Occurrence and clinical significance of overt blood loss per rectum in the general population and in medical practice

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SUMMARY. While the occurrence of blood loss per rectum in general practice is common and usually not serious, it may be the first symptom of a colorectal malignant disorder. To determine the occurrence and clinical significance of overt blood loss per rectum a Medline literature search was undertaken. The incidence of this symptom in the general population was reported to be approximately 20 per 100 people per year, the 'consultation incidence' in general practice approximately six per 1000 and the incidence of referral to a medical specialist was estimated to be about seven per 10 000 per year. The clinical significance of the symptom varied within different populations: the predictive value of overt rectal blood loss for colorectal malignancy was estimated to be less than one in 1000 in the general population, approximately two in 100 in general practice and up to 36 in 100 in referred patients. How the manifestation of the bleeding (and other signs and symptoms) contributes to the selection of patients at each of these stages, leading to increasing prior probabilities, is unknown.

Keywords: rectal diseases; haemorrhage; morbidity risk factors; morbidity.

Introduction

OVERT blood loss per anum or per rectum is common in general practice. Its aetiology is usually not serious but it may also be the first symptom of a colorectal malignant disorder. Although it is open to debate whether the prognosis of symptomatic colorectal malignant disease may be improved by earlier diagnosis,[1-13] the finding of a carcinoma will often raise the question of whether it would have been possible to detect it earlier.[14] Partly because of this there is considerable disagreement as to the optimal diagnostic management. Some advocate a full examination of every patient with blood loss per rectum (sigmoidoscopy in combination with barium enema or colonoscopy) in order to rule out the possibility of a malignant tumour,[15-28] whereas others favour a more conservative approach.[11,29] The general practitioner is faced with the task of selecting patients in such a way that the costs and benefits of diagnostic tests are reasonably balanced.

A literature review was undertaken of the occurrence (that is,

the incidence and characteristic manifestations) of blood loss per rectum and its predictive value with respect to colorectal tumours, in order to find data that may be of use in this selection process.

Method

A literature study was undertaken by means of a Medline search (compact disc read-only memory, CD-ROM) in Index Medicus and Excerpta Medica and a manual search in the Family Medicine Literature Index (FAMLI). For the publication years 1984 to 1991 the following keywords were used: bleeding per rectum, colorectal neoplasm (FAMLI), anal/rectal/colorectal bleeding, anal/rectal/colorectal/gastrointestinal haemorrhage and anal/rectal/colorectal blood loss. In some cases the search was restricted by adding the keywords colorectal polyps and colorectal carcinoma (CD-ROM). Additional sources were traced on the basis of references. Handbooks and Dutch publications, including several Dutch general practice registration projects, were also consulted. The literature traced was assessed systematically on the following points:

● presence of overt blood loss per rectum (nature of bleeding);
● description of the population: age, sex, method of selection;
● definition of blood loss used: in, on, or mixed with the stool, in the toilet or on the toilet paper, bright or dark red;
● period of time, frequency, and amount of blood loss;
● method of research: oral interview, written questionnaire, sample, population screening;
● country of origin.

Altogether, 8617 references were found by CD-ROM. Studies discussing only occult blood loss or upper abdominal pathology were excluded, as were studies of blood loss as a side effect of medication or surgery, bleeding per rectum in children, and in very specific diagnostic methods and therapeutic techniques. Approximately 2% of the studies seemed to be relevant and within the scope of this study. The keyword rectal bleeding yielded most of the references selected, and these were obtained from Index Medicus. Excerpta Medica and FAMLI added few new references. Reports on the occurrence of overt blood loss were few compared with those of occult blood loss. Only two references were found from CD-ROM and FAMLI which related to general practice: these turned out to be part of the same study and were concerned with predictive values rather than incidence.

Results

General population

Incidence. Nine studies were found relating to the general population. In these studies the occurrence of blood loss per rectum in healthy people, whose general practitioner was often not aware of the problem, was reported (Table 1).

The largest study was that by Kewenter and colleagues[36] who screened 9040 people by carrying out a sigmoidoscopy and barium enema on those with a positive Haemoccult test. Among respondents, 13% had noticed blood loss per rectum in the last six months. This study was the only one with a follow-up period of two years, intended to identify adenomas and carcinomas. In

Table 1. Studies reporting the occurrence of rectal bleeding in the general population.

First author (date of publication)	Population	Method (response rate)	Occurrence in previous period
Wadsworth (1971)[30]	>21 years old England	Random sample, interviews (87%) n = 2153	2% in 2 weeks
Jones (1976)[31]	>40 years old, healthy people, known bowel disease/ surgery excluded, Australia	Random sample Questionnaire plus interviews[a] n = 112	38% ever
Gill (1979)[32]	3 general practices Netherlands	Questionnaire (72%) n = 8211	2% in 2 weeks
Silman (1983)[33]	>40 years old, male employees, England	Questionnaire plus Haemoccult test (51%) n = 916	12% in 3 months
Farrands (1984)[34]	45–75 years old, excluded colorectal pathology known by GP, England	Questionnaire (34%) n = 527	7% in 6 months
Chapuis (1985)[29]	>50 years old, healthy men, Australia	Interviews (85%) n = 319	15% in 6 months
Dent (1986)[35]	>30 years old, healthy people Australia	Random sample, interviews (45%) n = 202	16% in 6 months
Kewenter (1989)[36]	60–65 years old Sweden	Random sample (66%) n = 9040	13% in 6 months
Jones (1992)[37]	20–90 years old England	Questionnaire (71%) n = 1620	20% in 1 year (40–60 year olds: 10%)

n = number of respondents. [a]Response rate not known.

another large study, by Gill,[32] 2% of the 8211 people who answered the prestructured questionnaire claimed to have detected blood in their faeces at least once in the preceding two weeks. Wadsworth and colleagues' study also reported a 2% incidence.[30] Kewenter and colleagues' study differs from those of Gill and Wadsworth and colleagues with respect to selection of respondents by age and the time period enquired about. It is unclear whether these two factors are sufficient to account for the differences in the results.

The study by Jones and Lydeard covered a population with an age and sex distribution representative of general practice.[37] They found a prevalence of rectal blood loss of 20% in one year; among people between the ages of 40 and 60 years, the prevalence was 10%. Three studies,[29,33,35] dealing with smaller numbers and covering a 3–6 month period yielded incidence figures similar to those of Kewenter and colleagues.[36]

Farrands and Hardcastle[34] and Jones[31] present figures that deviate from the findings of the other studies. In a study with a low response rate (34%) Farrands and Hardcastle reported rectal bleeding in 7% of respondents during the last six months. In Jones' small study 38% of respondents reported ever having had rectal bleeding.[31] In both studies, known intestinal disorders were excluded. The percentages found may therefore have been higher if the total population had been considered, particularly in the study by Farrands and Hardcastle where known haemorrhoids were possibly excluded.

Thus it seems reasonable to assume that 7%–16% of the western European and Australian adult population at large will report at any one time experience of blood loss per rectum in the past six months; 20% will report symptoms in the previous year, and 2% will report symptoms in the previous two weeks.

Manifestation of blood loss. Only Jones' study reported the frequency and volume of rectal bleeding.[31] In approximately half of the 43 cases blood loss had occurred more than five times ever; usually there was only a drop of blood (79%). In 21% there was medium (18%) or heavy (3%) bleeding. The blood was usually noticed on the toilet paper (84%) and/or on the stool (63%).

Other authors did not report on frequency, length of time, or amount of blood loss. The occurrence of blood in or mixed with the stool varied widely: in 100% of reported cases of rectal bleeding,[32] 27%,[33] and 3%,[35] Two authors indicated that the blood was mostly reported to be on the paper, in the toilet or on the stool (73%–97%).[33,35] Usually the blood was bright red but in 23%–29% of cases it was reported to be dark red.[33,36] Many people (19%–43%) seldom or never inspected their faeces or the toilet paper.[32,35]

Diagnostic value. The predictive value of blood loss per rectum for the presence of rectal or sigmoid neoplasms (adenomas and carcinomas), has been reported in four studies of the general population;[29,33,34,36] it varies from 3% to 8% for adenomas and from 0% to 1% for carcinomas. Kewenter and colleagues found that in 346 people reporting dark red blood loss, there were three adenomas but no carcinomas (predictive value 1%).[36] In 818 people reporting bright red blood loss 11 carcinomas and 35 adenomas were identified (predictive value 6%). In contrast, Silman and colleagues more frequently found an adenoma in patients with dark red blood loss (16% of 25) than bright red blood loss (2% of 83).[33] Chapuis' team screened 319 healthy men aged 50 years and over and calculated that the sensitivity and specificity of rectal blood loss for rectal or sigmoid adenomas were 33% and 86%, respectively (likelihood ratio for positive or negative findings 2.36 and 0.78, respectively).[29] Silman's team obtained a sensitivity of 86% and a specificity of 89% for colorectal adenomas greater than 1 cm in diameter (likelihood ratio for positive or negative findings 7.82 and 0.16, respectively).[33]

General practice

Incidence. The literature search yielded no references to the incidence of overt blood loss per rectum in the general practice population. As a substitute data were analysed from four registration projects carried out in Dutch general practices (Table 2). The national study records diagnoses, and in cases where no dia-

Table 2. Incidence of overt blood loss per rectum in the general practice population, as reported in four Dutch studies.

Diagnoses	Incidence (per 1000 of the population per year) reported in			
	Monitoring project (1984)[38a]	Continuous morbidity registration project (1985)[39a]	Transition project (1991)[40b]	National study (1991)[41c]
Rectal bleeding not otherwise specified	0.6–0.9	–	4.0	0.4
Haemorrhoid(s)	7.6–8.2	12.1	4.0	6.8
Malignant neoplasm colon/rectum	0.2–1.1	0.6	0	0
Anal fissure, perianal abscess	2.2	1.4	0.2	3.2
Diverticulosis/diverticulitis	2.4	–	0	1.6
Chronic enteritis/colitis	0.2–0.5	–	0.1	0.8
Other	–	2.0	–	–
Total[d]	13.2–15.3	16.1	8.3	12.8

[a]Diagnoses. [b]Reasons for encounter. [c]Symptoms and diagnoses. [d]All cases of rectal bleeding and disorders where rectal bleeding could have been a symptom.

gnosis is made by the end of an illness episode, the symptom is registered.[41] The incidence of rectal bleeding, not otherwise specified was reported to be 0.4 per 1000 persons per year. A disorder in which rectal blood loss may have been a prominent symptom was diagnosed in 12.8 persons per 1000 per year. The continuous morbidity registration project does not include blood loss per rectum as a separate category.[39] However, a similar incidence of 16.1 per 1000 for diagnoses associated with this symptom was reported. The figures of the monitoring project are also in the same range.[38] The transition project registers reasons for encounter rather than diagnoses.[40] Consequently, the incidence of rectal blood loss as a reason for encounter was higher in this study and the incidence of haemorrhoids was correspondingly lower.

There are other data regarding lower abdominal pathology in general practice that may be of use in approximating the incidence of overt rectal blood loss. Bekker and colleagues investigated the indications for proctoscopy and found an incidence of four per 1000 per year.[42] Unpublished data point to incidence rates of rectal bleeding of eight per 1000 in England (Fuller J, personal communication) and six per 1000 in Denmark (Nørrelund N, personal communication). Taken together these data indicate that the incidence of rectal bleeding in general practice lies between four and eight cases per 1000 per year.

Manifestation and diagnostic value. No epidemiologic data were found on the manifestation and precise diagnostic value of rectal bleeding in general practice. Most registration projects lack not only a gold standard for diagnosis but also diagnostic follow up. An exception is the transition project which gives an indication of the most frequent final diagnoses made during subsequent visits.[40] In illness episodes starting with rectal bleeding as reason for encounter, the following final diagnoses were made: haemorrhoids 30%, no cause found 26%, anal fissure or abscess 18%, constipation 4%, and other nonspecific diagnoses 4%. The incidence of colorectal carcinomas and adenomas was not given and therefore must have been found in fewer than 4% of cases of blood loss per rectum.

Hodgkin indicated a ratio of 1: 20 for the relationship between serious and trivial causes of blood loss per rectum;[43] this would mean a predictive value of approximately 5% for serious causes.

Referred patients

Incidence. Little has been reported on the incidence of blood loss per rectum in referred populations. Moreover, the incidence will be highly dependent on the referral situation: primary or sec-

ondary referral centre, medical or surgical service, urban or rural populations. For the situation in the Netherlands Lamberts recorded a referral rate for this complaint of 14%.[40] On the basis of this percentage, it can be calculated that around 0.6 patients per 1000 are referred per year because of blood loss per rectum (14% of the incidence of four per 1000 per year in general practice). Assuming a higher incidence rate of rectal blood loss in general practice, for example six per 1000, an estimate of an incidence of referred patients with rectal blood loss is approximately 0.8 per 1000 per year.

Diagnostic value. Numerous reports have described the relative frequency of diagnoses in patients presenting with rectal blood loss. Again these results are partly dependent on the referral situation but may nevertheless be of use in obtaining an impression of the efficacy and efficiency of the selection process. Results of 27 reports are summarized in Table 3. In an Australian study, the predictive value of blood loss per rectum for the presence of tumours was calculated to be 19%: for malignancy 11% and for adenomas 8%.[22,58] A colorectal tumour was found to be the cause of blood loss significantly more frequently in cases of blood mixed with the faeces (35%), and less frequently in cases with anal protrusion noticed by the patient (10%) or haemorrhoids identified by the general practitioner (10%). Dark red blood loss was reported in 11% of cases and bright red blood loss in 89%; colour of blood loss was not a discriminating factor for presence of a tumour.[22,58] The results of the Australian study relate to a referred but less selected population than the other studies presented in Table 3.[22,58] In these studies, often higher percentages of malignant tumours (up to 39%) and adenomas (up to 32%) were found.

Predictive value of rectal bleeding for colorectal cancer

The data presented can be used to obtain an estimate of the predictive value of overt rectal blood loss for the presence of a malignant colorectal tumour in the three situations described. The incidence figure of rectal blood loss as presented here (20 per 100 per year in the general population, six per 1000 per year in the general practice population, and seven per 10 000 per year in referred patients), the incidence of colorectal cancer in the western world (50 out of 100 000)[65] and two estimates of the incidence of colorectal cancer with overt blood loss as an initial symptom (10% and 50%) were used. The frequencies of 10% and 50% of bleeding in colorectal malignancy are based upon retrospective studies that have recorded signs and symptoms, including blood loss in patients in whom a colorectal tumour was

Table 3. Reported frequencies of sources of rectal blood loss in referred patients.

First author, date of publication	% of cases with primary diagnosis							
	Malignancy	Polyps	Inflammatory bowel disease	Diverticulosis/ diverticulitis	Anal fissure/ abscess	Haemorrhoids	Other	Unknown
Noer 1962 (n = 221)[44]	39	10	18	28	–	–	5	–
Williams 1977 (n = 311)[16]	4	2	5	–	18	54	10	7
Boley 1979 (n = 84)[45]	8	11	1	35	2	7	24	12
Brand 1980 (n = 306)[46]	8	24	4	21	–	–	4	39
Dehn 1982 (n = 110)[47]	5	5	4	3	15	65	–	3
Shinya 1982 (n = 2200)[48]	19	32	6	1	–	27	10	6
Boley 1984 (n = 99)[49a]	9	–	–	43	–	–	41	11
McCallum 1984 (n = 248)[50]	3	16	–	–	–	–	–	–
Bat 1985 (n = 194)[20a]	6	14	–	21	–	100	3	–
Brouwer 1985 (n = 110)[51]	4	25	13	15	25	–	5	13
Goulston 1986 (n = 145)[22a]	11	8	2	3	5	72	3	–
Guillem 1987 (n = 224)[52]	18	23	8	16	30	–	5	–
Krishnan 1987 (n = 70)[53]	5	7	10	20	5	21	11	21
Pines 1987 (n = 387)[24a]	1	22	–	–	–	100	–	–
Swarbrick 1987 (n = 237)[54]	10	16	10	17	–	–	2	45
Tedesco 1987 (n = 285)[18]	11	–	–	–	–	–	–	–
Cheung 1988 (n = 337)[25a]	11	10	2	7	–	74	–	–
Irvine 1988 (n = 71)[55]	7	27	5	25	–	17	4	15
Tate 1988 (n = 49)[56]	18	–	–	–	–	–	–	–
Hixson 1989 (n = 75)[57]	1	14	–	–	–	75	7	3
Mant 1989 (n = 145)[58a]	11	8	2	3	5	72	3	–
Peillon 1989 (n = 38)[59]	21	–	–	8	–	–	21	8
Udezue 1989 (n = 500)[60]	5	–	–	–	10	79	3	3
Bhargava 1990 (n = 144)[61]	6	13	1	1	–	–	53	26
Brenna 1990 (n = 194)[62a]	12	18	13	–	–	–	13	49
Church 1990 (n = 269)[63]	14	7	6	8	–	–	4	41
Wang 1991 (n = 205)[64]	23	10	21	2	–	–	18	26

n = total number of patients in group. [a]Exceeds 100% as more than one diagnosis per patient.

identified. In one study blood with stool was an initial symptom in 10% of patients with a colorectal carcinoma.[66] In other studies, different initial symptoms may have led to investigations for colorectal cancer, overt rectal blood loss appearing with time in 40–80%.[67-72]

Within the limits of uncertainty inherent in this type of analysis the predictive value of rectal bleeding for colorectal malignancy can be estimated to increase from probably less than one in 1000 in the general population to approximately two in 100 in general practice and up to 36 in 100 in referred patients.

Discussion

Studies of the occurrence of blood loss per rectum in the general population can yield percentages that are either higher or lower than is really the case. There are various reasons for an underestimation: rarely do people inspect their stool; in none of the studies was the patients' report controlled by inspection (validity); and the percentages reported nearly always referred to healthy or even more healthy than average populations (that is, excluding those with known intestinal disorders). Furthermore, it is not always easy for people to think, let alone speak about, diseases. Wadsworth and colleagues offer three explanations for this: first, inadequate social acceptance (for example an interview about haemorrhoids is not readily accepted); secondly, fear or superstition that talking about a disease increases the likelihood of contracting it; and thirdly, a limited memory.[30] The reported percentages can also be an overestimation. When response rates varying from 34% to 87% are obtained, it is likely that in some studies

subjects with blood loss were more motivated to take part.

In the largest and probably best documented study involving 1164 patients with blood loss per rectum, a positive Haemoccult test was obtained and sigmoidoscopy and barium enema were performed.[36] A rescreening took place after one to two years and the cancer and death registry provided monitoring. The predictive value of overt blood loss for colorectal adenomas was calculated to be 3% and for carcinomas 1%. However, this applied only to subjects aged between 60 and 65 years, a category with a higher incidence of colorectal cancer compared with younger age groups. On the basis of other findings[29,34,35] and the calculations made it can be concluded that in the general population aged 30 years and over the predictive value of blood loss is less than 1% with respect to carcinomas, and less than 10% for adenomas greater than 1 cm in diameter. In younger people the values should be much lower but the data do not permit an exact determination of the predictive values in relation to age.

If each individual with rectal blood loss were to consult the general practitioner, this would imply in an average general practice of 2350 patients approximately 470 consultations per year. However, the estimated incidence in general practice was somewhere between four and eight per 1000; four per 1000 is probably lower than the actual incidence, because in these analyses blood loss was sometimes classified under other diagnoses. Assuming the incidence rate to be eight per 1000 in the general practice population per year implies that one out of 25 patients will consult a doctor: multiplication of eight per 1000 by a factor of 25 in order to obtain the estimated incidence of 20% a year in

the population at large. This disparity is presumably related to the so-called iceberg phenomenon of complaints in general practice.[30,73] No more than approximately 6% of patients with haemorrhoids are known by their general practitioner to have this complaint;[30] blood in bowel motions and haemorrhoids are frequent complaints that usually do not occasion a general practice visit.[73] Jones and Lydeard found that fewer than one third of the patients aged between 40 and 60 years with rectal bleeding consulted a doctor for rectal blood loss.[37] There is no information available indicating when blood loss becomes a reason to consult a doctor; neither is it known whether these patients are characterized by specific signs and symptoms.

The patients that are ultimately referred are still further selected, and therefore the prior probability of serious disorders is higher than in the population that is not referred. The manner of selection is unknown. Comparing the data of Mant and colleagues[58] with the data reported in studies in the general population, it may be deduced that blood mixed with the stool and bright red blood are selection criteria, considering that these occur relatively more frequently in the selected population. However, selection on the basis of age and other symptoms cannot be ruled out.

In the Australian study of referred patients no difference between the predictive value for colorectal cancer was found between dark red or bright red blood loss,[58] whereas in two studies in the general population dark red blood had either a higher[33] or a lower[36] predictive value. This clearly illustrates that conclusions pertaining to dark red blood loss having more[33] or less[36] predictive value are as yet premature, in particular in the situation of the general practice, about which virtually no data are available.

In conclusion, on the basis of the literature available, it may be concluded that approximately 20% of the population at large report having noticed rectal blood loss in the course of the preceding year. With regard to complaints of blood loss per rectum presented to the general practitioner, an iceberg phenomenon seems to exist: only approximately one out of 25 people with rectal bleeding consults the general practitioner for this complaint.

Following this selection by the patients themselves, a second filtration takes place in the general practice. It appears that general practitioners perform this function reasonably well. Thus, the prior probability of colorectal malignant disease rises from around 2% to 7%–36%. Little is known about the method of selection, and whether this could be made more effective. Moreover, these data on the incidence and causes of rectal blood loss in general practice are mainly based upon indirect estimations. Therefore it would be useful to perform a prospective study on the incidence of rectal blood loss in this setting and to identify signs, symptoms, and risk factors that may contribute to effective and efficient diagnosis.

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RCGP

Scientific Foundation Board

RESEARCH FUNDING

Applications are now being received for grants for research in or relating to general medical practice, for consideration at the October 1994 meeting of the Scientific Foundation Board. In addition to its general fund the Board also administers specific funds including the **Windebank Fund for research into diabetes.**

The Scientific Foundation Board's definition of research is catholic and includes educational research, observational as well as experimental studies, and accepts the methodologies of social science as valid. It is not in a position to fund educational activities.

If the study involves any intervention or raises issues of confidentiality it is wise to obtain advance approval from an appropriate research ethics committee otherwise a decision to award a grant may be conditional upon such approval.

Studies which do not, in the opinion of the Board, offer a reasonable chance of answering the question posed will be rejected. It may sometimes be useful to seek expert advice on protocol design before submitting an application.

Care should be taken to ensure that costs are accurately forecast and that matters such as inflation and salary increases are included.

The annual sum of money available is not large by absolute standards and grant applications for sums in excess of £5,000 are unlikely to be considered.

Chairman's action can be taken between meetings to approve grants of up to.£1000. These may be particularly appropriate to fund pilot studies.

Application forms are obtainable from the Clerk to the Board at: The Scientific Foundation Board, 14 Princes Gate, London SW7 1PU. *The closing date for receipt of completed applications is 26 August 1994;* any forms received after that date will, unfortunately, be ineligible for consideration.