Factors identifying higher risk rectal bleeding in general practice

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ABSTRACT

Background
Rectal bleeding is a common symptom. The ability to distinguish those patients having serious underlying pathology from those with self-limiting conditions is a continuing dilemma in general practice.

Aim
To determine the factors affecting the predictive and diagnostic value of rectal bleeding for bowel cancer in primary care.

Design of study
One-year prospective observational study.

Setting
Three large general practices.

Method
Three hundred and nineteen consecutive patients over the age of 34 years consulting their GPs with rectal bleeding were included in the study. Investigation was by flexible sigmoidoscopy or a questionnaire and review of all patients took place after 18 months. The main outcome measures were consultation rates; the prevalence of cancer, colitis and significant polyps in patients presenting with rectal bleeding; its diagnostic value when occurring with or without a change in bowel habit, perianal symptoms and abdominal pain.

Results
The consultation rate for rectal bleeding in patients over the age of 34 years was 15 per 1000 per year; 3.4% had colorectal cancer. The prevalence of cancer increased to 9.2% when the rectal bleeding was associated with a change in bowel habit, and to 11.1% when it was without perianal symptoms. Thirty-six per cent of cancer patients had a palpable rectal mass.

Conclusion
Over 96% of the patients who present to their GPs with rectal bleeding do not have cancer. Greater awareness of the diagnostic value of the different symptom combinations of rectal bleeding could help GPs adopt different management strategies for patients at higher and very low risk of cancer.

Keywords
cancer; gastrointestinal diseases; haemorrhage; primary care; rectal diseases; risk.

INTRODUCTION

Rectal bleeding in the community is very common;[1] only a small number of patients consult their GPs[2–4] and between 30 and 50% are referred to hospital.[3,4] Patients investigated in hospital represent the 'tip of the iceberg'[5] of all people with this symptom, and the prevalence of cancer in primary or secondary care depends upon the total number of people seeking medical advice. Little is known about how patients decide whether to see their GP or why GPs decide to refer patients to hospital.[1,2,4,5]

Two studies on rectal bleeding in primary care in Australia[6,7] and North East England[8] reported a 1 in 10 prevalence of cancer and it was suggested that all patients over 40 years of age with rectal bleeding should be referred to hospital for investigation.[6–8] Dutch[9] and Belgian[10] studies showing a 1 in 33 and 1 in 14 prevalence of cancer, respectively, suggested that more selective policies before referral were necessary. However, evidence on the predictive and diagnostic value of the various characteristics of rectal bleeding for cancer have been contradictory.[7,8,11–16]

This study aimed to determine the total number of patients over 34 years of age, consulting their GPs for rectal bleeding, and the predictive and diagnostic value of the different symptom combinations and characteristics of rectal bleeding.

METHOD

General practices and patients

Three practices, with 19 GPs, took part in the study, one in a market town/rural community, one in a suburban area, and one in an inner-city area.

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GPs were asked to identify patients whose primary complaint was rectal bleeding and those with other lower gastrointestinal symptoms who, on questioning, also had rectal bleeding. An age 35 years and over was chosen as most deaths from colorectal cancer occur in the older age group (93% occur in people over the age of 55 years).

The difficulty of identifying all patients consulting their GPs with rectal bleeding has been highlighted.[6,8,9] To overcome this, regular aide memoires including a monthly poster were sent to each GP and laminated posters were also displayed in the surgery common room. Patients were registered by their GPs on a tick box proforma with three options; whether the patient would accept flexible sigmoidoscopy or if not, fill in a postal questionnaire or neither. Weekly visits to the practices were carried out by a research assistant, who ensured that the pro forma letters were distributed to each GP for every surgery.

Symptoms and signs
A detailed history was obtained from all patients accepting a flexible sigmoidoscopy and those filling out the questionnaire. The patients were asked whether:

- The rectal bleeding was bright or dark red, or both; was noticed on the toilet paper; in large volumes; separate or mixed in the stool, or coating the surface of the stool.
- The bleeding was associated with a change in bowel habit and if so, whether this was to an increased or decreased frequency of defaecation or both, and to looser or harder stools or both; with abdominal pain or perianal symptoms including soreness, discomfort, lumps, lumpiness, itching, prolapse and pain.

Physical examination including abdominal palpation and digital rectal examination were carried out at the time of flexible sigmoidoscopy.

Investigations
All patients were encouraged to attend hospital for a flexible sigmoidoscopy. Bowel preparation was by self-administered phosphate enemas, 2 hours before leaving home.[17] Barium enema and colonoscopy was not performed on all patients.

Missed cancers
The occurrence of cancer in patients not having a flexible sigmoidoscopy, in those having a normal flexible sigmoidoscopy but no further imaging, or after a normal barium or colonoscopy, was determined by follow-up, 18 months after the first visit to their doctor.

'Significant' polyps
Polyps were recorded as being either metaplastic or significant adenomas (≥1 cm or villous histology).[18]

Estimation of the total numbers of patients with rectal bleeding
The total number of patients seen with rectal bleeding in the health district was estimated assuming that the consultation rates of patients in the study was similar to all other practices in the district (population 550 000), and with knowledge of its prevalence by age, in decades, in the study.

Analysis and statistics
The relative predictive value of the different symptom combinations and characteristics of rectal bleeding for bowel cancer was determined by the degree to which they changed the pre-test probability of cancer (that is, the overall prevalence of cancer of all patients in the study) and was expressed as a likelihood ratio:

$$\frac{\text{Sensitivity}}{1 - \text{Specificity}}$$

The likelihood ratio (LR) is the likelihood that a given test result would be expected in a patient with the target disorder compared to the likelihood that that same result would be expected in a patient without the target disorder. An LR of 1.0 means that the diagnostic factor is of no value in differentiating between those patients with and without the condition, for example, cancer. An LR of greater than 1.0 indicates the factor is associated with an increased probability and an LR of less than 1.0 means a reduced probability. Thus, tests with the largest or smallest likelihood ratios are of most diagnostic value. A test is of significant value if the LR is significantly different from 1.0 with a probability of 0.05 (that is, the 95% confidence interval [CI] for likelihood ratio does not span 1.0).

How this fits in

Rectal bleeding is common in the community and may be an early symptom of bowel cancer. This study shows that each year there are approximately 15 consultations for rectal bleeding in primary care per 1000 patients over the age of 34 years. The most useful factors in identifying higher risk groups were rectal bleeding in combination with a change in bowel habit to looser stools and/or an increased frequency of defaecation, bleeding without perianal symptoms and age over 60 years.

RESULTS

Numbers of patients seen and investigated

Three hundred and nineteen patients over 34 years of age were recorded as visiting their GPs with rectal bleeding; 176 (55.2%) women and 143 (44.8%) men. The distribution according to age is shown in Figure 1. The mean age for males was 56 years (range = 35–84 years) and for females 62 years (range = 35–94 years). The male/female ratios in the practices were not significantly different, the market town/rural community practice, 0.88, suburban practice 0.93 and inner city practice 0.58. (P = 0.3)

The mean number of patients recorded by each full-time GP for the year of the study was 19.2 (range = 8–37).

The age distribution in the study was not significantly different to the population in the whole health district and 1.5% (319/20 661) of patients over 34 years of age consulted their GPs in the year of the study.

The total number of patients recorded per month varied significantly from 16 to 49 per month (P<0.0001) with more patients being recorded in April and October, during months 6 and 12 of the study. The proportion of patients accepting a flexible sigmoidoscopic examination remained constant throughout the trial.

Of the 319 registered patients, 219 patients (69%) accepted a flexible sigmoidoscopy, 47 (15%) filled out questionnaires and 53 (17%) declined both flexible sigmoidoscopy and a questionnaire. Twenty-eight per cent (61/219) had either a barium enema (n = 37) or a colonoscopy (n = 24).

Cancers

Table 1 shows that 3.4% of patients in the study had cancer, all diagnosed by flexible sigmoidoscopy. No other patient subsequently developed a carcinoma in the 18-month follow-up period.

Colitis and significant polyps

The results in Table 2 show that 1.9% of patients had proctocolitis, and 12.3% of patients who underwent flexible sigmoidoscopy had polyps (Table 3). Twenty-six out of 27 of the polyps were adenomas of which 65% were significant polyps.[18] The diagnostic yield of significant polyps was 7.8%

Effect of age on diagnostic yield

The distribution according to age of patients with cancer, colitis and significant polyps is shown in Figure 1. An age of greater than 60 years is associated with a significantly increased risk of cancer (Table 1), with a predictive value of 5.2% for patients ≥60 years old and 1.8% for patients below this age.
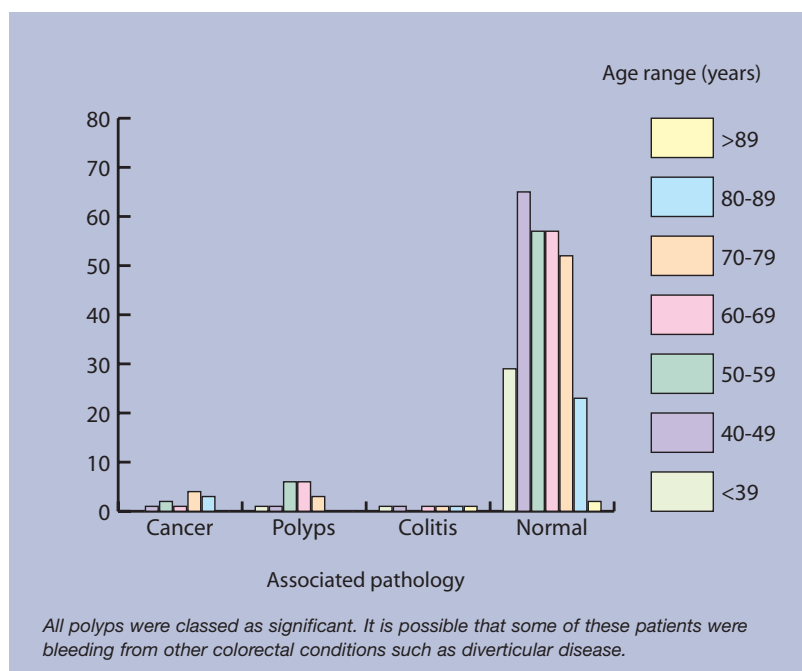

All polyps were classed as significant. It is possible that some of these patients were bleeding from other colorectal conditions such as diverticular disease.

Figure 1. Age and associated pathology of patients consulting their GPs with rectal bleeding.

The effect of symptom combinations and the characteristics of rectal bleeding on its predictive value

Two hundred and sixty-six patients (219 having flexible sigmoidoscopy and 47 filling in a patient questionnaire) were used in this analysis. These patients had a pre-test probability or predictive value for cancer of 4.1% (Table 1).

Rectal bleeding and a change in bowel habit

All cancer patients presented with rectal bleeding and a change in bowel habit, which had a significantly greater positive predictive value (9.2%) than rectal bleeding without a change in bowel habit (0%) (Table 1). The predictive value of this symptom combination was significantly higher (12.1%, LR = 1.345) when the change in bowel habit was to an increased frequency of defaecation and/or to looser stools compared with a change to decreased frequency of defaecation and/or harder stools (2.8%) (Table 1).

Rectal bleeding and a change in bowel habit also had a higher positive predictive value for colitis when the change in bowel habit was to an increased frequency of defaecation and/or to looser stools (6.0%) compared with a change to decreased frequency of defaecation and/or harder stools (2.8%), but this did not reach significance in this study (Table 2). For polyps (Table 3) there was also no significant improvement in positive predictive value between a change in bowel habit to increased frequency of defaecation and/or to looser stools (7.2%) or a change to decreased frequency of defaecation and/or harder stools (5.6%) (Table 1).

Table 1. The diagnostic value of symptom combinations and the characteristics of rectal bleeding for colorectal cancer in primary care.

Symptoms	Numbers	Predictive value	Likelihood ratio (95% CI)	Sensitivity	Specificity
Bleeding and CIBH	11/119	9.2	2.361 (2.046 to 2.725)	100	55
Bleeding and no CIBH	0/147	0			
Bleeding and CIBH (loose +/- frequent)	10/83	12.1	1.345[a] (1.071 to 1.689)	91	32
Bleeding and CIBH (hard +/- infrequent)	1/36	2.8			
Bleeding and no perianal symptoms	7/63	11.1	2.898 (1.752 to 4.792)	64	78
Bleeding and perianal symptoms	4/203	1.97			
Bleeding, CIBH and abdominal pain	6/67	9	0.966[a] (0.549 to 1.697)	55	44
Bleeding, CIBH and no abdominal pain	5/52	9.6			
Dark blood	3/31	9.7	2.133 (0.765 to 5.946)	27	87
Bright blood	8/199	4			
Aged ≥60 years	8/155	5.2	1.524 (1.042 to 2.229)	73	52
Aged ≤59	3/164	1.8			
Blood on paper only	2/82	2.4	0.580 (0.163 to 2.057)	18	69
Blood in pan and on paper	9/184	4.9			
Large volume of blood	1/79	1.3	0.297 (0.045 to 1.944)	9	69
Small volume of blood	10/187	5.3			
First time rectal bleeding	5/106	4.7	1.148 (0.590 to 2.231)	45	60
Not first time bleeding	6/160	3.8			
Blood mixed with the stool	1/33	3	0.724 (0.109 to 4.827)	9	87
Blood not mixed with the stool	10/233	4.3			

Total cancers in study: 11/319 = 3.4%. Diagnostic yield for cancer in patients sigmoidoscoped: 11/219 = 5%. Pre-test probability or positive predictive value of rectal bleeding in cancer for patients answering questionnaire or sigmoidoscoped: 11/266, 4.1% [95% CI = 2.1 to 7.3]). [a]Likelihood ratio derived using only patients with rectal bleeding and a change in bowel habit using pre-test probability of 9.2%. CIBH = change in bowel habit.

Rectal bleeding and a change in bowel habit indicated a significant increase in the overall positive predictive value for all pathology (20.2%) (Table 4).

Rectal bleeding without perianal symptoms
Rectal bleeding had a significantly higher predictive value (11.1%, LR = 2.898) than bleeding with perianal symptoms (2%) (Table 1). It also had a significantly higher predictive value for colitis (Table 2), but not for significant polyps (Table 3).

Patients presenting with rectal bleeding without perianal symptoms had a significant overall 31.7% positive predictive value for all pathology (Table 4).

Table 2. The diagnostic value of symptom combinations and the characteristics of proctocolitis in primary care.

Symptoms	Numbers	Predictive value	Likelihood ratio (95% CI)	Sensitivity	Specificity
Bleeding and CIBH	5/119	4.2	1.901 (1.295 to 2.789)	83	56
Bleeding and no CIBH	1/147	0.7			
Bleeding and CIBH (loose +/- frequent)	5/83	6.0	1.207 (0.827 to 1.763)	83	31
Bleeding and CIBH (hard +/- infrequent)	1/36	2.8			
Bleeding and no perianal symptoms	6/63	9.5	4.561 (3.626 to 5.737)	100	76.3
Bleeding and perianal symptoms	0/203	0			
Bleeding, CIBH and abdominal pain	1/67	1.5	0.355 (0.061 to 2.061)	20	42
Bleeding, CIBH and no abdominal pain	4/52	7.7			
Dark blood	1/31	3.2	1.5 (0.252 to 8.934)	20	86
Bright blood	4/199	2			

Total proctocolitis in study: 6/319, 1.9%. Diagnostic yield for proctocolitis in patients sigmoidoscoped: 16/219, 2.7% [95% CI = 1.1 to 6.1]). CIBH = change in bowel habit.

Table 3. The diagnostic value of symptom combinations and the characteristics of rectal bleeding for polyps in primary care.

Symptoms	Numbers	Predictive value	Likelihood ratio (95% CI)	Sensitivity	Specificity
Bleeding and CIBH	8/119	6.7	1.056 (0.626 to 1.781)	47	55
Bleeding and no CIBH	9/147	6.1			
Bleeding and CIBH (loose +/- frequent)	6/83	7.2	1.081 (0.711 to 1.643)	75	31
Bleeding and CIBH (hard +/- infrequent)	2/36	5.6			
Bleeding and no perianal symptoms	7/63	11.1	1.831 (0.992 to 3.380)	41	78
Bleeding and perianal symptoms	10/203	4.9			
Bleeding, CIBH and abdominal pain	4/67	6	0.881 (0.432 to 1.795)	50	43
Bleeding, CIBH and no abdominal pain	4/52	7.7			
Dark blood	2/31	6.5	0.864 (0.225 to 3.317)	12	86
Bright blood	15/199	7.5			

Total polyps in study: 27/319, 8.5%. Diagnostic yield for polyps in patients sigmoidoscoped: 27/219, 12.3% [95% CI = 8.2 to 17.4]). Diagnostic yield of significant polyps in patients sigmoidoscoped: 17/219, 7.8% [95% CI = 4.6 to 12.1]). CIBH = change in bowel habit.

Table 4. Symptom combinations predicting all pathology.

Symptoms	Numbers	Predictive value	Likelihood ratio (95% CI)	Sensitivity	Specificity
Bleeding and CIBH	24/119	20.2	1.724 (1.321 to 2.250)	71	59
Bleeding and no perianal symptoms	20/63	31.7	2.686 (1.858 to 3.882)	59	78
Dark blood	6/31	19.4	1.608 (0.718 to 3.603)	19	87
Bright blood	26/199	13.1			

CIBH = change in bowel habit.

Rectal bleeding with abdominal pain

Abdominal pain in addition to rectal bleeding with or without a change in bowel habit had no significant increase in cancer, colitis or polyp risk (Tables 1, 2 and 3).

Dark red bleeding

Dark as opposed to bright red rectal bleeding was of no significant predictive value for cancer (Table 1), colitis (Table 2), or significant polyps (Table 3).

The positive predictive value of dark red bleeding for all significant pathology was 19.4% compared with 13.1% for bright red bleeding and, again, not significantly different (Table 4).

Manifestation of rectal bleeding

None of the manifestations of rectal bleeding had significant predictive value for cancer (Table 1).

Palpable cancers

Thirty-six per cent (4/11) of cancers were palpable on digital rectal examination.

DISCUSSION

Summary of main findings

Rectal bleeding is common in the community and may be an early symptom of bowel cancer. This study shows that each year there are approximately 15 consultations for rectal bleeding in primary care per 1000 patients over the age of 34 years. The most useful factors in identifying higher risk groups were rectal bleeding in combination with a change in bowel habit to looser stools and/or an increased frequency of defaecation, bleeding without perianal symptoms and an age greater than 60 years.

The variation in the numbers of patients seen with rectal bleeding by GPs (from 8 to 37 per year) and in the timing of presentation in this study (from 16 to 49 per month) may be due to the difficulty in registering all patients with this symptom.[6,8,9] As there were also differences between the practices there may be variations in patient consultation behaviour. The 15 per 1000 per year consultation rate in this study should be regarded as the minimum rate in the health district. Other studies have reported consultation rates of 4–16 per 1000 per year.[1,8,9]

The diagnosis of cancer in this study was based on flexible sigmoidoscopy, selective use of barium enema and colonoscopy, and an 18-month follow-up of all patients. As it has been shown that flexible sigmoidoscopy to 60 cm detects virtually all significant causes of bleeding in patients presenting

with rectal bleeding to outpatients,[19] it is likely that total colonic imaging in all patients would not have revealed any further cancers.

The prevalence of cancer in patients with rectal bleeding in general practice is important for the development of referral guidelines. As large numbers of people in the community have rectal bleeding,[1–4] its predictive value for cancer in primary care will depend on the number of people deciding to seek medical advice and the accuracy with which this is recorded. Two studies in primary care[6–8] have reported a 10% predictive value for cancer in patients referred and investigated in hospital, compared with 5–6% in all patients seen in primary care. These studies[6–8] suggested that all patients with rectal bleeding over the age of 40 years seen in general practice should be referred to hospital for investigation. However, a Dutch[9] and a Belgian study[10] showing a 3.0% and 7.0% predictive value for cancer, respectively, suggested that selective referral policies were necessary.

Four previous studies[8,11–13] have shown an increased risk of cancer when rectal bleeding was associated with a change in bowel habit. In this study all patients with cancer had an associated change in bowel habit, and in 90% (10/11) this was to an increased frequency of defaecation and/or to looser stools, the typical change in bowel habit in bowel cancer patients[13,20] and giving a predictive value for cancer of 12%.

This study highlights the increased predictive value of rectal bleeding for cancer when perianal symptoms are absent. Other studies have shown that rectal bleeding with perianal symptoms in the absence of a change in bowel habit have a very low predictive value for bowel cancer, particularly when a rectal mass has been excluded.[3,13]

Abdominal pain has been emphasised in referral guidelines as an important alarm symptom.[21] Although one study in primary care[8] supports this view, this and three other studies[11–13] have shown that it is of no extra diagnostic value.

Although age is an important diagnostic factor, in this study an age of greater than 60 years with a 5% predictive value for cancer was less useful for the identification of a higher risk group than when rectal bleeding was associated with a change in bowel habit, or it occurred without perianal symptoms, regardless of age, with predictive values for cancer of 9.2% and 11.1%, respectively.

Dark red bleeding and how it is noticed, are often thought to be of diagnostic value for cancer, although there is little evidence for this.[7,8,11,15,22] In this study although dark rectal bleeding was associated with a higher predictive value for cancer, neither this nor the manifestations of rectal bleeding were of any significant diagnostic value.

In over a third of patients with cancer this was palpable, which once again emphasises the importance of a rectal examination in the management of patients with rectal bleeding in primary care.

Strengths and limitations of the study

The difficulty in identifying all patients consulting their GPs with rectal bleeding has been highlighted. A number of patients (17%) also declined both flexible sigmoidoscopy and a questionnaire, thus weakening the power of the study, This indicates however, that a proportion of patients with symptoms will decline further investigation. There was also a significant variation in monthly referral numbers of patients, again suggesting that the consultation rate is likely to underestimate the problem. The study may therefore be weakened by possible selection bias with possible unrepresentative recruitment. There was a relatively small number of patients with colorectal cancer identified in this study.

Implications for clinical practice and future research

In addition to the recognition of the predictive value of combinations of symptoms and signs in identifying patients at higher risk of cancer, GPs will need to continue with the time-honoured way of selecting patients on the basis of 'treat, watch-and-wait' strategies. In the presence of these common symptoms of rectal bleeding — change in bowel habit, abdominal pain and perianal symptoms — a greater understanding is needed on the predictive value of these symptoms or combination of symptoms in identifying those patients at high risk of large bowel pathology. Only with the help of this information will it also be possible to accurately identify the much larger group of patients with transient symptoms from benign disease that will greatly benefit from not being referred.[23]

Rectal bleeding is a common problem in general practice with a low predictive value for cancer. The combination of rectal bleeding with a change in bowel habit to increased frequency of defecation with or without loose motions, and without perianal symptoms and an age over 60 years should be used to identify those patients at higher risk of cancer for more prompt referral to hospital. Patients at lower risk, and with a low level of anxiety regarding their symptoms can be treated for longer periods in primary care, so that those with transient bleeding from benign conditions can avoid hospital investigation.

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