

Yield of colonoscopy with special reference to lower gastrointestinal bleeding in a tertiary referral center in Eastern India

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Abstract

Background: Little data exist on the yield of colonoscopy in its different indications, especially gastrointestinal (GI) bleeding. Furthermore, there are no formal guidelines regarding the timing of its performance in the work up for lower GI bleeding. **Methods:** In a retrospective study, spanning from January 2007 to December 2013, the clinical data of all the patients undergoing colonoscopy were retrieved from the hospital records including the predominant symptom which mandated colonoscopy and results of the other tests done before colonoscopy including upper GI endoscopy (esophagogastroduodenoscopy [EGD]). The type of GI bleed (overt or occult) along with the presence or absence of iron deficiency anemia (IDA) was noted. The yield of EGD in the corresponding years in those having a presentation with lower GI bleed and/or IDA was also noted for comparison. **Results:** Overall yield of colonoscopy was low (25.7%) like for all its indications except lower GI bleed where its yield was highest (45.2%). 81.2% of the cases with a diagnosis presented with lower GI bleed, highest for colon cancer (90%), and polyps (86.1%). Cases of occult bleed more often had a positive diagnosis than overt bleed ($P = 0.02$). EGD yielded positive findings in more cases (43.2%, $P = 0.00$) than colonoscopy (except piles). Colonic cancers and polyps were presented with hematochezia when compared to gastric cancer which presented more often with occult bleed and other clinical symptoms. **Conclusion:** EGD should be done first in lower GI bleeding to exclude upper GI source and select subsequent colonoscopy. For hematochezia and occult bleed, colonoscopy is important whether IDA is present or not.

Key words

Colon cancer, colonoscopy, gastrointestinal bleed, iron deficiency anemia

Introduction

Colonoscopy is commonly performed nowadays for lower gastrointestinal (GI) symptoms. The indications for which referral to a particular center is done, depends on the

population which it subserves, the ease of access to it, as also the attitude of referring doctors. However, of the numerous indications, evaluation of lower GI bleed is possibly the most worrisome and common reason. There is a lack of published data from India regarding the value of colonoscopy in its different indications, especially lower GI bleed where the anxiety of cancer and other serious disease is high among patients.

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Further, no formal guidelines exist in India regarding the sequence of the performance of endoscopy (esophagogastroduodenoscopy [EGD] and/or colonoscopy) in the cases of GI bleed. Western guidelines are formulated based on the prevalence of suspected lesions in their population as well as the cost-effectiveness of endoscopy in the setting. Most studies are in the patients of positive fecal occult blood test (FOBT) with/without iron deficiency anemia (IDA) and guidelines are variable, some advocating colonoscopy first followed by EGD if negative^[1,2] and some advocating bidirectional endoscopy.^[3] In both the cases, the write up is driven by the lower detection rate of gastric cancer compared to colon cancer in the West in positive FOBT cases^[4] as well as clinically insignificant lesions on EGD which do not need therapeutic intervention.^[1,5] The bottom line is the cost benefit ratio inclusive of hospital stay, procedure cost vis-a-vis patient's benefit. In India, the situation is different. The incidence of gastric cancer is higher than colon cancer. Upper and lower GI endoscopies are cheaper (upper << lower) with increasingly easy availability and performance on an outpatient basis. This along with the fear of missing important lesion makes its performance pressing and so often nonselective and unscrupulous.

The present center caters to a population served largely at the ground level by general doctors who have a low threshold for referral. In addition, it is partly open access where a patient can directly attend for sufficient reason. The study was aimed at (1) finding the yield of colonoscopy in its different indications in such an open access referral system and more importantly (2) finding the detection rate of different lesions by endoscopy in the different types of GI bleed (especially cancers) and also since EGD is cheaper, whether its prior performance can eliminate the need or help to select further colonoscopy.

Methods

In this retrospective, observational study, all the patients undergoing colonoscopy from January 2007 to December 2013 were included. The predominant clinical symptom which mandated colonoscopy was noted based on which other appropriate tests were done before colonoscopy, e.g. complete hemogram, stool occult blood by Guaiac test, ultrasonography and/or computed tomography scan abdomen, enteroclysis, and EGD. Our policy is to perform EGD, first for all the cases of suspected GI bleed (overt [melena or hematochezia] or occult) with/without IDA and do colonoscopy in those who are negative for any clinically important lesions and where there is a suspicion of colonic pathology on other tests. All EGD and colonoscopies were performed with Pentax FG 29V and FC 38F video endoscope and video colonoscope, respectively, and diagnosis was arrived at by history, appearance of lesion, or biopsy as appropriate. GI bleed was noted as overt (hematochezia or melena) or occult along with associated IDA, if any. The various upper GI lesions diagnosed by EGD in the corresponding years in those having presentation with

lower GI bleed and/or IDA were also noted to determine the importance of each as cause and also for comparison with similar presentations of colon cancer and polyps.

Statistical analysis

Age was represented as mean \pm standard deviation (SD) (range) and compared by Student's *t*-test. Other results were expressed as proportions/percentages. Difference of proportions was compared by the Z-test and a two-sided *P* value < 0.05 was considered as significant.

Results

A total of 826 cases were referred for colonoscopy of which 69 were canceled due to various reasons (low GC, poor bowel preparation, no consent, and inability to tolerate procedure), so 757 cases were included in the final analysis. The various indications for referral along with diagnostic yield per indication are represented in Table 1 and the various diagnoses along with year wise break up are represented in Table 2. Piles was the only diagnosis in 29.6% cases except which the overall yield was low (25.7%). Leaving 30 procedures performed in postoperative cases and 8 cases having miscellaneous diagnosis (rectal prolapse, fistula, anal fissure, and perianal abscess), colonoscopy was normal in 309 (40.82%) cases. The mean age \pm SD (range) and M: F ratio for overall group, the group with normal colonoscopy, and the group with a diagnosis were 55.41 \pm 15.68 (12–86); 453:304 (1.49:1), 55.32 \pm 14.23 (21–86); 1.31:1 (175:134), and 55.88 \pm 12.78 (12–84); 101:85 (1.19), respectively (*P* = not significant). Similar data for the individual diagnosis are shown in Table 2. The sex ratio for different age groups is represented in Figure 1. Location of polyps were rectal 13, sigmoid colon 12, transverse colon 3, ascending colon/cecum 5; and those of cancer were rectal 31,

Table 1: Diagnostic yield of colonoscopy per indication

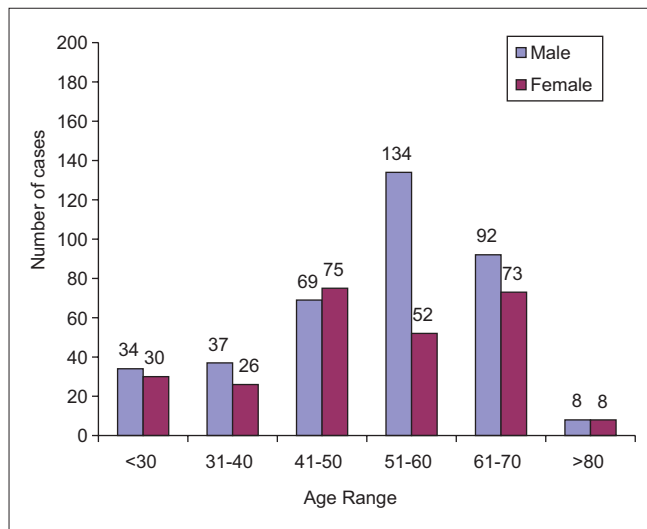
Cause for referral	Number of cases	Positive diagnosis (%)	Remarks
Pain in left lower abdomen	65	8 (12.3)	
Constipation	55	7 (12.7)	8 piles
Suspected intestinal obstruction	32	8 (25)	
Asymptomatic secondaries in liver	36	7 (19.4)	All 7 had cancer
Abdominal mass	18	7 (38.9)	3 cancer, 4 external compression
Assess postoperative recurrence of colon cancer	30	All normal	
Elevated CEA	17	6 (35.3)	All cancer
GI bleed	334	151 (45.2)	Rest 183 piles
Frequent stool/mucus in stool	138	All normal	15 piles
Something coming out per rectum	32	4 (12.5)	18 piles
Total	757	194 (25.6)	Includes 8 miscellaneous

CEA=Carcinoembryonic antigen, GI=Gastrointestinal, 4 cases of external compression not considered in Positive Diagnosis

Table 2: Colonoscopic diagnosis along with year wise break up of numbers

Year	2007	2008	2009	2010	2011	2012	2013	Total (%)
Total number of colonoscopies	145	92	100	110	118	97	95	757
SRUS (53.61±10.52 [50-67], 3:4)	2	0	1	2	1	0	1	7 (0.9)
Telangiectasia (60.45±13.14 [45-78], 6:3)	4	1	0	2	1	1	0	9 (1.2)
Colonic polyp (56.93±19.81 [7-80], 20:16)	8	1	6	6	5	8	2	36 (4.8)
Colon cancer (60.92±13.34 [32-84], 23:27)	10	6	8	4	10	6	6	50 (6.6)
Radiation proctitis (50.34±9.74 [38-65], 1:9)	2	0	1	0	1	3	3	10 (1.3)
Ulcerative colitis (45.16±15.14 [23-68], 15:9)	5	5	4	3	3	1	3	24 (3.2)
Ileitis (42.49±14.42 [23-60], 8:4)	4	2	1	2	3	0	0	12 (1.6)
Colitis (57.38±13.88 [42-74], 12:7)	3	2	2	5	3	2	2	19 (2.5)
Diverticulosis (68.3±8.24 [60-75], 2:1)	0	1	1	0	1	0	0	3 (0.4)
SI bleed (53.45±11.63 [40-67], 5:2)	0	1	1	1	0	2	2	7 (0.9)
Stricture (54.21±8.74 [42-67], 3:2)	0	1	1	0	1	0	2	5 (0.7)
External compression (56.36±12.3 [44-69], 3:1)	0	1	0	1	0	1	1	4 (0.5)
Miscellaneous (48.14±11.34 [35-62], 6:2)	2	1	1	0	2	1	1	8 (1.1)
Total diagnosis (55.88±12.78 [7-84], 107:87) (%)	38 (26.2)	21 (22.8)	26 (26)	26 (23.6)	29 (24.6)	24 (24.7)	22 (23.2)	194 (25.7)
Only piles (53.92±16.36 [21-80] 146:78) (%)	40 (27.6)	29 (31.5)	16 (16)	36 (32.7)	42 (35.6)	31 (32)	30 (31.6)	224 (29.6)

Bracketed numbers following each diagnosis represents (age in years±SD [range], male: female). Colitis includes amebic/infectious, diversion, ischemic, nonspecific. Miscellaneous includes rectal prolapse, fistula, fissure, and perianal abscess. SRUS=Solitary rectal ulcer syndrome, SI=Small intestinal, SD=Standard deviation

**Figure 1: Number of cases of different sex in various age groups**

sigmoid colon 13, transverse colon 1, and ascending colon/cecum 5. Ileitis was due to tuberculosis in 6 cases. Crohn's disease was seen in 3 cases and nonspecific in 3 cases.

The yield in the cases of GI bleed are summarized in Table 3 and the disease wise breakup of presentation as overt or occult bleed with/without IDA is shown in Table 4. Thus, 151/334 (45.2%) of all the cases of suspected lower GI bleed had a diagnosis and out of 186 cases with a diagnosis of 151 (81.2%) were presented with lower GI bleed, proving it to be a very important indication for colonoscopy. But at the same time, 183 cases had only piles as etiology of bleed (the rest 41 cases of piles were diagnosed in patients with other symptoms). 45/50 (90%) cases of colon cancer and 31/36 (86.1%) cases of colonic polyps were presented with GI bleed with/without anemia. A positive diagnosis was achieved

in 113/269 (42%) cases of overt bleed versus 38/65 (58.5%) cases of occult bleed ($P = 0.02$). However, in both groups between those having a positive diagnosis with IDA and those without IDA (except piles), presentation with overt bleed was not different from occult bleed ($P = 0.34$ and 0.11 , respectively). IDA was present in 31.1% cases overall and clinically important lesion was found in 80/334 (24%) of such cases.

Around 25% EGD in our unit are performed every year to investigate GI bleed. A total of 1685 EGD were performed in the study period of which a positive diagnosis was arrived at in 37–48% (43.2%, 727 cases overall) patients in these years. 86% of the rest (826/958) were considered for colonoscopy of whom 757 (79%) finally underwent the procedure. The overall yield of colonoscopy (leaving piles) was significantly lower 25.7% ($P = 0.000$) than EGD but with piles it was 55.3% (P not significant). The important diagnoses are listed in Table 5 along with their mode of bleeding presentation. Significantly, more number of colonic cancers presenting with hematochezia were detected compared to gastric cancer which presented significantly more often with occult bleed. Other clinical symptoms were present in 65/76 (85.5%) cases of gastric cancer such as anorexia, weight loss, or abdominal mass whereas it was present in 13/50 (26%) cases of colon cancer (mass, ascites, and colonic obstruction) and 2/36 (5.6%) cases of colonic polyp. Asymptomatic hepatic metastasis was present in 15 (30%) colon cancers and only 12% cases had elevated carcinoembryonic antigen (CEA) level, which accounted for 35.3% of all cases of elevated CEA (in all such cases the level was more than 10 ng/ml).

Except for GI bleed, the yield was modest for other indications and least for nonspecific symptoms of pain abdomen, constipation, frequent stool, or mucus in stool. Incidence of colonic diverticulosis was very low.

Discussion

This is possibly the first Indian study of its kind showing the yield of colonoscopy in most of its indications and since it is conducted in an open access system with a predominant general referral base, the results reflect to some extent the attitude of people and doctors to lower GI symptoms and their outcome in this section of population. Lesions similar to our study have been reported from other Asian countries. In a nationwide Chinese survey, involving nearly 54,000 patients, the chief causes of lower GI bleed were similar to our study including the low incidence of diverticulosis.^[6] Similar findings were reported from Pakistan and Bangladesh.^[7,8] In a nationwide Korean study of 1518 cases of iron deficiency (50%

had anemia) by upper and lower GI endoscopy, clinically important lesions were identified in 24.6% of the patients with anemia with similar frequency of lower GI (13.6%) and upper GI tract lesions (11.9%).^[9] Even lower yield for isolated abdominal pain has been reported from New Zealand.^[10]

Our study also showed that the yield of colonoscopy is low for most indications except GI bleed where its yield is high, provided upper GI bleed is excluded by EGD. The type of bleed is important. Large number of overt bleed is caused by piles so it should be excluded by proctoscopy (especially in the cases of its characteristic intermittent, small quantity blood smeared on stool with perianal symptoms) before embarking on colonoscopy. This was due to a low threshold for referral. EGD detected more lesions than subsequent colonoscopy, so it is very useful as an initial investigation for GI bleed and helps to select subsequent colonoscopy judiciously. The yield of colon cancer was low as it is less common in India but more than gastric cancer in the cases of overt bleed. In the cases of occult bleed, yield of gastric cancer was higher. However, previous ongoing occult bleed cannot be excluded in the colon cancer cases. Most cases of gastric cancer had other symptoms, but most colon cancers and polyps were asymptomatic except for the GI bleed. Thus, for overt lower GI bleed (especially melena), colonoscopy should be embarked on after an initial upper GI endoscopy and proctoscopy (for hematochezia) is negative with/without other suggestive symptoms or investigations. A USA study of 1743 colonoscopies performed after a nondiagnostic upper GI endoscopy for melena found positive diagnosis in only 4.2%.^[11] For ongoing hematochezia, colonoscopy is important whatever may be the outcome of EGD.

For occult bleed, colonoscopy is more important after negative upper GI endoscopy, especially if IDA is present. Though only 19.5% of those with a colonoscopic diagnosis were presented with occult bleed, most of these were the cases of colonic polyps and cancers. British Society of Gastroenterology guidelines for IDA strongly recommends upper and lower GI endoscopies for all such patients, especially those above 50 years age, those with symptoms suggesting GI disease, and those with a strong family history of GI cancer.^[12] In an Italian study of patients with IDA, those with positive FOBT had an endoscopic lesion detected in 79.2% cases, at both upper

Table 3: Colonoscopic yield in the cases of GI bleed

Type of bleed with/without anemia	With a diagnosis (%)	Only piles (%)	Total (%)
Overt (n=269)			
With anemia	61 (22.7)	7 (2.6)	68 (20.3)
No anemia	52 (19.3)	149 (55.4)	201 (60.2)
Occult (n=65)			
With anemia	19 (29.2)	17 (26.2)	36 (10.8)
No anemia	19 (29.2)	10 (15.4)	29 (8.7)
Total	151 (45.2)	183 (54.8)	334 (100)

GI=Gastrointestinal

Table 4: Breakup of presentation of GI bleed disease wise

Diagnosis	Overt (%)	Occult (%)	Anemia (%)
SRUS	7 (100)	0	2 (28.6)
Telangiectasia	6 (66.7)	3 (33.3)	6 (66.7)
Colonic polyp	21 (58.3)	10 (27.8)	10 (27.8)
Colonic cancer	28 (56)	17 (34)	36 (72)
Radiation proctitis	10 (100)	0	5 (50)
Ulcerative colitis	24 (100)	0	2 (8.3)
Ileitis	2 (16.3)	2 (16.3)	4 (33.3)
Colitis	4 (21)	3 (15.8)	5 (26.3)
Diverticulosis	0	0	0
Small gut bleed	7 (100)	0	7 (100)
Stricture	0	3 (60)	3 (60)
External compression	0	0	0
Miscellaneous	4 (50)	0	0
Piles	156 (69.6)	27 (10.2)	24 (13.1)
Total	269 (80.5)	65 (19.5)	104/334 (31.1)

Anemia means Hb <10 g/dl. SRUS=Solitary rectal ulcer syndrome, SI=Small intestinal, GI=Gastrointestinal

Table 5: Type of GI bleed in important upper and lower GI diseases

Diseases	Total (%)	Overt bleed (%)	Hematochezia (%)	Melena (%)	Occult bleed (%)	Anemia (%)
Gastric cancer	76/1685 (4.5)	3 (3.9)	0	3 (3.9)	47 (61.8)	57 (75)
Gastric ulcer	34/1685 (2)	9 (26.5)	1 (3)	8 (23.5)	25 (73.5)	20 (58.8)
Duodenal ulcer	111/1685 (6.6)	101 (91)	6 (5.4)	95 (85.6)	10 (9)	69 (62.2)
Gastroduodenitis	308/1685 (18.2)	268 (87)	3 (1)	265 (86)	40 (13)	206 (67)
Esophageal varix	196/1685 (11.6)	185 (94.4)	3 (1.5)	182 (92.9)	11 (5.6)	156 (79.6)
Colon cancer	50/757 (6.6)	28 (56)	25 (50)	3 (6)	17 (34)	36 (72)
Colonic polyps	34/757 (4.8)	21 (58.3)	21 (58.3)	0	10 (27.8)	10 (27.8)

P value for the difference of proportions between gastric cancer versus colonic cancer $P=0.03$, occult bleed for gastric versus colonic cancer $P=0.004$, overt bleed for gastric versus colonic cancer $P=0.00001$, anemia for gastric versus colonic cancer $P=0.08$. GI=Gastrointestinal

endoscopy (52.1%) and colonoscopy (33.3%) and FOBT was found to be an independent predictor of both bleeding lesions and cancer.^[13] An USA study where 63.4% subjects were Asians found equal incidence of upper GI and lower GI lesions and of gastric and colonic cancer on bidirectional endoscopy in positive FOBT cases.^[14] Gastric cancer was higher among Asians. Similar detection rate of bidirectional endoscopy has been reported from Scandinavia.^[15]

The main limitations of the study are its retrospective nature with a relatively lesser number of subjects and it has being conducted in one region of the diverse Indian subcontinent. However, we are hopeful that this will provide the platform for future multicentric studies.

Conclusion

Unselective colonoscopy has low yield for all lower GI symptoms except bleeding in which EGD should possibly be done first to exclude upper GI source of bleed and select subsequent colonoscopy. For ongoing hematochezia and occult bleed, colonoscopy is important whether IDA is present or not. The yield of colon cancer is more than gastric cancer in the cases of overt bleed and less for occult bleed. Serum CEA level has low accuracy for the diagnosis of colonic cancer.

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Conflicts of interest

There are no conflicts of interest.

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