

Two-year retrospective analysis of patients undergoing direct to procedure flexible sigmoidoscopy investigation with rectal bleeding as a primary complaint

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ABSTRACT

Background and aims Rectal bleeding affects ~15% of the general population and is a common reason for referral to gastroenterologists by primary care physicians. Direct to procedure flexible sigmoidoscopy is an appealing modality to investigate rectal bleeding due its diagnostic yield, safety profile, and accessibility. Patients referred on a routine basis for direct to procedure clinic by primary care physi-

cians with the sole complaint of rectal bleeding have not previously been studied. Our study aims to explore the spectrum of diagnoses and evaluate for potential clinical predictors of underlying pathology in this specific patient population.

Methods In total, 528 charts of patients referred to the Kingston General Hospital and Hotel Dieu Hospital endoscopy units (Kingston, Canada) with the sole complaint of rectal bleeding were reviewed. All of these patients were referred on a routine basis to direct to procedure clinic from primary care physicians. The performance of various clinical variables in predicting significant pathology was assessed by univariate analysis.

Results The diagnostic spectrum of the cohort studied included hemorrhoids (75.5%), anal fissures (4%), ulcerative colitis (3.2%), Crohn's disease (1.1%), indeterminate proctitis/colitis (1.7%), and colorectal malignancy (2.7%). Of the various clinical variables assessed, only male sex predicted significant pathology (25.2% of males vs 17.6% of females, $P < 0.05$).

Conclusion Our study highlights the need for a thorough investigation of rectal bleeding given the lack of clinical predictors. Future prospective studies with more patients are needed to fully assess the utility of various clinical variables in predicting pathology in this patient population. This would allow for more effective triaging of a routine rectal bleeding, a very common reason for patient referral to gastroenterologists by primary care physicians. Flexible sigmoidoscopy was not associated with complications or missed diagnosis in our study. As such, the technique appears to be a suitable initial investigative modality for patients with rectal bleeding.

Introduction

Rectal bleeding is a problem that is reported to affect approximately 15% of the population [1]. The etiology varies widely from benign causes such as hemorrhoids, to more serious pathology such as that of inflammatory bowel disease (IBD) and lower gastrointestinal malignancy. The low predictive value of

symptomatic rectal bleeding for underlying pathology, including that of malignancy [2], often leads to referral to Gastroenterology for assessment. The diagnostic yield and low complication rates of flexible sigmoidoscopy (FS) have made it an appealing modality for assessing symptomatic patients [3, 4]. Direct to procedure clinics with flexible sigmoidoscopy (DTP-FS) have been used to address this type of referral. The lack of a sig-

► **Table 1** Primary diagnosis of patients with the primary complaint of rectal bleeding post FS (n = 528).

Primary diagnosis post FS	Frequency (# of patients)	Percentage (%)
Normal	110	20.8
Hemorrhoids	289	54.7
Anal fissures	21	4
Adenomatous polyps	42	8
IBD	23	4.3
▪ Ulcerative colitis	17	3.2
▪ Crohn's	6	1.1
Indeterminate proctitis/colitis	9	1.7
Rectal malignancy	12	2.3
Colon malignancy	1	0.2
Other	8	1.7
Missing/no documentation	12	2.3

FS, flexible sigmoidoscopy; IBD, inflammatory bowel disease

nificant difference in cancer detection between consultant led and open access endoscopy clinics [5] and the ability of FS to detect pathology in the setting of bright red blood per rectum [6, 7] both highlight DTP-FS clinics as an appealing option for patient referrals. However, studies have illustrated that most patients with rectal bleeding have benign underlying causes. In some studies, both malignancy and IBD have been shown to contribute to less than ~5% of cases of rectal bleeds [8, 9]. Given the predominance of benign pathology, one may question whether alternative investigative approaches to DTP-FS are more appropriate for evaluating rectal bleeding. In addition, evaluation of potential clinical features that would allow for effective and efficient triaging of these patients is also needed.

The objectives of our study were to examine the diagnostic spectrum of rectal bleeding and assess for clinical predictors of underlying gastrointestinal pathology in patients referred by primary care physicians with the primary complaint of rectal bleeding. We were specifically interested in primary care physician referred patients as they constitute the majority of referrals in our center and have not been specifically assessed as a cohort by previous studies.

Methods

This was a retrospective study of patient charts and included those who were at least 18 years of age referred from a primary care physician for rectal bleeding to be seen as a DTP-FS. These patients were assessed at either the Kingston General Hospital or Hotel Dieu Hospital endoscopy unit between June 2010 and June 2012. Both hospitals serve Kingston, Ontario and have a catchment area of 600 000 in Southeastern Ontario. Patients with any of the following criteria were excluded from our study:

1) patients who were not referred from a primary care physician (e. g. Emergency Department); 2) patients whose primary complaint was not that of rectal bleeding; 3) patients with established gastrointestinal disorders; 4) patients with a family history of gastrointestinal malignancy; 5) patients with a previous failed/aborted FS; and 6) patients with radiation proctitis as an etiology of rectal bleeding. The exclusion criteria were established in order to specifically assess patients referred from family physicians who are routinely triaged with the primary complaint of rectal bleeding. Patients who exhibited concerning or suggestive features on history would often be triaged via alternative avenues; either on a more urgent basis or to be seen in a gastrointestinal clinic first. This study and its methodology were approved by Queen's University Health Sciences Research Ethics Board (HSREB) before initiation.

Our primary outcome of interest was that of significant pathology, namely histological features of acute and/or chronic inflammation or neoplasia. Other study variables included: 1) patient demographics; 2) duration of bleed; 3) descriptive quality of bleed based on history taken; 4) quality of bowel preparation; 5) need for follow-up visit or tests.

The performance of clinical variables in predicting significant pathology was assessed using univariate analysis. Two-sided *P* values <0.05 were considered to be statistically significant.

Results

A total of 2059 flexible sigmoidoscopy procedure notes were reviewed with 528 charts fulfilling criteria for analysis. The median age was 51 years (range 17 to 94 years) with 54.9% female. FS was either normal or showed hemorrhoids in the majority of patients with a combined frequency of 75.5%. Other findings deemed to cause the rectal bleeding included anal fissures (4%), ulcerative colitis (3.2%), Crohn's disease (1.1%), indeterminate proctitis/colitis (1.7%), and colorectal malignancy (2.5%). Within the group of patients with colorectal malignancy, 3/13 (23.1%) patients had a palpable mass on rectal exam and none endorsed a history of bright red blood seen only on wiping. A combined category of "other" consisted of a post-FS diagnosis of ischemic colitis, diverticulosis, or angiodysplasia with a frequency of 1.7%. A total of 12 patients (2.3%) did not have a diagnosis that was explicitly noted in the chart and thus were classified as incomplete/missing (► **Table 1**). Details on the frequency and respective percentages of duration of bleed, quality of bleed, quality of bowel preparation, and need for additional follow-up and tests are fully summarized in ► **Table 2**. The duration of bleeding was divided into five categories; less than 1 week, 1 week to 1 month, 1–6 months, 6–12 months, and greater than 1 year with an overall mean duration of bleed at 68.8 weeks. On history, 13.1% and 20.1% of patients endorsed blood mixed in or coating the stool, respectively; 45.7% of patients endorsed outlet bleeding symptoms of either blood dripping into the bowl or blood noted on wiping.

In total, 20.6% and 21.8% of patients required follow-up assessment by a gastrointestinal physician and/or additional investigations (predominantly colonoscopy), respectively, after

► **Table 2** Clinical characteristics and procedural history of patients seen with the primary complaint of rectal bleeding (n = 528).

Characteristics	Frequency (# of patients)	Percentage (%)
Demographics		
▪ Men	238	45.1
▪ Women	290	54.9
Duration of bleed		
▪ Up to 1 week	92	17.4
▪ > 1 week up to 1 month	70	13.3
▪ > 1 month up to 6 months	117	22.2
▪ > 6 months up to 1 year	60	11.4
▪ > 1 year	94	17.8
Quality of bleeding		
▪ On tissue paper only	88	16.7
▪ Dripping in bowl	153	29.0
▪ Coating the stool	106	20.1
▪ Mixed with stool	69	13.1
Quality of bowel preparation		
▪ Poor/incomplete	69	13.1
▪ Moderate	101	19.2
▪ Satisfactory/complete	355	67.6
▪ Missing/no documentation	3	0.6
FS completion		
▪ Yes	499	94.5
▪ No	28	5.3
Need for follow-up		
▪ Yes	109	20.6
▪ No	415	78.6
Need for additional tests		
▪ Yes	115	21.8
▪ Colonoscopy	19	3.6
▪ No	408	77.3
FS, flexible sigmoidoscopy		

FS was done. Subsequent investigation with colonoscopy was performed in 19 (3.6%) patients with rectal bleeding. Colonoscopy was carried out due to tubular adenoma(s) being detected on FS or because additional concerning gastrointestinal symptoms were elicited upon further assessment. In all of the patients who subsequently underwent colonoscopy, none had findings of proximal colonic pathology that could account for their symptoms of bright red blood per rectum.

Data analysis (► **Table 3**) found a significant association between male gender and significant pathology (25.2% of males vs 17.6% of females, $P=0.032$). Age, duration of bleed, quality of rectal bleeding, and quality of bowel preparation were not predictors of significant underlying pathology.

Discussion

DTP-FS clinics are used in the assessment of rectal bleeding. Our study objectives were to assess the spectrum of diagnoses, the prevalence of significant pathology, and the performance of clinical factors in predicting significant pathology. In total, 75.5% of the primary diagnoses in our study was either that of normal FS or hemorrhoids. Polyps, malignancy, and IBD accounted for a lower percentage of 8.0%, 2.5%, and 4.3%, respectively. The proportion of patients with a benign cause of their lower gastrointestinal bleeding was quite comparable to a previous study based in Hong Kong [10]. Those authors assessed the value of FS for all patients with rectal bleeding and reported that 78.9% of patients with rectal bleeding had either a normal FS or hemorrhoids. Our study found polyp/malignancy and IBD frequencies that were higher in comparison to Choi et al. The lower rate of polyp/malignancy in the Hong Kong study may be explained by the lower FS completion rate of 81.9% compared to 94.5% in our study. An unsuccessful FS in our study was defined as an aborted exam due to poor bowel preparation or withdrawal of consent leading to an incomplete examination. The differences in IBD detection may be due to the geographical variation in prevalence of IBD, with studies demonstrating greater prevalence in North American versus Asia [11, 12].

Our analysis highlights that male sex was associated with significant pathology in the setting of rectal bleeding. This finding is congruent with previous studies which have highlighted a higher risk of adenoma and colorectal cancer among male sex [13, 14]. In addition to this, the association of gender and significant pathology in our study may have been contributed by the 3.2% of patients who were found to have ulcerative colitis as a cause of their rectal bleed. It has been established that male gender is associated with ulcerative colitis [15]. Contrary to this, historical features (such as that of duration and quality of bleed), which are routinely ascertained during assessment, are not associated with serious pathology. Previous studies have echoed similar findings highlighting the low predictive value of rectal bleeding for the presence of colorectal cancer [2, 16] and the lack of association between quality of rectal bleeding and pathology [9]. However, it is noteworthy that a history of bright red blood just on tissue paper was not reported in any of the patients found to have colorectal cancer. Quality of bowel preparation has been shown to affect polyp detection, with poor preparations translating to missed lesions [17]. However, our study did not find any associations between quality of bowel preparation and pathology. This is likely a reflection of the use of FS instead of colonoscopy in this study. FS is a limited exam with the majority of our patients having moderate to satisfactory bowel preparations via enema, and when the preparation was unsatisfactory, the patients were administered a

► **Table 3** Univariate analysis of clinical predictors of significant pathology in patients with the primary complaint rectal bleeding (n = 528).

Characteristic	Significant pathology		P value
	Yes	No	
Demographics			
▪ Age, years	50.9	49.03	0.336
▪ Male, %	25.2	74.8	0.032 ¹
Duration of bleed, %			0.054
▪ Up to 1 week	17.4	82.6	
▪ > 1 week up to 1 month	28.6	71.4	
▪ > 1 month up to 6 months	23.9	76.1	
▪ >6 months up to 1 year	28.3	71.7	
▪ > 1 year	12.8	87.2	
Quality of bleeding, %			0.580
▪ On tissue paper only	17.0	83.0	
▪ Dripping in bowl	21.6	78.4	
▪ Coating the stool	22.6	77.4	
▪ Mixed with stool	26.1	73.9	
Quality of bowel preparation, %			0.772
▪ Poor/incomplete	20.3	79.7	
▪ Moderate	23.8	76.2	
▪ Satisfactory/complete	20.6	79.4	
FS completion, %			0.233
▪ Yes	21.6	78.4	
▪ No	10.7	89.3	
Need for follow-up, %			N/A
▪ Yes	47.7	52.3	
▪ No	14.2	85.8	
Need for additional tests, %			N/A
▪ Yes	50.4	49.6	
▪ No	13.0	87.0	
FS, flexible sigmoidoscopy ¹ P<0.05			

FS, flexible sigmoidoscopy
¹ P < 0.05

second enema. Thus, we were not expecting to see a difference in bowel preparation quality between those with and without pathology.

The findings of polyps and/or diverticula at FS were likely incidental rather than a true cause of blood per rectum. Given the difference in time between symptom onset and subsequent investigation with FS, it is difficult to ascertain whether diverticulosis found at FS was the cause of the bleeding that prompted referral. Given the increase in prevalence of diverticular disease with age, being estimated to occur in up to a third of patients

over the age of 60 [18, 19], we suspect that this post-FS finding was most likely to be incidental. In particular, most patients presented with recurrent small volume bright red rectal bleeding with defecation, which is not typical of a diverticular bleed. Adenomatous polyps were detected in 8% of patients referred for rectal bleeding. Although this outcome is considered pathologically significant, it was also likely an incidental finding. In the vast majority of cases, adenomatous polyps are asymptomatic and rarely cause macroscopic bleeding. As such, polyps in the setting of rectal bleeding in our patients were incidental findings of significant pathology. Patients in whom we found diverticular disease and/or polyps likely had other sources of bleeding that were not identified, such as small hemorrhoids, or other outlet pathology that had healed by the time FS was performed. Proximal pathology that could account for rectal bleeding was not found in any of the patients who underwent additional testing with colonoscopy (i.e. patients with polyps). This is an interesting outcome as it suggests that FS may be a suitable first line investigative tool for outpatient rectal bleeding. The outcomes of FS can provide guidance on the need for subsequent diagnostic testing; however, additional prospective studies are needed to confirm the efficacy of FS vs other diagnostic modalities to detect pathology in patients with rectal bleeding. Interestingly, current reviews and guidelines on the management of acute overt lower gastrointestinal bleeding recommend the usage of colonoscopy as a first line investigative/therapeutic tool. Colonoscopy after adequate hemodynamic resuscitation has been shown to give a diagnostic yield in 48–100% of patients who present with an acute lower gastrointestinal bleed [20–22]. However, these recommendations are primarily designed for the management of major acute lower gastrointestinal bleeding.

There are several limitations to our current study. First, it was retrospective in design. As such, lack of a standardization in data collection for each patient may have had an effect on our analysis. The reliance on review of individual physician charting to obtain our clinical variables resulted in a lack of uniform acquisition of data points. For instance, the quality of bleeding was not consistently documented by all physicians and is estimated to have been omitted in ~20% of the charts. Overall, this can affect our analysis in establishing associations between clinical variables and significant pathology. Further studies utilizing a prospective and standardized approach for data collection are needed to better elucidate the utility of clinical features as predictors of pathology. Our study also assessed a very specific population of patients (exclusion criteria described above). As such, a fairly sizeable number of patients were not included in our final analysis. Patients with significant family history, past gastrointestinal history, or previous medical conditions (i.e. anemia, pelvic radiation) that predisposed them to having significant gastrointestinal pathology were not evaluated in our specific cohort of patients [23, 24]. The majority of these patients would have been referred via an alternative pathway rather than through the routine triage pool. The purpose of our study was to assess for predictors of pathology in routine referrals such that improvements to the triaging process can be made. As such, our findings can only be applied to

this specific group of patients (namely individuals with the sole complaint of bright red rectal bleeding and no other concerning features on history). A potential future study that can also be considered would be an assessment of clinical predictors of pathology in patients who are evaluated on a more urgent basis (direct referral to gastrointestinal clinic, referral from emergency department, urgent add on or direct to procedure).

Future research endeavors should entail the use of a prospective study design to further assess the utility of additional clinical features that would aid in elucidating the pathology of underlying gastrointestinal bleeding. In addition to the clinical parameters addressed in this study, the prospective studies should systematically assess for the presence of perianal pain, hard stools, anal pruritus/discharge, and concurrent anticoagulant use as they can all potentially aid in identifying underlying pathology. In particular, the last variable is of importance as use of anticoagulation for various underlying comorbidities has been shown to increase the risk of lower gastrointestinal bleeding from various pathologies [25–27]. Finally, there is a need for a larger prospectively designed randomized control trial to assess whether FS would be an appropriate initial investigative tool for rectal bleeding compared to colonoscopy.

In conclusion, our study demonstrates that, in the setting of bright red rectal bleeding, a diagnosis of normal FS or hemorrhoids accounts for the majority of the cases. Male gender was a risk factor of significant pathology. Other clinical features including that of duration of bleed, descriptive quality of bleed, and quality of bowel preparation were not associated with significant pathology. This lack of association highlights the limited utility of clinical features in predicting pathology and underlines the need for initiating additional work-up (i.e. flexible sigmoidoscopy) to better characterize the etiology of rectal bleeding. The lack of proximal colonic findings in patients who further underwent colonoscopy, supports the use of FS as an appropriate initial modality to investigate patients with rectal bleeding.

Competing interests

Dr Henry H. Nguyen, Dr Robert Bechara, and Dr William G. Paterson do not have any declarations. Dr Lawrence C. Hookey is a consultant for Ferring Pharmaceuticals and Pentax Medical.

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