Open-Access Flexible Sigmoidoscopy Frequently Leads to Additional Colonoscopy in Symptomatic Patients over 50 years

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ABSTRACT

Background & Aims: General practitioners (GPs) in the Netherlands have open access to flexible sigmoidoscopy (FS) for patients with lower gastrointestinal symptoms, but not to colonoscopy. This study was performed to investigate the yield of FS in GP-referred patients, to evaluate the proportion of patients in whom additional colonoscopy was performed and to investigate whether there was a subgroup of patients referred for symptoms with a low risk of detecting significant findings.

Methods: All patients undergoing FS in 2008 and 2009 who were referred by GPs were analyzed. Indications for additional colonoscopy were the presence of polyps and/or colorectal cancer (CRC), polyp screening or surveillance, incomplete FS or other reasons.

Results: In total, 916 patients underwent FS. A cause for the symptoms was found in 44.2% of patients. In patients aged 50 years or older, additional colonoscopy was more frequently performed than in younger patients (27.5% vs. 9.6%, OR=3.6 [95% CI 2.4-5.4]), mainly due to a higher prevalence of adenomatous polyps (29.9% vs. 10.5%, OR=3.6 [95% CI 2.4-5.4]) and CRC (7.5% vs. 1.3%, OR=6.2 [95% CI 2.2-17.5]) during FS. In 7.8% patients undergoing FS for abdominal pain as the presenting symptom, a probable cause for the symptoms was found, mainly diverticular disease.

Conclusion: Due to the high prevalence of polyps and CRC in symptomatic patients aged 50 years or older undergoing FS, an additional colonoscopy is performed frequently. In patients referred with abdominal pain, FS is unlikely to reveal a relevant cause for the symptoms.

Key words: abdominal pain – diagnostic yield – colonoscopy – flexible sigmoidoscopy – general practitioner – open access.

INTRODUCTION

Insufficient capacity of endoscopy units and increasing waiting lists for endoscopy are common in many countries [1, 2]. This is mainly due to the fact that the population is aging in the Western world, resulting in a higher prevalence of morbidity. Worldwide, the incidence of colorectal cancer (CRC) is rising [3-5]. This has resulted in the introduction of CRC screening programs in many countries, further increasing the demand on endoscopy units [6-8].

The mainstay of endoscopic examination of the colon is colonoscopy, which is invasive and requires extensive bowel preparation. Flexible sigmoidoscopy (FS) is an alternative to colonoscopy; however, it has the disadvantage that only the left-sided colon (up to the splenic flexure) can be evaluated. Although this procedure can be experienced as less comfortable for the patient than colonoscopy with sedation [9], bowel preparation for FS is less burdensome and the endoscopic procedure itself is less time consuming for the endoscopist and patient than colonoscopy. As the incidence of significant findings, i.e. colorectal polyps and CRC, is highest in the left-sided colon [10], this is a further argument to promote the use of FS.

The health care system in the Netherlands is based on a well developed primary care system. All patients are initially seen by a general practitioner (GP), and only referred to the hospital (second line medical care) if indicated. In general, GPs in the Netherlands have direct access to FS but not to colonoscopy. Although it is already widely accepted that colonoscopy should replace FS for most indications in patients over 50 years of age, the availability of open access to FS for primary care physicians in the Netherlands still promotes a preferential referral pattern.
towards FS. This has resulted in a significant number of referrals for FS to Dutch endoscopy units over the years.

In a proportion of patients referred for FS, findings during the examination result in an indication for additional colonoscopy. This procedure needs to be scheduled and the patient should take a repeat and more extensive bowel preparation. These patients thus eventually undergo two endoscopic procedures. To date, the exact burden of open access sigmoidoscopy on our endoscopy capacity is unclear.

Furthermore, a substantial part of GP referrals for FS is for patients presenting with abdominal pain. Based on clinical experience and the literature [11, 12], it may well be that FS in these patients only rarely yields an explanation for the symptoms or clinically relevant findings. Reducing the number of FS procedures in patients with a low a priori risk of detecting relevant findings might help to reduce the high demand on endoscopic capacity.

We conducted a retrospective study to investigate the yield of FS in patients referred by their GP and to evaluate the proportion of patients in whom additional colonoscopy was indicated and performed. Furthermore, we investigated whether there was a subgroup of patients referred for FS for symptoms with a low a priori risk of detecting significant findings during FS.

METHODS

Study population

All patients, 18 years or older, undergoing FS in a large, general hospital and referred by the GP in the period January 1 2008 through December 31 2009 were identified using the endoscopy reporting system (Endobase [Olympus Medical Systems Europa GMBH, Hamburg, Germany]). All endoscopy reports in the hospital are generated using this reporting system. Patients referred for FS by other (non-GP) physicians were excluded.

All endoscopies were performed using Olympus 160 or 180 series sigmoidoscopes or colonoscopes. Bowel preparation for FS consisted of oral sennosides the day before the procedure and a sodium phosphate enema one to two hours before the procedure. Standard introduction during FS was up to the splenic flexure.

During the study period, there was no mass screening program for CRC in the Netherlands.

Data collection

Age, gender, main indication for and diagnostic yield of FS were collected for all patients. In case of multiple indications, the main indication, as reported by the endoscopist, was used in the analyses. All findings during FS were recorded and used for the analyses. This may have resulted in more than one finding per patient. If applicable, pathology reports and relevant colorectal medical history were reviewed from the patient charts. In our institution, we have strict criteria for additional colonoscopy after FS, i.e.: presence of polyps and/or CRC during FS, polyp screening or surveillance after CRC, incomplete FS or other reasons. If additional colonoscopy had been performed, the indication for the procedure and diagnostic yield were also collected. Patient data were then encrypted and further analyzed.

The interpretation of the findings during FS in relation to the symptoms of the patient was left to the discretion of the physician performing the endoscopy.

Data analysis

Patients who underwent FS were divided into two groups: patients younger than 50 years and patients aged 50 years or older. We investigated whether additional colonoscopy had been performed and to what extent it had been performed more frequently in patients of 50 years or older compared to younger patients and what the main indications for colonoscopy were.

In addition, patients were analyzed according to the indication for FS to investigate in which subsets of patients FS had a higher or lower risk of finding the cause of the symptoms. For this, we analyzed the five most common indications for FS.

Statistical analysis

Data analysis was performed using the Statistical Packages for Social Sciences version 15 [SPSS, Chicago, Illinois, USA]. Descriptive statistics were used for continuous variables. The frequencies and percentages were calculated for categorical variables. Statistical differences between groups were calculated using the chi-squared test and expressed in odds ratio (OR) and 95% confidence interval (CI). Means were compared using the Student’s t-test. Statistical significance was set at p<0.05.

Multivariate analysis was performed to identify indications for FS that were independently associated with finding a cause for the symptom.

Ethical approval

In the Netherlands, no informed consent or institutional approval is required for this type of observational, retrospective research with encrypted patient data.

RESULTS

Patients’ characteristics

In the study period, a total of 916 patients were referred for FS by the GP, of which 603 (65.8%) were 50 years of age or older. Patient characteristics are summarized in Table I. The medical history with regard to colorectal disease was not different between patients younger or older than 50 years, except for a higher frequency of a history of colonic polyps in patients of 50 years or older. In patients of 50 years or older, indications for FS were more often a change in bowel habits, abdominal pain and abnormalities found on previous imaging studies (Table II).

Endoscopy findings

Flexible sigmoidoscopy detected a similar rate of patients with hemorrhoids in both age groups; in 155/603 (25.4%) patients of 50 years or older vs. 77/313 (24.6%) patients younger than 50 years. In patients 50 years or older, FS less frequently detected inflammatory bowel disease (IBD) or no abnormalities. However, in the older age group colorectal polyps, colorectal cancer and diverticular disease were found more often (Table III).
Open-access flexible sigmoidoscopy

In both age groups, a cause for the presenting symptom was found in 44% of patients. Two possible causes for the presenting symptoms were found in 64 patients and three possible explanations for the symptoms were found in 2 patients. Hemorrhoids were thought to be the explanation for the presenting symptoms in 20.1% of all FS procedures. Colorectal cancer, polyps and diverticular disease were the most common causes of the symptoms in patients of 50 years or older, whereas IBD was more prevalent as a cause in patients younger than 50 years (Table III).

In patients aged 50 years or older, significantly more frequently an additional colonoscopy was performed compared to the younger patients (Table IV). The predominant indications for additional colonoscopy were polyps or CRC found during FS in both patient groups. In 5.1% of patients under the age of 40 years, in 14.0% of patients aged 40-50 years and in 27.5% of patients of 50 years or older additional colonoscopy was performed (p<0.001).

Diagnostic yield per indication

The five most common indications for FS were rectal blood loss, change in bowel habits, abdominal pain, constipation and diarrhea (Table II). The cause for the presenting symptom was found in 324/461 (70.3%) patients with rectal blood loss, in 6/21 (22.2%) patients with diarrhea, in 17/82 (20.7%) patients with a change in bowel habits, in 4/40 (10.0%) patients with constipation and in 8/103 (7.8%) patients with abdominal pain (p<0.001). There was no statistically significant difference in the proportion of additional colonoscopies between these diagnostic groups (range 17.5-24.1%, p=0.33).

Table V shows the results of the subset of patients with the lowest yield during FS, i.e. those with abdominal pain as the only symptom, compared with patients referred for another indication. Patients referred for abdominal pain were more often 50 years or older. Significantly more often no abnormalities were found in this group. Patients with abdominal pain did not have an increased risk of finding CRC. Flexible sigmoidoscopy was less likely to reveal an explanation for the symptoms in patients with abdominal pain. If the cause of the symptoms was found, it was mainly diverticular disease (7/8 patients). The proportion of patients with abdominal pain that underwent additional colonoscopy was the same as in the other patients.

In line with these findings, multivariate analysis showed that the indications rectal blood loss (adjusted OR 16.25 [10.30-25.63]), a change in bowel habits (adjusted OR 1.97 [1.16-3.37]) and diarrhea (adjusted OR 2.68 [1.07-6.71])
were independently associated with finding a cause for the symptoms during FS. Constipation (adjusted OR 0.78 [0.26-2.39]) and abdominal pain (adjusted OR 0.70 [0.38-1.30]) were not found to be associated with finding a cause for these symptoms.

**DISCUSSION**

In this retrospective cohort study of patients referred for FS by their GP, we found that an additional colonoscopy was performed in 27.5% of patients of 50 years or older.
This resulted in a significant burden on the capacity of the endoscopy unit. In patients referred for abdominal pain as the only presenting symptom, FS yielded a cause for the symptoms in less than 8% of patients and in these cases mainly diverticular disease was found (7/8).

The observation in our study that findings during FS warranted colonoscopic evaluation in only a minority of patients under the age of 50 years is in line with other reports. Several authors have reported that the incidence of colonic polyps and CRC in patients under the age of 40-45 years presenting with rectal blood loss is low, making FS a valuable tool in this patient group [13-16]. In our study, in only 5.1% of patients under the age of 40 years a full additional colonoscopy was performed, as compared to 14.0% in patients between age 40 and 50 years and 27.5% in patients of 50 years or older. As the main indication for additional colonoscopy was the finding of polyps and/or CRC, it reflects the increasing incidence of polyps and CRC in the aging population as has been repeatedly reported before [17, 18].

The frequency of isolated proximal adenomas in patients under 40 years of age presenting with rectal bleeding has been reported to be very low [19] and they have been reported in less than 1% of patients aged 41-50 years [14]. These findings combined with the relatively low need for additional colonoscopy in our study may still support a role for FS as a diagnostic tool in patients under the age of 50 years. As the main indication for additional colonoscopy was the finding of polyps and/or CRC during FS, it reflects the increasing incidence of polyps and CRC in the aging population as has been repeatedly reported before [17, 18].

As can be expected, the frequency of colonic polyps was not different between patients with and without abdominal pain as indication for FS. This confirms that colonic polyps are asymptomatic in the vast majority of cases [21]. Selinger et al also reported that colonic evaluation with colonoscopy or CT colonography for patients with abdominal pain found incidental colonic pathology, mainly colonic polyps, in the

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**Table V. Yield of flexible sigmoidoscopy in patients solely presenting with abdominal pain**

<table>
<thead>
<tr>
<th>Abdominal pain</th>
<th>Other</th>
<th>Odds ratio (95% confidence interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>103</td>
<td>813</td>
</tr>
<tr>
<td>Male</td>
<td>53 (51.5)</td>
<td>396 (48.7)</td>
</tr>
<tr>
<td>Mean age, years (range)</td>
<td>58.8 (24-91)</td>
<td>55.9 (15-93)</td>
</tr>
<tr>
<td>Age over 50 years</td>
<td>79 (76.7)</td>
<td>524 (64.5)</td>
</tr>
<tr>
<td>History of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colonic polyps</td>
<td>3 (2.9)</td>
<td>25 (3.1)</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>0 (0)</td>
<td>8 (1.0)</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>1 (1.0)</td>
<td>10 (1.2)</td>
</tr>
<tr>
<td>Partial colectomy for other reasons</td>
<td>2 (1.9)</td>
<td>1 (0.2)</td>
</tr>
</tbody>
</table>

**Findings during flexible sigmoidoscopy:**

| No abnormalities | 49 (48.0) | 243 (29.9) | 2.17 (1.43-3.29) |
| Hemorrhoids      | 9 (8.7)   | 223 (27.4) | 0.25 (0.13-0.51) |
| Polyps           | 19 (18.4) | 194 (23.9) | 0.72 (0.43-1.22) |
| Diverticular disease | 37 (35.9) | 174 (21.4) | 2.06 (1.33-3.18) |
| Colorectal cancer| 1 (1.0)   | 48 (5.9)   | 0.16 (0.02-1.14) |
| Inflammatory bowel disease | 0 (0) | 42 (5.2) | n/a |
| Other            | 6 (5.9)   | 99 (12.2)  | 0.45 (0.19-1.06) |

**Found explanation for indication during FS:**

| n | 8 (7.8)** | 397 (48.8) | 0.09 (0.04-0.18) |

Numbers in parentheses are percentages unless otherwise indicated
* t-test; ** Diverticular disease in 7 and CRC in 1 patient
same proportion of patients compared to those who were referred for other indications [20], a finding we actually confirmed.

Historically, abdominal pain is often considered as one of the main presenting symptoms of CRC [22]. However, recent publications have concluded that abdominal pain alone has a low predictive value for the presence of CRC [21, 23, 24]. Our study confirms this and raises the question whether colonoscopic examination should routinely be performed in patients only presenting with abdominal pain as it is unlikely to yield a clinically relevant cause for the pain. Nonetheless, it should be kept in mind that colonoscopy is able to detect asymptomatic colonic polyps in a subgroup of patients, meaning that the indication for colonoscopy changes from a diagnostic to a screening one.

Marderstein et al proposed that a full colonoscopy is not always indicated in patients presenting with bright red blood after or during defecation, with no family history of colorectal neoplasia or change in bowel habits, as colonoscopy in these patients is unlikely to yield significant findings [25]. The authors defined significant findings as adenomas > 1 cm, villous adenoma, cancer in situ or invasive cancer. However, they do not report on the number of patients with ‘non significant’ other adenomas, which would have been found during FS and would subsequently have led to additional colonoscopy. A drawback of this study is that we were not informed about the follow-up of patients that did not undergo additional colonoscopy. The frequency of relevant colonic lesions in the more proximal part of the colon in this patient group is therefore unclear. It has been reported that 25-30% of CRCs and 20-25% of adenomatous polyps are located in the proximal colon [10]. Many of these patients, however, are also known to have more distal lesions that will be detected during FS and followed by colonoscopy. A recent meta-analysis showed that more than half of proximal neoplastic colonic lesions occurred isolated, i.e., in patients without concurrent distal polyps or CRC [26]. Thus, based on this finding, it may well be that the need to perform a colonoscopy is even higher than was observed in our study. The absence of information on the follow-up of patients also makes it impossible to report the frequency of other, non-neoplastic diagnoses, e.g., Crohn’s disease, in patients who did not undergo additional colonoscopy.

The slightly higher prevalence of a history of colonic polyps in the patients over 50 years might have led to selection bias. However, repeat analysis without these patients (4.1% and 1.0% in the patients over 50 years might have led to selection bias. A recent meta-analysis showed that more than half of proximal neoplastic colonic lesions occurred isolated, i.e., in patients without concurrent distal polyps or CRC [26]. Thus, based on this finding, it may well be that the need to perform a colonoscopy is even higher than was observed in our study. The absence of information on the follow-up of patients also makes it impossible to report the frequency of other, non-neoplastic diagnoses, e.g., Crohn’s disease, in patients who did not undergo additional colonoscopy.

Furthermore, it can be argued that the scoring of the probable cause of the symptoms was rather subjective. This is, however, a reflection of every day clinical practice in which clinicians make a diagnosis based on the available information.

**CONCLUSION**

In 44.2% of patients referred for FS by their GP, the probable cause of the symptoms was found. However, due to the high prevalence of polyps and CRC during FS in patients aged 50 years or older, an additional colonoscopy was performed frequently in this patient group. In patients referred with abdominal pain as the sole presenting symptom, FS is unlikely to reveal a cause of their symptoms with clinical consequences.

**Conflicts of interest.** The authors have no conflicts of interest to declare or relevant funding by third parties related to this paper.

**Authors’ contribution.** HJMP: study concept and design, acquisition, analysis and interpretation of data, manuscript draft. MJ: acquisition, analysis and interpretation of data, critical revision of manuscript. PDS: interpretation of data, critical revision of manuscript. MAB: study concept and design, analysis and interpretation of data, critical revision of manuscript.

**REFERENCES**