.5\%, versus WT > 11 min had ADR 47.1\% (\( p< 0.001 \))
  - No incremental yield beyond WT of 10 min

Lee et al. Endoscopy 2013; 45: 20-6
Withdrawal Time

- Study from Minnesota,
  - 77,000 screening colonoscopies by 51 MDs
  - Longer mean WT associated with higher ADR (3.6% per minute)
  - Interval CRC: Compared with WT ≥6 min, the adjusted incidence rate ratio for WT <6 minutes was 2.3 (95% CI: 1.5–3.4; P < .0001).

*Shaukat et al. Gastroenterology 2015*
Withdrawal Time

- Longer withdrawal time implies careful, more thorough colon mucosa inspection
- Better technique almost invariably requires more time: Cleansing, distention, examination of proximal side of folds
- Despite increased detection of polyps with longer WT, WT still secondary to ADR, especially for high-level detectors
- WT may be most relevant to correct the performance of physicians with low ADR.

**Adenoma Detection Rate**

- ADR = Surrogate measure for CRC incidence and interval CRC incidence
- originally based on large variability in adenoma detection between endoscopists
- Proportion of screening colonoscopies where at least one adenoma is detected
- **Targets:**
  - Men: ≥ 30%
  - Women: ≥ 20%
  - Mixed male/female population: ≥ 25%

We should care if adenomas are missed!!!
Risk of CRC is reduced with higher ADR

Corley et al. NEJM 2014, Kaminsky et.al NEJM 2010
Polyp Detection Rate

• PDR = Surrogate measure for ADR
• Advantage: No need for manual pathology entry, collected automatically with procedure reports/billing
• Correlates well with ADR

  *William et al. Gastrointest Endosc 2012; 75: 576-82*

Limitations:
- Surrogate of a surrogate
- Even more corruptible than ADR

Adenoma Per Colonoscopy (APC) Rate

• Total number of adenomas divided by total number of screening colonoscopies

• Better “global” measure of adenoma detection
  - 42,000 colonoscopies, 316 French endoscopists
  - For MDs with ADR around 35%, APC varied from 0.36 to 0.98
    *Denis et al. Dig Liv Dis 2014; 46:176-81*

• Overcomes “one and done” issue with standard ADR

Limitations:
- Could increase costs if providers have to submit adenomas in separate bottles
- Additional validation studies needed.
Not just adenomas...
<table>
<thead>
<tr>
<th>Pathway</th>
<th>Frequency</th>
<th>Genes</th>
<th>MSI</th>
<th>Precursor</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIN</td>
<td>65% to 70%</td>
<td>APC, K-ras, p53</td>
<td>No</td>
<td>Adenoma</td>
<td>Slow</td>
</tr>
<tr>
<td>Lynch</td>
<td>3%</td>
<td>MLH1, MLH2, MLH6, PMS2</td>
<td>Yes</td>
<td>Adenoma</td>
<td>Fast</td>
</tr>
<tr>
<td>CIMP</td>
<td>30% to 35%</td>
<td>BRAF</td>
<td>Sometimes</td>
<td>Serrated</td>
<td>Can be fast</td>
</tr>
</tbody>
</table>

Rex DK, et al. [5]

Molecular basis of colorectal cancer
Basic Molecular Pathways in CRC

- Chromosomal Instability (CIN) Pathway---60%-70%
  - Adenoma-carcinoma sequence

- Mutator Pathway---5%
  - Defective DNA mismatch repair (hMLH1, hMSH2, hMSH6, hPMS2)
  - Microsatellite instability (MSI)
  - Example: Lynch syndrome

- Serrated pathway---25%-35%
  - BRAF oncogene mutations
  - Epigenetic DNA promoter hypermethylation leading to the CpG island methylator phenotype (CIMP)
  - MSI +/-
WHO Classification of Serrated Colonic Lesions

• Hyperplastic Polyp
  - Microvesicular HP (MVHP)
  - Goblet-cell rich HP (GCHP)
  - Mucin-poor HP (MPHP)

• Sessile Serrated Adenoma/Polyp (SSA/P)
  - SSA/P without cytological dysplasia
  - SSA/P with cytological dysplasia

• Traditional Serrated Adenoma (TSA)

"Main" Serrated Pathway

- Normal mucosa
  - BRAF mutation
- Promoter hypermethylation
- MVHP
- SSA/P
  - hMLH1 hypermethylation
  - Epigenetic silencing
- SSA/P-CD
  - Accelerated progression
- CANCER
  - CIMP-high
  - MSI

Variable Progression  Rapid Progression (Lynch-like)

SSA/P: Most prevalent visual descriptors

- Mucus cap (64%)
- Rim of debris or bubbles (52%)
- Alteration of the contour of a fold (37%)
- Interruption of underlying mucosal vascular pattern (32%)

Tadepalli et al. Gastrointest Endosc 2011; 74: 1360-8
Serrated Pathway and Interval CRC: Overlap of Molecular Signatures

Compared to non-interval CRC, interval CRC more likely to:

- Be located in the proximal colon
- Demonstrate MSI
- Be associated with CIMP

*Sawhney et al. Gastroenterology 2006; 131: 1700-5
Arain et al. Am J Gastroenterol 2010; 105: 1189-95

• Nurses’ Health Study and the Health Professionals Follow-up Study
  - 88,902 subjects, 22-year follow-up
  - Cancers diagnosed within 5 years of colonoscopy twice more likely to have CIMP and microsatellite instability

## Variable detection of proximal serrated lesions

<table>
<thead>
<tr>
<th>Author</th>
<th>N screening colons</th>
<th>N endoscopists</th>
<th>N polyps</th>
<th>ADR</th>
<th>PSP-DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hetzel (2010)</td>
<td>7192</td>
<td>13</td>
<td>4535</td>
<td>13.5%-36.4%</td>
<td>1.4%-7.6%</td>
</tr>
<tr>
<td>Kahi (2011)</td>
<td>6681</td>
<td>15</td>
<td>11,049</td>
<td>17%-47%</td>
<td>1%-18%</td>
</tr>
<tr>
<td>De Wijkerslooth (2013)</td>
<td>1354</td>
<td>5</td>
<td>1635</td>
<td>24%-40%</td>
<td>6%-22%</td>
</tr>
<tr>
<td>Payne (2014)</td>
<td>7215</td>
<td>32 sites</td>
<td>5548</td>
<td>17.4%-43.5%</td>
<td>0%-9.8%</td>
</tr>
</tbody>
</table>

Hetzel et al. *Am J Gastroenterol.* 2010; 105: 2656-64  
Kahi et al. *Clin Gastroenterol Hepatol.* 2011; 42-6  
De Wijkerslooth et al. *Gastrointest Endosc* 2013; 77: 617-23  
Quality in colonoscopy in Croatia

- Many endoscopic centers
- Overall quality is unknown
- When quality is unknown, we fear large variations
- European guidelines are slowly appearing
- Bowel cancer screening is main quality target in EU
Quality indicators in colonoscopy in screening program in Croatia

Proposal I

- Colonoscopists with sufficient number of conducted colonoscopies (85%>200-300)
- Bowel cleansing (>90% BBPS >6)
- Cecal intubation rate (>90%)
- Colonoscopy withdrawal time (>90% 6 min)
- Adenoma detection rate ( M>50%; F>30%)
Quality indicators in colonoscopy in screening program in Croatia
Proposal I

• Left and right colon adenoma detection proportion (L:R 65%:35%)
• Sessile serrated lesion right colon detection rate-SSLR (>4%)
• Mean adenoma per positive procedure - MAP+ (no reference standard)?
• Referral to surgery or tertiary endoscopy (<5%)
• Endoscopic complication rate:
  – Probirna kolonoskopija: 0,5%
  – Terapijska kolonoskopija <2,5%
  – Perforacije koje zahtjevaju kiruršku terapiju: <1/1000
  – Varenja koja zahtjevaju kiruršku terapiju:
Re-audit

Identify standards

Collect data in current practice

Compare to standards

Plan necessary change

Implement change

Funded by the European Union
Polyp classification

Mirjana Kalauz
Clinical Hospital Center Zagreb
Polyp classification

- Paris classification
- Kudo classification
- NICE
Paris Classification

I-p (pedunculated)

I-s (sessile)

II-a (flat elevated)

II-b (flat flat)

IIc (flat depressed)

III (flat ulcerated)
Kudo pit patterns

• Developed for use in chromoendoscopy
  – Indigo carmine remains in depressions (pits)
  – The violet dyes actually stain the mucosa
• Pits = openings of the colonic crypts
• Pit pattern = arrangement of openings on mucosal surface
# Kudo pit pattern classification

- characteristics of the different pit pattern types

<table>
<thead>
<tr>
<th>Pit pattern type</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>roundish pits</td>
</tr>
<tr>
<td>II</td>
<td>stellar or papillary pits</td>
</tr>
<tr>
<td>III S</td>
<td>small roundish or tubular pits (smaller than type I</td>
</tr>
<tr>
<td></td>
<td>pits)</td>
</tr>
<tr>
<td>III L</td>
<td>large roundish or tubular pits (larger than type I</td>
</tr>
<tr>
<td></td>
<td>pits)</td>
</tr>
<tr>
<td>IV</td>
<td>branch-like or gyrus-like pits</td>
</tr>
<tr>
<td>V</td>
<td>non-structured pits</td>
</tr>
</tbody>
</table>

Kudo S. Et al. GIE 1996
But in real life classification is not really that easy
Kudo pit patterns

• Technique
  – Feces & mucous must be washed away before staining
  – 2 – 7ml applied to lesion, excess suctioned before observation
    • Spray catheter or syringe injection for indigo carmine
  – Violet dyes require 30 – 60 seconds to stain prior to observation
The Kudo Classification
Pit Patterns

<table>
<thead>
<tr>
<th>Histology</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperplastic</td>
<td>Nothing</td>
</tr>
<tr>
<td>Adenoma</td>
<td>Snare polypectomy</td>
</tr>
<tr>
<td>High grade adenoma</td>
<td>EMR en bloc or pEMR</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>EMR en bloc, ESD, or surgery</td>
</tr>
</tbody>
</table>

Histology:
- I: Round pits, with a regular distribution
- II: Cross or star-shaped pits, slightly larger than normal
- III: Large tubular pits, elongated, slightly curved or rounded
- IV: Small tubular or roundish pits, smaller than normal and in a compact arrangement
- V: Branched or gusse-like pits, large and tortuous ("bean surface")
# NBI International Colorectal Endoscopic (NICE) Classification

<table>
<thead>
<tr>
<th></th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td>Same or lighter than background</td>
<td>Browner relative to background (verify color arises from vessels)</td>
<td>Brown to dark brown relative to background; sometimes patchy whiter areas</td>
</tr>
<tr>
<td><strong>Vessels</strong></td>
<td>None, or isolated lacy vessels coursing across the lesion</td>
<td>Brown vessels surrounding white structures**</td>
<td>Has area(s) of disrupted or missing vessels</td>
</tr>
<tr>
<td><strong>Surface Pattern</strong></td>
<td>Dark or white spots of uniform size, or homogeneous absence of pattern</td>
<td>Oval, tubular or branched white structure surrounded by brown vessels**</td>
<td>Amorphous or absent surface pattern</td>
</tr>
<tr>
<td><strong>Most likely pathology</strong></td>
<td>Hyperplastic</td>
<td>Adenoma***</td>
<td>Deep submucosal invasive cancer</td>
</tr>
</tbody>
</table>

* Can be applied using colonoscopes with or without optical (zoom) magnification

** These structures (regular or irregular) may represent the pits and the epithelium of the crypt opening.

*** Type 2 consists of Vienna classification types 3, 4 and superficial 5 (all adenomas with either low or high grade dysplasia, or with superficial submucosal carcinoma). The presence of high grade dysplasia or superficial submucosal carcinoma may be suggested by an irregular vessel or surface pattern, and is often associated with atypical morphology (e.g., depressed area).
**Advanced endoscopic imaging: European Society of Gastrointestinal Endoscopy (ESGE) Technology Review**

**Authors**
James E. East, Jasper L. Vlegels, Philip Rowlandt, Pradeep Bhandari, Raf Bisschops, Evelien Dekker, Cesare Hassan, Gareth Morgan, Ralf Kiesslich, Galus Longcroft-Wheaton, Ana Wilson, Jean-Marc Dumonceau

**Institutions**
Institutions are listed at end of article.

---

**Colonic lesion**

**NICE classification**

- Type 1 polyp
- Type 2 polyp

**WASP classification**

≥2 of following features of sessile serrated lesion:
- Clouded surface?
- Indistinct border?
- Irregular shape?
- Dark spots inside crypts?

**Fig. 4** Workgroup serrAte polypS and Polyposis (WASP) classification for optical diagnosis of hyperplastic polyps, sessile serrated lesions and adenomas, based on the Narrow band imaging International Colorectal Endoscopic (NICE) classification and four sessile serrated lesion-like features.
Post-polypectomy surveillance in colorectal screening programme

Mirjana Kalauz
Clinical Hospital Center Zagreb
Outline

• Background & definitions
• EU/ESGE guidelines
• Case presentations
• Conclusions
Reminder

• Surveillance is the ongoing follow-up of patient at increased risk of the disease
EU/ESGE guiding principals

• Prior adenoma is a risk factor for advanced neoplasia
• Risk is related to baseline colonoscopy findings: polyp size, number, histological grade
EU/ESGE guiding principals

• Surveillance focus should be highest risk individuals and minimum frequency to provide protection against future cancer

• an indiscriminate use of post-polypectomy surveillance would represent a substantial burden on endoscopy resources
The case for surveillance

• Efficacy of endoscopic surveillance only shown in epidemiological studies
• No RCT
• Patients not in surveillance have 3-4x risk for CRC

BUT:
• Approx 20% endoscopy capacity is colonoscopic surveillance
• Significant volume of unnecessary inaccurate surveillance

Radaelli F. DigLiverDis 2012
ESGE Guideline 2013
Citat iz guideline str 843 4. pasos
Surveillance Interval

• Studies have shown large proportion of surveillance procedures are inappropriate (40-69%)
• Endoscopist should be responsible
• Histology required so will need mechanism to finalise report
• Adherence to published surveillance should be monitored as a part of QA

Schoen Gastroenterology 2010
Key recommendations

Cesare Hassane et al. Post-polypectomy colonoscopy surveillance: European Society in Gastrointestinal Endoscopy Guideline 2013
High quality colonoscopy

- Complete
- Meticulous inspection
- Adequately cleaned
- All neoplastic lesions removed and retrieved
- Endoscopist responsibility for providing written recommendation for surveillance
High Risk

❖ Repeat at 3 years if:
  ▪ Adenoma with villous histology
  ▪ or high grade dysplasia
  ▪ or ≥10 mm
  ▪ or ≥ 3 adenomas

❖ Serrated polyps ≥10 mm
  ▪ dysplasia
Low risk

- Repeat at 10 years or return to screening if:
  - 1-2 tubular adenoma
  - or <10 mm
  - or LGD

- Serrated polyps <10 mm, no dysplasia
COLONOSCOPIC SURVEILLANCE FOLLOWING ADENOMA REMOVAL (EU 2010)

Baseline colonoscopy (CS)

Low risk
1-2 adenomas AND both small (<10 mm)
AND tubular AND low grade neoplasia

Intermediate risk
3-4 small adenomas OR at least 1 ≥10 mm/≤20 mm
OR villous OR high grade neoplasia

High risk
≥ 5 small adenomas OR At least one ≥20 mm

A
Routine Screening

B
3 years

C
Within 1 year

Findings at surveillance CS

- One negative exam
  → 5 yearly
- Two consecutive negative exams
  → Routine Screening

Findings at surveillance CS

- Negative, low or intermediate risk adenomas
  → 3 yearly
- Two consecutive negative exams
  → 5 yearly
- High risk adenomas
  → C
- High risk adenomas
  → C

Notes:
1 Baseline colonoscopy must be complete in order to accurately assess risk.
2 Optional additional criteria
3 Other consideration: age, family history, accuracy and completeness of examination
4 Clearing colonoscopy to check for missed lesions
Smjernice HGD-a
Other key recommendation

- Piecemeal resection >10 mmFU within 6/12 mo
- Inadequate prep-early repeat
- Symptomatic patients prompt repeat
- Stop at ~ 80 years
- FH CRC- no influence
- No evidence for interval FOBT

Keighley APT 2003
Yag Clinical Endos 2012
Case one

• Female 55
• Rectal bleeding
• Single 8 mm polyp at sigmoid flexure
• Polypectomy performed with cold resection

• Histology: 12 mm tubular adenoma, LGD
What would be surveillance interval?

- 1 year
- 3 years
- 5 years
- 10 years
Learning points: case one

• Teach precise polyp size measurement to the mm level
• Photograph all lesions prior to resection
• For lesions in the diminutive size range, consider photography with a closed biopsy forceps
• For lesions 6-15 mm photograph with open snare

Plumb et al. Endoscopy 2016
Case two

- 65 male
- Screening colonoscopy
- Otherwise fit and well
- Single polyp 30 mm
- Piecemeal resection performed
- Histology: villotubular adenoma, LGD
What would be surveillance interval?

- 1 year
- 3 years
- 5 years
- 10 years
Learning points: case two

• Piecemeal EMR >10 mm
• FU within 6/12 mo before surveillance starts
• Incomplete excision consistently shown to in increase PCCRC

Pohl (CARE study) Gastroenterology 2013
Case three

• 5 polyps (largest in sygmoid colon 25 mm)
• Removed by electroresection
• Histology: tubular and villotubular adenoma (LGD)
What should be screening interval?

- 1 year = EU guideline
- 3 years = ESGE guideline
- 5 years
- 10 years
Case four

- 64 male
- Rectal bleeding
- Colonoscopy: 8 mm polyp in rectum. Polypectomy performed with cold biopsy forceps
Case four

• Histology:
• A single fragment measuring 4 mm, tubular adenoma with LGD

• What next?
Learning points: case four

- Careful inspection & accurate description of polyps
- Snare resection of almost all polyps
- Cold forceps only used for biopsy or removal of 1-2 mm polyps
- Prompt follow-up
- If malignancy of small lesion suspected, avoid multiple biopsies (may be amenable to ESD)
ADR: Validation (and vindication)

- Polish screening colonoscopy study
  - 45,000 subjects, 186 endoscopists
  - Patients whose endoscopists’ ADR was < 20% had at least 10-fold higher risk to be diagnosed with interval CRC, compared to those whose endoscopists had ADR ≥ 20%
  - Interval CRC risk increased as ADR decreased

Kaminski et al. NEJM 2010; 362: 1795-1803.