Several recent studies of the efficacy of screening for cervical cancer have used a case-control approach, three drawing controls from the general population and hence including both patients and controls who had never been screened, compared with our study in which all patients and controls had been screened at least once. In Toronto Clarke and Anderson found a relative protection against invasive cervical cancer of 2.7 in women who had been screened in the previous five years compared with those who had not; the effect was not appreciably changed when several possible confounding variables such as socioeconomic state, marital state, age at marriage, and age at first sexual intercourse were considered. Raymond et al obtained a relative protection of 3.2 associated with one or more previous negative smears in their study in Geneva, in which cases and controls were matched on nationality and marital state as well as age.14 The apparent diminution of this effect with increasing number of negative smears may be explained by repeated screening of patients with symptomatic tumours. For both these studies estimates of relative protection as a function of time since the last negative smear will soon be available (personal communication). In Cali, Colombia, Arístizabal et al estimated a relative risk of 9.4 for invasive cervical cancer among women not screened 12-72 months before the date of diagnosis of the case compared with those screened.15 This effect refers largely to a period 12-35 months before the date of diagnosis. Recently, a study in Milan, using hospital controls and relying on interview data to determine screening history, found a relative protection against invasive cervical cancer of 3.9 in women reporting at least one previous screen compared with those never screened, although positive or abnormal smears may have been included.16

Further studies will help to sharpen the estimates of relative protection as a function of time elapsed since a negative screen and to determine the effect of age. Our results suggest that high protection is given certainly in the first three years, but that by the seventh year much of this protection has disappeared, although there is still some protective effect relative to no screening even after 10 years. While, however, the percentage of invasive cancers prevented will obviously increase with successively shorter intervals between rescreening, the number of screening tests required to prevent an invasive cancer will rise, and it is this trade off that must be considered when formulating any screening policy either for a community or for the individual.

References

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Predictive value of rectal bleeding in screening for rectal and sigmoid polyps

P H CHAPUIS, K J GOULSTON, O F DENT, A D TAIT

Abstract
Overt rectal bleeding is a common symptom of colorectal cancer and polyps but also occurs in apparently healthy people. It is not known how often this represents bleeding from an undiagnosed rectal or sigmoid polyp or cancer. Three hundred and nineteen apparently healthy men aged 50, selected by random sampling, were interviewed and underwent flexible sigmoidoscopy to at least 30 cm. Polyps of 10 mm or more in diameter were diagnosed in 12, one of whom also had an adenocarcinoma. Rectal bleeding during the previous six months was reported by 48, four of whom were found to have polyps; seven polyps and one cancer were diagnosed among the 271 who reported no rectal bleeding. Rectal bleeding had a specificity of 86%, a sensitivity of 32% and a positive predictive value of 8% for rectal or sigmoid polyps or cancer. Restricting the analysis to those subjects who regularly inspected their stools did not improve the predictive value.

Sigmoidoscopy in apparently healthy subjects with rectal bleeding will not result in the diagnosis of appreciable numbers of rectal and sigmoid polyps or cancers.

Introduction
Bleeding from the rectum is recognised as a common symptom of colorectal cancer and particularly of rectal cancer, in which it
occurs in over two thirds of patients before diagnosis. It is also a symptom of early rather than late cancer: Raftery and Samson found that 98 (54%) of 182 patients with Dukes' A and B stage cancer had rectal bleeding as a presenting symptom compared with 17 (11%) of 158 patients with C or D stage tumours. Because of the problem of delay by patients in presenting colorectal symptoms that may be due to cancer it has been suggested that people living in high risk countries should be educated to report important symptoms as soon as possible. Knowledge of the prevalence of rectal bleeding in apparently healthy adults is, however, scanty, and some people may not routinely inspect their bowel motions. Furthermore, it is not known whether a public education campaign encouraging the adult population to consult general practitioners for rectal bleeding would result in the diagnosis of appreciable numbers of colorectal neoplasms or would generate many costly investigations with negative results.

Here we report the results of a prospective survey of a randomly selected group of apparently healthy Australian men aged 50 or over, who were asked about rectal bleeding as a symptom and underwent flexible sigmoidoscopy. The aim was to estimate the sensitivity, specificity, and predictive value of rectal bleeding in screening for rectal or sigmoid polyps or cancer in a group of subjects at increased risk because of age.

Patients and methods

This study was part of a project assessing gastrointestinal disease among Australian male veterans of the second world war. Surviving members of the sixth, seventh, eighth, and ninth divisions of the Australian Imperial Forces residing in the Sydney metropolitan area were sampled randomly and invited to take part in a gastro-intestinal survey requiring half a day of investigations at this hospital (85% response). All subjects were apparently well and were not being investigated for any gastrointestinal condition. Each veteran was interviewed by a gastroenterologist, and, after a phosphate enema had been given, flexible sigmoidoscopy was performed with a 60 cm Fujinon fibreoptic sigmoidoscope (FS-QBF). In a clinical interview participants were asked if they had observed any bleeding from the anus over the preceding six months. In a self completed questionnaire they were asked how often they looked at their stools or the toilet paper after a bowel motion.

The table shows the generalised decision matrix for the study.

<table>
<thead>
<tr>
<th>Decision matrix</th>
<th>Cancer or polyp</th>
<th>No cancer or polyp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal bleeding reported</td>
<td>a</td>
<td>c</td>
</tr>
<tr>
<td>No rectal bleeding reported</td>
<td>b</td>
<td>d</td>
</tr>
</tbody>
</table>

The following definitions were used:

- sensitivity = \( \frac{a}{a + c} \) x 100
- specificity = \( \frac{d}{b + d} \) x 100
- positive predictive value = \( \frac{a}{a + b} \) x 100

The positive predictive value was the probability that a person with rectal bleeding would be found to have a polyp or cancer at sigmoidoscopy.

If a polyp of any size was visualised at flexible sigmoidoscopy total colonoscopy and polypectomy at another visit were recommended. For the purposes of this study, however, only lesions of at least 10 mm in diameter seen at flexible sigmoidoscopy were included in the analysis because smaller lesions are recognised to be unlikely to bleed. Spoken and written informed consent were obtained at the beginning of the survey and before sigmoidoscopy and the veteran's practitioner also informed. Approval for the study was obtained from this hospital's ethics review committee. Data were coded for computer processing and all statistical operations performed with version 9 of the statistical package for the social sciences as implemented on a Univac 1100 computer.

Results

Of 351 veterans sampled, 328 (93%) consented to undergo flexible sigmoidoscopy, which was performed to at least 30 cm in 319. The remainder were excluded from analysis. Retained faeces prevented passage of the instrument to 30 cm in seven, and the procedure was terminated because of discomfort in two others. Among the 319 subjects the examination was completed to 60 cm in 159 (50%), to 50-59 cm in 64 (20%), to 40-49 cm in 64 (20%), and to 30-39 cm in 32 (10%). The procedure was incomplete to 60 cm because of retained faeces, discomfort, or diverticulitis.

The mean (SD) age of subjects was 66 (4.7) years, range 58-81. No subject had a history of colorectal cancer, but two had a history of colorectal polyps. Thirty six knew of a first degree relative with colorectal cancer. Colorectal polyps 10 mm or more in diameter (estimated at sigmoidoscopy) were found in 12 of the 319 subjects (3.8%). One subject refused further investigation. In addition to an adenomatous polyp, one subject had an adenoscarcinoma (Australian clinicopathological stage C) diagnosed at 30 cm; he had no rectal bleeding or any other symptom. In the remainder nine adenomatous polyps and one hyperplastic polyp were removed and examined histologically. Polyps less than 10 mm in diameter were found in 40 subjects. Forty four veterans had rectal bleeding as a symptom but on sigmoidoscopy had no polyp greater than 10 mm in diameter or any cancer. Of these 44, six had small polyps (less than 10 mm), four had haemorrhoids; two had melanosis coli, one with haemorrhoids; 10 had diverticular disease, five with haemorrhoids; 11 had haemorrhoids alone; and in 15 no abnormality was found.

Overall, 48 subjects (15%) had noticed bleeding from the rectum in the preceding six months, of whom 44 (92%) did not have rectal or sigmoid cancer or polyps 10 mm or more in diameter, whereas eight (18%) of the 12 with polyps or cancer had not reported rectal bleeding. Rectal bleeding had a sensitivity of 33% (SE 14%), a specificity of 86% (2%), and a positive predictive value of 8% (4%) for rectal or sigmoid cancer or polyps 10 mm or more in size.

One hundred and eighty eight (95%) of the subjects stated that they looked at their stools less often than at every one in two motions, and 199 (56%) looked at the toilet paper on less than one in two occasions. For subjects who looked at their stools on at least one in two occasions the positive predictive value of rectal bleeding was 9% compared with 7% for the remainder. Of the 48 who reported rectal bleeding, 43 (90%) reported blood on the toilet paper, 18 (38%) blood in the toilet bowl, and 11 (23%) blood on the stool. The positive predictive value of blood on the toilet paper was 9%; for blood in the bowl 11%; and for blood on the stool 9%.

Discussion

Of the sample of veterans examined, 48 (15-0%) reported rectal bleeding over the preceding six months. Because all veterans had flexible sigmoidoscopy performed to a minimum distance of 30 cm it was possible to calculate a predictive value for colorectal cancer or polyps of 10 mm or more in diameter in the lower sigmoid and rectum. This figure was only 8%, which means that 92% of sigmoidoscopies (if the self reporting of this symptom was to be thus investigated) would not show an adenomatous polyp of 10 mm or greater in diameter or a cancer. Furthermore, the manner in which bleeding was seen (on the toilet paper, in the toilet bowl, on the stool) had no influence on the result. A predictive value of rectal bleeding for polyps less than 10 mm in diameter was not determined because these are recognised to be unlikely to bleed. An ideal study of the predictive value of rectal bleeding for all colorectal neoplasms would have required colonoscopy in all subjects, with or without bleeding, which would have been unethical.

A 30 cm flexible sigmoidoscope has been considered for use by the primary physician as this distance of insertion, although visualising only half of the surface area of the sigmoid colon, covers that portion of the large intestine that has about 50% of cancers and adenomas located within it. Bleeding may come from lesions above 30 cm, but we believe that this is relatively
uncommon and in any case would not alter our conclusions regarding the rectum and sigmoid.

Silman et al found six patients who had adenomas greater than 10 mm in diameter among 108 who had noticed rectal bleeding, and Farrant and Hardcastle found one patient with a sigmoid adenoma among 35 with rectal bleeding. We found four patients with adenomas among 48 who had noticed rectal bleeding but, unlike the two previous reports, we subjected those 263 subjects who had not noticed rectal bleeding to sigmoidoscopy and found seven with polyps and one with cancer. Forty four subjects would have undergone unnecessary sigmoidoscopy with its attendant cost and anxiety if a policy of investigation on the basis of rectal bleeding had been implemented.

Although flexible sigmoidoscopy was performed in this study by experienced endoscopists, in a minority of patients it was not inserted beyond 40 cm. This difficulty has been reported previously and might have been overcome by a bowel preparation. In patients rather than volunteers it is our practice to repeat sigmoidoscopy after more thorough bowel preparation. Our findings, however, are certainly valid for rigid sigmoidoscopy, for which the average length of insertion has been reported as 19-5 cm.

We examined rectal bleeding in apparently healthy men who had not consulted a doctor for this symptom. The results confirm that rectal bleeding is not rare in healthy men and caution against any public education programme designed to use it as a "screening test" for colorectal cancer. A patient presenting to a doctor with this symptom is, however, a different problem. We are currently examining whether full investigation of such patients will result in the diagnosis of significant numbers of colorectal neoplasms. The recent onset of rectal bleeding or the concomitant presence of other symptoms may select those people who go to their doctor and, together with other factors as yet undefined, may allow the doctor to select patients for colorectal investigation.

### SHORT REPORTS

**Adverse cardiovascular response to oral trimeprazine in children**

Trimeprazine has been widely used both as a premedicant and as a general paediatric sedative. Recently we became aware of four cases in which the use of trimeprazine as a paediatric premedicant was accompanied by disturbing cardiorespiratory instability.

**Case reports**

The table summarises all four cases. Case 1 is reported in detail below.

<table>
<thead>
<tr>
<th>Case No</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Weight (kg)</th>
<th>Dose of trimeprazine (mg)</th>
<th>Proposed operation</th>
<th>Medical history</th>
<th>Previous trimeprazine administration</th>
<th>Patient's complaint</th>
<th>Physical signs</th>
<th>Time since trimeprazine administration</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>F</td>
<td>17-7</td>
<td>60</td>
<td>Tonsillectomy</td>
<td>Upper respiratory tract infection</td>
<td>No</td>
<td>Diarrhoea, abdominal pain</td>
<td>Hypotension (pulses impalpable); bradycardia (52/min); apnoea</td>
<td>None</td>
<td>Oxygen inhalation; adrenaline by subcutaneous injection; sodium bicarbonate; hydrocortisone 30 min intravenous infusion</td>
<td>Drowsy for 12 hours; operation abandoned</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>F</td>
<td>25-9</td>
<td>90</td>
<td>Myringotomy</td>
<td>Upper respiratory tract infection</td>
<td>Yes (possible hypotension)</td>
<td>Sodium uncannibalism; &quot;Suddenly after...&quot; convulsions; cyanosis; bradycardia; hypotension</td>
<td>None</td>
<td>None</td>
<td>Drowsy for 6 hours; second episode of bradycardia 150 beats per minute; spontaneous recovery Operation deferred; operation 2 days later without incident</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>F</td>
<td>21-6</td>
<td>90</td>
<td>Tonsillectomy</td>
<td>Fever (settled overnight)</td>
<td>No</td>
<td>Abdominal pain</td>
<td>Vomiting; bradycardia; 60 min hypotension</td>
<td>None</td>
<td>None</td>
<td>Drowsy for 2 hours; operation was delayed</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>M</td>
<td>16</td>
<td>48</td>
<td>Plastic surgery</td>
<td>Recurrent chest infection</td>
<td>Yes (no recorded complications)</td>
<td>Central cyanosis; bradycardia (50/min)</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**References**

17. Leicester RJ, Pollett WG, Hawley PR, Nicholas RJ. Flexible fiberoptic sigmoidoscopy as an outpatient procedure. Lancet 1982;i:34-5.

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