Flexible sigmoidoscopy screening for colorectal neoplasia in average-risk people: evaluation of a five-year rescreening interval

Cameron F E Platell, Gillian Philpott and John K Olynyk

ABSTRACT

Objective: To determine the prevalence of colorectal neoplasia detected by rescreening people with average risk five years after initial screening by flexible sigmoidoscopy.

Design: Prospective survey of results of a colorectal cancer screening program.

Participants: People aged 55–64 years with no symptoms or family history of colorectal cancer who were recruited from the community for flexible sigmoidoscopy screening five years previously (July 1995 to December 1996) and had no colorectal neoplasms detected.

Setting: Fremantle Hospital, Western Australia, a community-based teaching hospital, December 2000 to June 2001.

Main outcome measures: Number and size of colorectal neoplasms (adenomas or cancer) compared between rescreened patients and initial screening population (all 982 people screened between July 1995 and December 1996).

Results: 803 people were eligible for rescreening; 138 were no longer at the recorded address, and 361 of the remaining 665 (54%) were rescreened. Rescreening found a significantly lower prevalence of colorectal adenomas than initial screening (8% [95% CI, 5%–11%] versus 14% [95% CI, 13%–15%]; $P < 0.05$) and also a lower percentage of adenomatous polyps over 5 mm in diameter (32% [95% CI, 15%–49%] versus 51% [95% CI, 46%–56%]; no significant difference).

Conclusion: Average-risk people who have been screened for colorectal neoplasms, with none found, have a low prevalence of neoplastic lesions five years later. Longer rescreening intervals need to be considered.

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IT IS WIDELY ACCEPTED that community screening for colorectal cancer significantly reduces mortality from this disease.[1-9] However, the optimal screening method and time interval between repeat screenings remain unclear.[5-7] Factors that may influence choice of screening method include accuracy of the test, adverse effects and acceptability to the physician and patient.[7] Factors which may influence choice of rescreening interval include acceptability to patients, accuracy of the initial screening test and natural history of the disease.[10,11] Progression from normal bowel to adenoma to cancer is relatively slow, and rescreening intervals of five to 10 years are often proposed.[5-7] Yet there is little conclusive evidence to support these proposals.[7]

Fremantle Hospital, in Western Australia, has been conducting a community-based screening program for colorectal neoplasia using flexible sigmoidoscopy since 1995. In the six years since its inception, the program has screened over 3000 patients with average risk of colorectal cancer. The current study aimed to determine the prevalence of neoplastic lesions (adenomas or cancer) in a subset of these people who were rescreened five years after first screening.

METHODS

Setting and participants

In 1995, a flexible sigmoidoscopy facility dedicated to screening for colorectal cancer was established at Fremantle Hospital. The screening program recruited people from the community who were aged 55–64 years with no symptoms suggesting colorectal cancer and no first-degree relatives with this disease, as described previously.[1-3]

From the established database of the facility, we selected people who had been screened more than five years before (July 1995 to December 1996) and had no colorectal neoplasms (adenoma or cancer) detected. They included patients found to have hyperplastic polyps on initial screening. These patients were sent a letter inviting them to attend for another flexible sigmoidoscopy. The letter also asked about abdominal symptoms and family history of bowel cancer, and those with no symptoms and average risk were scheduled for the procedure between December 2000 and June 2001. People with symptoms or family history were advised to see their local general practitioner.

The project was approved by the Fremantle Hospital Ethics Committee.

Screening procedure

All procedures were performed on an outpatient basis after informed consent was obtained. Patients were given a phosphate enema before undergoing flexible sigmoidoscopy without sedation. Procedures were either performed or supervised by a qualified endoscopist from the same team that performed the initial screenings. Biopsies were taken from any polyps or tumours, but no attempt was made to remove polyps. Depth of insertion of the sigmoidoscope

University of Western Australia at Fremantle Hospital, Fremantle, WA.
Cameron F E Platell, PhD, FRACS, Associate Professor, Department of Surgery; **Gillian Philpott,** EN, Research Officer, Department of Medicine; **John K Olynyk,** MD, FRACP, Associate Professor, Department of Medicine.
Reprints will not be available from the authors. Correspondence: Associate Professor Cameron F E Platell, University of Western Australia at Fremantle Hospital, PO Box 480, Fremantle, WA 6160.
cplatell@cyllene.uwa.edu.au

was recorded, but no attempt was made to determine corresponding anatomical depth.

Patients with biopsy-proven adenomas of any size or cancer were advised to have a follow-up colonoscopy. Detailed results of these colonoscopies are not yet available. Patients with hyperplastic polyps were advised that they needed no further follow-up.

Statistical analysis

We compared prevalence of colorectal neoplasms and number and size of polyps between rescreened patients and the original screening population (all 982 patients screened between July 1995 and December 1996) using the χ^2 test. We also used the χ^2 test to compare prevalence of hyperplastic and adenomatous polyps between patients who had been found to have hyperplastic polyps at initial screening and those who had no polyps detected. Significance was defined as the probability of a type I error of less than 5%.

RESULTS

Participants

Eight hundred and three people were screened by the flexible sigmoidoscopy program at Fremantle Hospital between its inception in July 1995 and December 1996 and had no neoplasms detected. These 803 were invited to be rescreened: 138 invitations were returned indicating that the person no longer lived at the recorded address, and 361 of the remaining 665 people presented for rescreening (response rate, 45% overall and 54% of those who presumably received the invitation). Five patients were excluded because of symptoms or family history that had become apparent in the intervening five years.

Rescreening

For rescreening, mean depth of insertion of the flexible sigmoidoscope was 60 cm (range, 30–110 cm). This was not significantly different from depth of insertion in the initial screening group (mean, 57 cm; range, 25–100 cm).[1] Depth of insertion at rescreening was limited by pain (61% of patients), proximal faecal loading (21%) and inadequate distal bowel preparation (18%).

Comparison of results of initial screening and rescreening of average-risk people for colorectal neoplasia using flexible sigmoidoscopy

	Initial screening ($n = 982$)[2]	Rescreening ($n = 361$)
% With diagnosis (95% CI)		
No abnormality	64% (63%–66%)	76% (72%–81%)
Hyperplastic polyps	18% (16%–19%)	15% (12%–19%)
Tubular adenomas	11% (10%–12%)	7% (4%–9%)
Tubulovillous adenomas	1.7% (1.3%–2.1%)	0.6% (0%–1.4%)
Tubular adenomas with severe dysplasia	0.7% (0.68%–0.74%)	0.3% (0–0.8%)
Cancer	0.3% (0.29–0.33%)	0
Other	0	0.8% (0–1.7%)
Mean adenoma diameter (mm) (95% CI)	7.2 (3.1–9.8)	6.0 (1.4–10.6)
Adenomas with diameter		
>5 mm (% of all adenomas)	71 (51%)	9 (32%)
>11 mm (% of all adenomas)	20 (14%)	2 (7%)

Results of rescreening are shown in the Box. No cancers were detected, while colorectal adenomas were detected in 28 people (8%). Initial screening identified a significantly higher incidence of colorectal neoplasia (14%; $P < 0.05$). Adenomatous polyps identified at rescreening were smaller than those found at initial screening. The proportion of adenomatous polyps over 5 mm in diameter at rescreening was 32% versus 51% at the initial screening (not significant). Similarly, the proportion over 11 mm in diameter at rescreening was 7% versus 14% at initial screening (not significant).

Eighty-eight of the people rescreened were noted to have hyperplastic polyps on initial screening (24% of all those rescreened). These people had a significantly higher prevalence of hyperplastic polyps on rescreening than those who were polyp-free at initial screening (31/88 [35%] versus 24/274 [9%]; $P < 0.01$). They also had a higher prevalence of adenomatous polyps on rescreening, but the difference was not significant (9/88 [10%] versus 19/274 [7%]). Mean diameter of hyperplastic polyps found at rescreening was 4.0 mm (95% CI, 2.1–5.9 mm). Rescreening also identified other abnormalities in three people: non-specific colitis in two and solitary rectal ulcer syndrome in one.

DISCUSSION

Our study found that the prevalence of colorectal neoplasia in average-risk people was 50% less in those who had been screened five years before using flexible sigmoidoscopy than in those undergoing first screening. In addition, adenomas found on rescreening tended to be smaller than those found on first screening. Our results suggest that rescreening average-risk people with flexible sigmoidoscopy at intervals longer than five years could be considered for evaluation.

Several tests are currently recommended for screening average-risk people for colorectal cancer.[6-8] These include faecal occult blood testing (FOBT), flexible sigmoidoscopy and colonoscopy. Each test has advantages and disadvantages. Flexible sigmoidoscopy was chosen for this study as it is generally safer and easier to perform than colonoscopy and has higher sensitivity than FOBT.[5-7] Using the strategy of following up with colonoscopy all patients found to have an adenoma gives flexible sigmoidoscopy a sensitivity of 70%.[7] The main disadvantages of flexible sigmoidoscopy are its inability to detect lesions that are more proximal in the colon[7,9] and its low compliance rate.[1-3] Indeed, we found that only

around half the people contacted presented for rescreening.

The rescreening interval is an important consideration in any population-based screening program.[6,7] For colorectal cancer, it needs to take into account the natural progression of adenomatous polyps to cancer and is calculated to avoid missing advanced neoplasia that may develop in the period between screenings.[10-12] Intervals of both five and 10 years have been proposed for colorectal cancer screening programs based on endoscopy.[4-7] In our study, rescreening identified one patient with severe dysplasia in an adenoma; this may have progressed to cancer if the rescreening interval had been 10 years. This raises the question whether a screening program should aim to detect all cases of the disease, or whether overall benefit to the community and cost-effectiveness should be of greater concern.[7]

Recent reviews have sought to evaluate the cost effectiveness of a variety of strategies and rescreening intervals. Bolin and colleagues concluded that annual FOBT, five- or 10-yearly colonoscopy, and five-yearly flexible sigmoidoscopy are all cost-effective strategies, with costs of less than US$40 000 per life-year saved (the arbitrary upper limit for positive cost effectiveness).[8] Yet, of these strategies, flexible sigmoidoscopy was considered the most expensive. In contrast, Frazier and colleagues in the United States modelled the cost effectiveness of a range of screening methods using data from previously published trials.[5] The most cost-effective strategy was five-yearly flexible sigmoidoscopy plus annual rehydrated FOBT, which reduced colorectal cancer mortality by 80%. The cost of this program was US$92 900 per life-year gained, as opposed to US$16 100 for 10-yearly flexible sigmoidoscopy.[5] These figures compare favourably with US$132 000 per life-year saved for annual mammography.[13]

Hyperplastic polyps in the colon are generally considered to have no significance in predicting risk for colorectal cancer, and patients with hyperplastic polyps were not considered for follow-up in our program. However, Jass recently observed that some subsets of hyperplastic polyps have definite malignant potential.[14] The risk relates to aberrant methylation pathways, and the main predictors are multiple and large hyperplastic polyps, especially those situated proximally in the colon. Our study revealed a trend towards increased numbers of adenomatous polyps in people who were previously noted to have only hyperplastic polyps compared with those who were polyp-free on first screening. We intend to follow up this group carefully to assess whether the presence of hyperplastic polyps is indeed a risk factor for colorectal neoplasia.

In conclusion, rescreening after five years found a low prevalence of colorectal neoplasia in average-risk people who had been found to have no colorectal neoplasms on first screening by flexible sigmoidoscopy. This suggests that a longer rescreening interval may be indicated, which would significantly reduce screening costs and might help improve patient compliance.

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