Adenoma Detection During Both The Insertion and Withdrawal Versus Only Withdrawal of Colonoscopy: A Prospective Randomized Controlled Trial

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Conflicts of Interest: None
Background

- Polyps seen and not removed during colonoscopic insertion are sometimes unable to be found during withdrawal.
- Additional inspection and polypectomy for polyps ≤ 10 mm during insertion reduced polyp miss rate.¹
- Two RCTs reported that insertion polypectomy offered no additional benefit on adenoma detection.²,³

Aims of Study

- **Primary aim:**
  To evaluate whether additional inspection and polypectomy during insertion increased adenoma detection rate (ADR).

- **Secondary aims:**
  To compare the proximal colon ADR and hyperplastic polyp detection rate (HPDR), adenoma per colonoscopy (APC), adenoma per positive colonoscopy (APPC), and other pertinent procedure-related measures.
Inclusion and Exclusion Criteria

**Inclusion criteria:**
Patients aged $\geq 45$ years who were able to give informed consent were eligible for enrollment.

**Exclusion criteria:**
- Previous surgical resection of the colon
- Inflammatory bowel disease
- Polyposis syndrome
- Gastrointestinal bleeding
- ASA classification of physical status $\geq 3$
- Refusal to provide written informed consent
- Obstructive lesions of the colon
- Inadequate preparation (BBPS score of 0 or 1 in any segment)
- Inability to completely remove a polyp
Randomization and Intervention

Randomization

Study group
- Cleaning, Inspection, Removal of small polyps
  - Cleaning, Inspection, Removal of all polyps

Control group
- No procedure
  - Cleaning, Inspection, Removal of all polyps

Colonoscopic insertion

Colonoscopic withdrawal
Potential participants (n=683)

255 excluded
153 <45 y/o
80 refuse
10 unsedated
6 colon op Hx
5 other prep
1 ASA-3

Randomization (n=428)

2 excluded
1 ca obstruction
1 ask unsedated
1 ESD

Study group (n=214)

3 excluded
1 ca obstruction
1 ask unsedated
1 ESD

Control group (n=214)

4 excluded
3 ESD
1 ask unsedated

Analyzed (n=211)

Analyzed (n=210)
## Results: Demographics and Indications

<table>
<thead>
<tr>
<th></th>
<th>Study group (N=211)</th>
<th>Control group (N=210)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, n (%)</td>
<td>99 (46.9)</td>
<td>99 (47.1)</td>
<td>1.000</td>
</tr>
<tr>
<td>Age, mean (SD), years</td>
<td>57.7 (8.5)</td>
<td>58.2 (8.5)</td>
<td>0.465</td>
</tr>
<tr>
<td>Body mass index (BMI), mean (SD), kg/m²</td>
<td>25.2 (4.2)</td>
<td>25.3 (3.7)</td>
<td>0.707</td>
</tr>
<tr>
<td>Family history of CRC, n (%)</td>
<td>34 (16.1)</td>
<td>27 (12.9)</td>
<td>0.406</td>
</tr>
<tr>
<td>Active Smoker, n (%)</td>
<td>36 (17.0)</td>
<td>24 (11.4)</td>
<td>0.531</td>
</tr>
<tr>
<td>Screening indication, n (%)</td>
<td>75 (35.5)</td>
<td>84 (40.0)</td>
<td>0.367</td>
</tr>
<tr>
<td>Surveillance indication n, (%)</td>
<td>136 (64.5)</td>
<td>126 (60.0)</td>
<td></td>
</tr>
</tbody>
</table>
## Colonoscopy Procedures

<table>
<thead>
<tr>
<th></th>
<th>Study group</th>
<th>Control group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cecal intubation time, mean (SD), min</td>
<td>11.1 (4.8)</td>
<td>6.2 (4.7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Withdrawal time, mean (SD), min</td>
<td>23.1 (7.9)</td>
<td>29.2 (9.8)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Total procedure time, mean (SD), min</td>
<td>34.2 (10.3)</td>
<td>35.3 (11.4)</td>
<td>0.283</td>
</tr>
<tr>
<td>BBPS score, mean (SD)</td>
<td>7.0 (0.5)</td>
<td>7.0 (0.5)</td>
<td>0.999</td>
</tr>
<tr>
<td>Patient discomfort during procedure (score 0-10), mean (SD)</td>
<td>0.3 (0.9)</td>
<td>0.4 (1.0)</td>
<td>0.525</td>
</tr>
<tr>
<td>Colonoscopy technical difficulty (score 0-10), mean (SD)</td>
<td>2.7 (1.3)</td>
<td>2.6 (1.2)</td>
<td>0.227</td>
</tr>
<tr>
<td>Fentanyl dose, mean (SD), ug/kg</td>
<td>1.16 (0.34)</td>
<td>1.15 (0.38)</td>
<td>0.736</td>
</tr>
<tr>
<td>Midazolam dose, mean (SD), mg/kg</td>
<td>0.07 (0.04)</td>
<td>0.07 (0.05)</td>
<td>0.987</td>
</tr>
</tbody>
</table>
Adenoma Detection Rate (ADR)

Study | Control
---|---
Overall ADR: 63.5% | 68.1%
Proximal ADR: 46% | 56.2%

P = 0.041
Detection of Advanced Adenoma and Proximal Hyperplastic Polyp

- Advanced ADR: Study 16.1%, Control 15.7%
- Proximal HPDR: Study 31.8%, Control 24.3%

P = 0.104
Adenoma and Hyperplastic Polyp Per Colonoscopy (APC/HPPC)

Overall APC

Study: 1.6
Control: 1.9

P = 0.26

Proximal APC

Study: 0.9
Control: 1.2

P = 0.092

Overall APC & Proximal HPPC

Study: 2.2
Control: 2.3

P = 0.44
Adenoma Per Positive Colonoscopy (APPC) & Adenoma detected after the first adenoma (ADR-Plus)

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<tbody>
<tr>
<td>Overall APPC, mean (SD)</td>
<td>2.5 (2.0)</td>
<td>2.7 (2.5)</td>
<td>0.484</td>
</tr>
<tr>
<td>Proximal APPC, mean (SD)</td>
<td>2.0 (1.4)</td>
<td>2.1 (1.9)</td>
<td>0.659</td>
</tr>
<tr>
<td>Overall ADR-Plus, mean (SD)</td>
<td>1.5 (2.0)</td>
<td>1.7 (2.5)</td>
<td>0.484</td>
</tr>
<tr>
<td>Proximal ADR-Plus, mean (SD)</td>
<td>1.0 (1.4)</td>
<td>1.1 (1.9)</td>
<td>0.659</td>
</tr>
<tr>
<td>Patients classified as high-risk group, n (%) [95% CI]</td>
<td>61 (28.9) [22.9-35.5]</td>
<td>62 (29.5) [23.5-36.2]</td>
<td>0.915</td>
</tr>
</tbody>
</table>

*High-risk group was defined as patients with presence of ≥3 adenomas of any size, any adenoma ≥1 cm in size, or adenoma with villous component, or high-grade dysplasia.
## Risk Factors for Colon Adenomas

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group vs. control group</td>
<td>1.23</td>
<td>0.71-2.13</td>
<td>0.469</td>
</tr>
<tr>
<td>Age (for a 5-year increase)</td>
<td>1.32</td>
<td>1.15-1.51</td>
<td>0.0001</td>
</tr>
<tr>
<td>Female vs. male</td>
<td>0.90</td>
<td>0.56-1.43</td>
<td>0.646</td>
</tr>
<tr>
<td>BMI (for a 1-kg/m² increase)</td>
<td>1.06</td>
<td>1.00-1.13</td>
<td>0.065</td>
</tr>
<tr>
<td>Active smoker</td>
<td>0.98</td>
<td>0.51-1.89</td>
<td>0.957</td>
</tr>
<tr>
<td>Family history of CRC</td>
<td>0.87</td>
<td>0.47-1.61</td>
<td>0.651</td>
</tr>
<tr>
<td>Screening vs. surveillance indication</td>
<td>1.44</td>
<td>0.92-2.26</td>
<td>0.115</td>
</tr>
<tr>
<td>Endoscopist</td>
<td>0.96</td>
<td>0.48-1.92</td>
<td>0.905</td>
</tr>
<tr>
<td>BBPS score (for a 1-point increase)</td>
<td>0.79</td>
<td>0.49-1.28</td>
<td>0.338</td>
</tr>
<tr>
<td>Colonoscopy withdrawal time (for a 1-min increase)</td>
<td>1.08</td>
<td>1.04-1.11</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
Conclusion

Additional inspection and polypectomy during colonoscopice insertion did not improve ADR and other secondary quality measures compared with traditional inspection and polypectomy performed entirely during withdrawal.