ORIGINAL ARTICLE

Appropriateness of colonoscopy at a tertiary care centre – are we overdoing gastrointestinal endoscopy?

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ABSTRACT

Aim To evaluate the pattern of indications and a spectrum of colonic pathology, and to determine appropriateness of indications for colonoscopy in order to improve patient selection for colonoscopy.

Methods This retrospective study includes 294 patients who were referred to the Gastroenterology Department from a primary care physician in order to approach endoscopic examination. Study data included patients' anamnestic data (comorbidities, positive family history, performed radiological examinations) an indication for the procedure, and colonoscopy findings.

Results Haematochezia was confirmed in 186 (63.26%), positive radiologic finding in183 (62.24%) and anaemia in 157 (53.40%) patients. Adenoma and colorectal carcinoma were detected in 40 (13.6%) and 53 (18%) patients, respectively. A significant association between haematochezia and colorectal neoplasm was confirmed (p=0.019), haematochezia and inflammatory bowel disease (p=0.027), and between radiological finding and colorectal neoplasm (p=0.018). There was no significant association between anaemia and any of the colonoscopic findings. According to EPAGE II criteria indications were appropriate in 187 (63.6%), uncertain in 67 (22.8%) and inappropriate in 40 (13.6%) patients.

Conclusion This study confirmed a slightly larger number of uncertain and inappropriate indications for colonoscopy compared to other studies that examined indications for colonoscopy, which can be attributed to a high number of patients with functional bowel disorders.

Keywords: colonic diseases/diagnosis, colorectal neoplasm, polyps, utilization

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INTRODUCTION

Colonoscopy provides an excellent view of the mucosa of the entire colon and terminal ileum. Colonoscopy is safe and effective not only for a diagnosis, but also for therapeutic interventions. In recent years, indications for colonoscopy and its use in gastroenterology have increased mainly due to conscious sedation, safety, and technological developments (1). The main indications are examination after polypectomy or colorectal cancer resection, haematochezia, iron deficiency anaemia, uncomplicated abdominal pain and bloating, chronic diarrhoea and constipation (2).

There are many reasons for a patient experiencing symptoms, such as chronic constipation, lower abdominal pain and bloating. The prevalence of constipation in the general population ranges from 2-30%, with a female to male ratio of 2:1 (3). Bloating is experienced at least once a month in 16% of healthy individuals and symptoms are consistent with irritabile bowel syndrom (IBS) in 10-30% of adults in the general population (3).

It is very important to make a distinction between organic and functional disorders. Although diagnostic colonoscopy may be useful for patients with functional disorders, its appropriateness should be revised (4). Some studies report overuse of endoscopy and questionable indications in 30% of performed procedures, while others report that one of ten patients undergo inappropriate colonoscopy (4). The reasons include cancer phobia, the investigation of accidentally identified suspicious carcinoma found on other radiological imaging methods and overuse of colonoscopy in functional bowel disorders (5).

Diagnostic yield in relation to each indication is defined as the ratio between significant findings detected on colonoscopy and the total number of procedures performed for that indication (6). The presence of any of the following lesions was considered as a significant finding on colonoscopy: a pre-malignant or malignant lesion, IBD, polyps, while haemorrhoids and diverticulosis were not considered as significant findings (7). Various scientific institutions, such as the European Panel of Appropriateness of Gastrointestinal Endoscopy (EPAGE) (8) and the American Society for Gastrointestinal Endoscopy (ASGE) (9) have developed different guidelines on the appropriateness of indications for colonoscopy.

The aim of this study was to evaluate the pattern of indications and the spectrum of colonic pathology of patients at a tertiary health care facility in Bosnia and Herzegovina in order to evaluate the appropriateness of colonoscopy.

PATIENTS AND METHODS

Patients and study design

This is a retrospective study carried out at the Clinic for Gastroenterohepatology, Clinical Centre of the University of Sarajevo in the period January 2018 to January 2019 including all patients reported to the Gastroenterology Department for the first time (from a primary care physician), in order to approach endoscopic examination.

Study data included patients' demographic and anamnestic data (comorbidities, positive family history, radiological examinations performed), an indication for the procedure, and colonoscopy findings.

Inclusion criteria were: haematochezia, chronic diarrhoea (more than 3 watery stools with or without mucus during the day for at least a month), abdominal pain, constipation, hypochromic anaemia (haemoglobin level <120 g/L), significant weight loss (>10% during a period of three months), radiologically suspected colon cancer and positive family history of colon cancer. Patients under surveillance after polypectomy or colorectal cancer resection, and patients with sigmoidoscopy were excluded from the study.

Our study was a retrospective, observational study which did not influence the patient care, hence no approval from our institutional ethical committee was required.

Methods

All patients underwent bowel preparation for colonoscopy according to the standard protocol: soup at 12 hours, 2 tablets of laxative at 14 hours, bitter salt at 16 hours (4x67 mL within 1 hour), laxative suppository at 18 hours, in the period 19-22 h drinking 3 L of liquid. Those who had arrived for colonoscopy with poor bowel preparation were asked to continue with the preparation until the next day.

Digital rectal examination was performed on all patients before the colonoscope insertion. Colonoscopy was thereafter performed using Olym-

pus Exera III Videocolonoscope (CF HQ190L, Tokyo, Japan) with the patient being placed in the left lateral position. Supine posture and abdominal pressure were applied where necessary.

The analysis of the number of symptoms and indications in correlation with the endoscopic finding was performed, in order to assess diagnostic yield for each indication. Diagnostic yield is defined as the ratio between significant findings detected on colonoscopy and the total number of procedures performed for that indication. Colorectal neoplasm, as well as all lesions that increase the risk of developing colorectal cancer (polyps and IBD) are considered as significant lesions on colonoscopy. Benign lesions are considered as haemorrhoids, diverticulosis or normal finding.

Low risk adenoma (LRA) is defined as one or two adenomas or tubular adenomas <10 mm in size. High-risk adenoma (HRA) refers to patients with tubular adenoma >10 mm, 3 or more adenomas, adenoma with villous histology or high-grade dysplasia. Adenoma detection rate (ADR) is a benchmark quality measure for colonoscopy. It is defined as a proportion of patients with at least one colorectal adenoma detected among all patients examined by an endoscopist.

A comparison of the colonoscopic findings in order to assess the appropriateness of the indications for colonoscopy was performed for patients with/without haematochezia, anaemia and positive radiological finding, and EPAGE score was calculated. According to EPAGE criteria (8), appropriateness of colonoscopy is classified into 3 categories: appropriate (≥7), uncertain (4–6) and inappropriate (≤3).

Statistical analysis

The statistical analysis included descriptive statistics and the calculation of indication rates for distal endoscopy, endoscopic and pathohistological examination, and EPAGE scoring system. Chi square tests were performed to evaluate a degree of significance with 95% confidence interval (CI) and significance level at p=0.05.

RESULTS

Out of 294 patients, 165 (56.1%) were males and 129 (43.9%) females (male to female ratio of 1.27). The mean age of the patients was 62 years (range of 19–93 and 20-82 years for males and females, respectively).

The most common indication was haematochezia, in 140 (47.6%), followed by chronic diarrhoea in 93 (31.6%), abdominal pain in 88 (29.9%), constipation in 71 (24.1%), anaemia in 60 (20.4%), significant weight loss in 50 (17.0%), radiologically suspected colon cancer in 37 (12.5%) and positive family history in 7 (2.3%) patients (Table 1).

Table 1. Patients' demographic and anamnestic characteristics

Variable	No (%) of patients
Gender	
Males	165 (56.1)
Females	129 (43.9)
Haematochezia	
Yes	140 (47.6)
No	154 (52.3)
Diarrhoea	
Yes	93 (31.6)
No	201 (68.4)
Constipation	
Yes	71 (24.2)
No	223 (75.9)
Anaemia	
Yes	60 (20.4)
No	234 (79.6)
Abdominal pain	
Yes	88 (29.9)
No	206 (70.1)
Significant weight loss	
Yes	50 (17)
No	244 (83)
Radiological finding	
Negative	257 (87.4)
Positive	37 (12.6)
Positive family history	
Yes	7 (2.4)
No	287 (97.6)

According to the EPAGE II criteria indications were appropriate in 185 (63.6%), uncertain in 67 (22.8%) and inappropriate in 40 (13.6%) patients.

Out of 294 patients, 56 (19.0%) were patients with normal colonoscopy. For the remaining 238 patients, the abnormal findings were as follows: haemorrhoids (85; 35.7%), colon neoplasms (43; 18%), polyps (47; 19.7%) of which 33 (13.8%) were adenomas; 21 (8.8%) patients had haemorrhoids and polyps concurrently, inflammatory bowel disease (IBD) was found in 34 (14.3%) and diverticulosis in 29 (12.2%) patients.

Diagnostic yields were as follows: haematochezia 186 (63.2%), positive radiologic finding 183 (62.2%), diarrhoea 158 (53.7%), anaemia 157 (53.4%), and obstipation 124 (42.1%).

The most common indications for colonoscopy in 56 patients who subsequently had normal colonoscopy findings were constipation in 20 (35.7

%), abdominal pain in 18 (32.1%), and diarrhoea in 18 (32.1%) patients. Anaemia (as a single or associate with other symptoms) was observed in 13(23.2%) patients.

In 140 patients with haematochezia haemorrhoids were verified in 46 (32.9%), colorectal neoplasm in 27 (19.3%) (p=0.019), IBD in 23(16.4%) patients (p=0.027) (Table 2).

Table 2. Spectrum of colonoscopic diagnoses in patients with/without haematochezia, anaemia and positive radiological finding

Endoscopic finding	No (%) of patients					
	Haematochezia		Anaemia		Positive radiological finding	
	No	Yes	No	Yes	No	Yes
Normal	48 (31.2)	8 (5.7)	43 (18.4)	13 (21.7)	49 (19.1)	7 (18.9)
Colorectal neoplasm	15 (9.7)	27 (19.3)	30 (12.8)	12 (20.0)	32 (12.5)	10 (27.0)
Inflammatory bowel disease	12 (7.9)	23 (16.4)	30 (12.8)	5 (8.3)	29 (11.1)	6 (16.3)
Diverticulosis	9 (5.8)	7 (5)	13 (5.6)	4 (6.6)	78 (30.4)	1 (2.5)
Polyps	20 (13)	6 (4.3)	21 (9)	8 (13.3)	13 (5.1)	4 (10.8)
Haemorrhoids	39 (25.3)	46 (32.9)	70 (29.9)	15 (25.0)	24 (9.3)	7 (18.9)
Haemorrhoids and diverticulosis	5 (3.2)	8 (5.7)	9 (3.8)	1 (2.1)	13 (5.1)	1 (2.5)
Haemorrhoids and polyps	6 (3.9)	15 (10.7)	18 (7.7)	2 (3)	19 (7.4)	1 (2.5)
Total	154 (52.3)	140 (47.6)	234 (79.6)	60 (20.4)	257 (87.4)	37 (12.6)

In the group of patients with verified polyps there were 19 low risk adenomas (LRA), 14 high risk adenomas (HRA), and 13 non adenomatous polyps, with an adenoma detection rate (ADR) of 13.8%.

Of 60 patients with anaemia, haemorrhoids were observed in 15 (25.0%) patients, 13 (21.7%) patients had normal finding, and colorectal neoplasms were found in 12 (20.0%) patients (Table 2). No significant association between anaemia and any of the colonoscopic findings was found (p>0.05).

Patients with positive radiological finding had colorectal neoplasm in 10 (27.0%), haemorrhoids and normal findings in seven (18.9%) patients each, and inflammatory bowel disease in six (16.3%) (Table 2). A statistically significant association was shown only between radiological finding and colorectal neoplasm (p=0.018).

DISCUSSION

This study revealed a predominance of males presented for colonoscopy compared to females, which was also observed in the study of Cahyono et al. (10). Austin et al. verified an increasing rate of rectal cancer among younger adults, while among older ones it continues to decrease (11). In the presented study, the most common indication for colonoscopy was haematochezia, similar to observations in other European studies (8,12). The overall diagnostic yield of colonoscopy in this study was 55%, with highest values for haematochezia (63.5%) and positive radiologic findings (62.1%). A lower overall diagnostic yield (48.4%) was also recorded in a few studies, with haematochezia having the highest diagnostic yield (11,13).

The most common abnormalities detected during colonoscopy were haemorrhoids, polyps and colon neoplasms. Some studies reported haemorrhoids, colorectal cancer and inflammatory bowel disease as the most common colonoscopy-detected diagnoses, while others reported polyps, due to an increase in the number of individuals undergoing colonoscopy, the use of a high-resolution colonoscope, as well as lifestyle and diet change (2,13). A strong increase in adenoma detection rate (ADR) and neoplasm detection rate (NDR) was observed in few studies (14,15). Our study showed a lower ADR (13.8%) than previous studies, but a higher NDR detection rate (18%). The reason for these values may be the lack of screening programs in Bosnia and Herzegovina, as well as delayed reporting of patients to primary health care.

By analysing the symptoms separately, the most common indication for colonoscopy in our patients who subsequently had normal colonoscopy findings were constipation, abdominal pain and diarrhoea. In a Japanese study (16) 45.6% of patients with indication for colonoscopy were diagnosed with functional bowel disorders (according to the Rome III diagnostic criteria). Patients with functional bowel disorders had significantly higher rates of abdominal pain, hard or lumpy stools, watery stools and bloating compared to controls (16). A similar prevalence of functional bowel disorder was reported in other studies (17,18). Our results verifying a high percent of patients with normal colonoscopy (19%) are in correlation with some other studies (16-18), justifying a large number of normal colonoscopy

findings in patients with presented symptomatology of functional bowel disorders.

In our study, there was a significant association between haematochezia and colorectal neoplasm. Several studies showed increasing prevalence of colorectal cancer in younger patients (18-20), suggesting that haematochezia in young patients should not be neglected and attributed to haemorrhoid nodules, even when they are palpable. Among patients with anaemia, there was no significant association between anaemia and any of colonoscopy findings in our study. Some other studies showed a significant correlation between anaemia and proximal colorectal cancer (cancer of ascending colon and ileocecal region) (21,22).

In our study, nearly a quarter of patients with normal colonoscopy findings had anaemia at the first visit, which indicates the necessity to perform many other examinations before the colonoscopy in order to find the cause of anaemia.

A statistically significant association was shown between radiologically suspected carcinoma (described as thickening of the intestinal wall, narrowing of the intestinal lumen, or suspected infiltrative process on CT colonography) and colorectal neoplasm. Our results are in accordance with those reported in Halligan et al. study comparing CT colonography (CTC) and colonoscopy (23). According to the EPAGE II criteria, in our study indications were appropriate in 63.6%, uncertain in 22.8%, and inappropriate in 13.6% which is similar with a Spanish study, 73.68%, 16.57%, and 9.74%, respectively (8). Patients with appropriate or uncertain indications based on the EPAGE II criteria had more relevant endoscopic findings than those with inappropriate indications (13).

The rate of unnecessary colonoscopy is high, especially in patients younger than 50 years of age, among whom there is a higher incidence of irritable bowel syndrome (24). Considering the above, it is possible that a larger number of inadequate indications in our study is a consequence of a higher percentage of patients with symptoms of irritable bowel syndrome.

In conclusion, the obtained results can be used in making a local guideline for colonoscopy indications, especially in countries where screening programs are not implemented, such as Bosnia and Herzegovina. Rationalization of the demand for endoscopy is mandatory to prevent overburdening endoscopy units, decrease waiting lists for outpatient colonoscopy, improve efficiency in colonoscopy and reduce costs and potential risks arising from inadequate colonoscopy referrals.

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TRANSPARENCY DECLARATION

Conflicts of interest: None to declare.

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