# Screening Flexible Sigmoidoscopy in a Low-Risk, Highly Screened Population

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*Background.* The efficacy of screening flexible sigmoidoscopy in patients with a prior history of a negative screening sigmoidoscopy has not been previously studied.

*Methods.* Charts from 866 consecutive asymptomatic patients undergoing baseline or rescreening flexible sigmoidoscopy were reviewed. Any previously screened patient with a history of polyps was excluded from the study. Findings on sigmoidoscopy, including size, location, and histopathology of lesions and number of prior examinations, if any, were recorded.

*Results.* Polyps were found in only 12 of 866 patients (1.4%). The effect of prior screening was significant. Ten of 414 (2.4%) patients who had not undergone prior screening sigmoidoscopy were found to have polyps. In contrast, only two of 452 (0.4%) patients who had undergone prior screening were found to have polyps.

*Conclusions.* Screening flexible sigmoidoscopic examinations provided a low positivity yield in this study, a finding that is likely explained by the exclusion of previously screened patients with a history of polyps and by the significant number of previously screened patients. The relation between the prevalence of lesions and the patients' previous examination statuses suggests that multiple screenings for asymptomatic, low-risk patients at 3- to 5-year intervals as recommended by the American Cancer Society may be unnecessary.

*Key words.* Sigmoidoscopy; colonoscopy; mass screening; colorectal neoplasms; preventive health services.
(*J Fam Pract 1994; 38:245-248*)

Although a recent retrospective study concluded that screening sigmoidoscopy can reduce mortality from colorectal cancer, there continues to be controversy regarding the exact use of screening flexible sigmoidoscopy as a part of routine health screening.[1–3] For example, questions still exist on the appropriate age for an initial screening endoscopic examination, as well as the necessity of and intervals for subsequent screening examinations.[1]

A previous study, which was conducted at a family practice site and focused on the use of screening flexible sigmoidoscopy for asymptomatic patients with negative fecal occult blood test results, found lesions in 3.6% of the study subjects.[4] A recent study investigating 210 screening colonoscopic examinations on asymptomatic patients found a much higher prevalence of significant colorectal lesions (25%).[5] Comparison of the 25% positivity rate using colonoscopy and the 3.6% positivity rate using sigmoidoscopy suggests that flexible sigmoidoscopy may not be the appropriate screening method for colorectal cancer.

These studies and others, however, did not specifically exclude patients with histories of polyps on previous screening sigmoidoscopy or colonoscopy.[5–10] Significant lesions are more frequent in patients with histories of adenomatous polyps, even 10 years previously.[2] As many as 5% to 40%[11–16] of synchronous lesions may be missed by sigmoidoscopy, and 7% to 50% of metachronous lesions have been noted to occur in patients with a history of polyps of any histologic type.[16–20]

This study reviews 866 screening flexible sigmoido-

*Submitted, revised, September 30, 1993.*

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 ISSN 0094-3509

scopic examinations or reexaminations by family physicians as recommended for routine health maintenance in asymptomatic patients over a 3-year period.[21–23] The effects of excluding patients with a previous history of polyps on prior screening examinations and the effects of previous screening are explored.

## Methods

This retrospective study involved asymptomatic patients 50 years and older at a Los Angeles family practice clinic who underwent routine colorectal cancer screening by flexible sigmoidoscopy over a 3-year period between 1989 and 1992. These screening examinations were routine, baseline, or rescreening sigmoidoscopic examinations as recommended by the American Cancer Society.[21] Data for this study were obtained from chart reviews of 866 consecutive qualifying patients. This group of patients did not include those with positive fecal occult blood test results or a history of colonic polyps on previous screening.

All the patients were followed by their family physicians, who referred them for screening sigmoidoscopy as part of their routine health maintenance examination. The standard bowel preparation in this study group was Golytely (Braintree Laboratories, Inc, Braintree, Mass), which allowed for adequate examinations. All of the subsequent screening sigmoidoscopic examinations were performed by two experienced attending family physicians and 24 supervised resident family physicians. A 60-cm flexible sigmoidoscope was used with an average insertion depth of 50 cm. Biopsies of any polyps found were obtained during the same examination by the family physician and sent to a laboratory for histologic studies.

The number, size, histologic type, and location of all lesions found on these screening sigmoidoscopic examinations were recorded. Necessary follow-up colonoscopic examinations for significant histologic lesions found on the current screen were also reviewed and noted for the presence and location of additional lesions. All purely hyperplastic polyps, as demonstrated by histologic studies following biopsies, were not tabulated since follow-up colonoscopy is not recommended for these polyps [24] by the American Society for Gastrointestinal Endoscopy and since these polyps have not been identified as a significant risk for future development of colorectal cancer.[25] A biopsy histologic study was used to verify that a diminuitive polyp was hyperplastic and not adenomatous.

In addition to demographic information, previous screening sigmoidoscopic examinations were also recorded. The data were collected for all subjects, regardless of whether a positive or negative finding was made on the current screening sigmoidoscopy. Fisher's exact tests were performed on selected data.

Table 1. Demographic Characteristics of 866 Asymptomatic Patients Who Were Screened for Colorectal Cancer by Flexible Sigmoidoscopy

| Characteristic | All Patients (N = 866) No. (%) | Patients with Lesions (n = 12) No. |
|---|---|---|
| Age (y) | | |
| 50 to 54 | 213 (24.6) | 2 |
| 55 to 64 | 357 (41.2) | 5 |
| 65 to 74 | 225 (26.0) | 3 |
| 75 and over | 71 (8.2) | 2 |
| Sex | | |
| Female | 489 (56.5) | 5 |
| Male | 377 (43.5) | 7 |

## Results

### *Demographic Characteristics*

Demographic characteristics of the 866 patients are shown in Table 1. The mean age was 61.5 years (standard deviation [SD], 8.2). The age range was 50 to 89 years. Women comprised 56.5% of the patients.

### *Positive Examinations*

Of the 866 screening sigmoidoscopic examination results reviewed, only 12 (1.4%) patients were found to have polyps. Six of the 12 (50%) patients with polyps found on the screening sigmoidoscopic examinations had additional synchronous lesions found on follow-up colonoscopy. A total of 16 additional synchronous lesions were found, 5 (17.9%) of which were beyond the range of the 60-cm sigmoidoscope (Table 2). On two separate screening sigmoidoscopic examinations, biopsies of two lesions were not obtained because of technical difficulties related to equipment problems.

Two sigmoidoscopic examinations yielded two hyperplastic polyps with glandular irregularities. Unlike other purely hyperplastic polyps without abnormalities found on histologic study, those with glandular irregularities were tabulated and underwent follow-up colonoscopies as well.

Only one of the 12 polyps found on screening sigmoidoscopy was significant in size or in histologic findings as defined by current criteria.[25] Twelve additional histologically significant synchronous lesions, however, were found on follow-up colonoscopy.

Table 2. Lesions Found by 60-cm Flexible Sigmoidoscopy and Follow-up Colonoscopy

| Type of Lesion | Lesions Found by Sigmoidoscopy | Additional Lesions Found by Colonoscopy | |
|---|---|---|---|
| | | Total | Beyond 60-cm |
| Polyp | | | |
| Tubular | | | |
| <1 cm | 7 | 4 | 0 |
| >1 cm | 0 | 0 | 0 |
| Villous | 0 | 4 | 2 |
| Tubulovillous | 1 | 8 | 3 |
| Hyperplastic with glandular irregularity | 2 | 0 | 0 |
| Adenocarcinomas | 0 | 0 | 0 |
| Not biopsied | 2 | 0 | 0 |
| Total lesions | 12 | 16 | 5 |

### *Previous Screening Sigmoidoscopic Examinations*

In this group of 866 patients, 452 (52.2%) patients had undergone previous screening sigmoidoscopic examinations. Of the 854 patients without polyps, 450 (52.7%) had previous examinations, whereas 404 (47.3%) had no prior screening sigmoidoscopic examination.

Of the 12 patients with polyps, however, only 2 (16.7%) had previous screening examinations; 10 (83.3%) had no prior examination. The effect of prior screening was significant ($P = .017$). Of the 452 patients who had been previously screened, the intervals of prior screening sigmoidoscopy were as follows: 400 patients were screened 5 or more years previously; 181 were screened 6 to 10 years previously; 103 were screened 11 to 15 years previously; 21 were screened 16 to 20 years previously; and 4, more than 21 years previously. Because some patients had multiple previous screening sigmoidoscopic examinations before this 3-year study period, the number of previous examinations exceeds the number of patients.

## Discussion

The prevalence of lesions detected in this study was low compared with that of previous studies.[6–10,26–28] The difference may be attributable to multiple reasons. First, this investigation involved only asymptomatic patients. The Minnesota Colon Cancer Control study by Mandel et al[29] recently observed that nearly 30% of patients with positive fecal occult blood test results had polyps or colorectal cancer detected on colonoscopy, and ultimately concluded that annual fecal occult blood testing decreased colorectal cancer mortality by 33%. Therefore, although the exclusion of patients with positive fecal occult blood test results was necessary to define a truly low-risk, asymptomatic population, it may have lowered the yield of the current study. Other studies with higher yields on endoscopic examinations failed to exclude all symptomatic patients, a group that may have included patients with fecal occult blood positivity.[8,9,26–28]

Second, the lower yield may have been influenced by the exclusion of all patients with a history of polyps from this study. Since these patients are at a higher risk for future polyps,[11–20] their inclusion could have falsely increased the yield of a screening study.[5–10]

Third, there was a slight predominance of woman (1.3:1) in our study. The prevalence of polyps has been noted by previous studies to occur more frequently in men than women (1.4:2.1).[30–32] The demographics of our subjects with respect to sex may have affected the yield.

Fourth, previous screening examinations have been noted in other studies; however, either no significant effects were noted in these studies or the studies did not include exact figures needed to analyze the impact of multiple screening on their positive findings.[4,5] In this study, more than one half of the patients (52.7%) with negative findings had undergone previous screening. The effect of previous screening was significant and could have contributed to the low yield within the entire study.

The high proportion of our patients who were previously screened may have lowered the yield of this study. Although there may be an independent effect of previous screening on the low yield, volunteer biases can affect the yield of a voluntary screening study such as this one.[33] Perhaps compliant patients, who undergo repeat, or even a single, routine flexible sigmoidoscopy, have better health habits than the general population, as theorized by Selby and Friedman.[34] In this study, the high percentage of compliant, perhaps health-conscious patients who were rescreened could have resulted in a lower yield.

Although there were synchronous polyps that were missed and a few polyp biopsies that could not be obtained on the screening sigmoidoscopy in this study, the simple fact that index polyps were detected should not be ignored. Previous studies have shown that 14% to 34% of patients screened with flexible sigmoidoscopy had additional lesions on follow-up colonoscopy.[4,6,7,35,36] These index polyps, found on the screening sigmoidoscopic examinations performed by family physicians, prompted immediate and appropriate referrals for full colonoscopic examinations that ultimately led to the discovery of additional, significant synchronous lesions.

The low yield of screening examinations on the low-risk population (asymptomatic patients without a history of polyps) in this study suggests that multiple screenings on this group at the recommended 3- to 5-year intervals of the American Cancer Society may be

unnecessary.[21] Perhaps either the 10-year interval suggested by Selby[2] would be sufficient; or a single, baseline health maintenance flexible sigmoidoscopic or colonoscopic examination[37,38] should be performed at an appropriate age, and future 3- to 5-year interval reexaminations conducted only on high-risk patients, including those with histologically significant polyps found on any screening endoscopic examinations.

## Acknowledgments

This study was partially supported by the American Academy of Family Physicians through the McNeil Awards for Clinical Research by Family Practice Residents.

The authors would like to express their appreciation to Shawn Okuda Sakamoto, a research associate at Johns Hopkins University, for assistance with data collection, insightful comments and suggestions, and encouragement in the development of this manuscript; and to Janis F. F. Yao, Kaiser Permanente Research and Evaluation, for statistical support on this project.

## References

1. US Preventive Services Task Force. Guide to clinical preventive services: an assessment of the effectiveness of 169 interventions. Baltimore, Md: Williams & Wilkins, 1989:47–55.
2. Selby JV, Friedman GD, Quesenberry CP, Weiss NS. A case-control study of screening sigmoidoscopy and mortality from colorectal cancer. N Engl J Med 1992; 326:653–7.
3. Ransohoff DF, Lang CA. Sigmoidoscopic screening in the 1990s. JAMA 1993; 269:1278–81.
4. Cauffman JG, Hara JH, Rasgon IM, Clark VA. Flexible sigmoidoscopy in asymptomatic patients with negative fecal occult blood tests. J Fam Pract 1992; 34:281–6.
5. Rex DK, Lehman GA, Hawes RH, Ulbright TM, Smith JJ. Screening colonoscopy in asymptomatic average-risk persons with negative fecal occult blood tests. Am J Gastroenterol 1991; 100: 64–7.
6. Achkar E, Carey W. Small polyps found during fiberoptic sigmoidoscopy in asymptomatic patients. Ann Intern Med 1988; 109: 880–3.
7. Blue MG, Sivak MV, Achkar E, Matzen R, Stahl RR. Hyperplastic polyps seen at sigmoidoscopy are markers for additional adenomas seen at colonoscopy. Gastroenterology 1991; 100:564–6.
8. Overholt BF. Flexible fiberoptic sigmoidoscopy: technique and preliminary results. Cancer 1971; 28:123–6.
9. Rosevelt J, Frankl H. Colorectal cancer screening by nurse practitioner using 60-cm flexible fiberoptic sigmoidoscopy. Dig Dis Sci 1984; 29:161–3.
10. Ujszaszyl L, Pronay G, Nagy G, Kovacs J, Libor L, Minick K. Screening for colorectal cancer in a Hungarian county. Endoscopy 1985; 17:109–12.
11. Rider JA, Kirsner JB, Moeller HC. Polyps of the colon and rectum. A four- to nine-year follow-up study of 537 patients. JAMA 1959; 170:633–8.
12. Foutch PG, Mai H, Pardy K, Disario JA, Manne RK, Kerr D. Flexible sigmoidoscopy may be ineffective for secondary prevention of colorectal cancer in asymptomatic, average-risk men. Dig Dis Sci 1991; 36:924–8.
13. Hoff G, Vatn M. Epidemiology of polyps in the rectum and sigmoid colon: endoscopic evaluation of size and localization of polyps. Scand J Gastroenterol 1985; 20:356–60.
14. Muto T, Bussey JR, Morson BC. The evolution of cancer of the colon and rectum. Cancer 1975; 36:2251–70.
15. Neugut AI, Johnsen CM, Forde KA, Treat MR. Recurrence rates for colorectal polyps. Cancer 1985; 55:1586.
16. Chu DZJ, Giacco G, Martin RG, et al. The significance of synchronous carcinomas and polyps in the colon and rectum. Cancer 1986; 57:445–50.
17. Franklin R, McSwain B. Carcinoma of the colon, rectum and anus. Ann Surg 1980; 171:811–7.
18. Brahme F, Ekelund GR, Norden JG, Wenckert A. Metachronous colorectal polyps: comparison of development of colorectal polyps and cancer in persons with and without history of polyps. Dis Colon Rectum 1974; 17:166.
19. Henry LG, Condon RE, Schulte WJ, Aprahamian C, DeCosse JJ. Risk of recurrence of colon polyps. Ann Surg 1975; 182:511–5.
20. Waye JD, Braunfeld S. Surveillance intervals after colonoscopic polypectomy. Endoscopy 1982; 14:79–81.
21. American Cancer Society. Summary of current guidelines for the cancer related checkup: recommendations. New York, NY: American Cancer Society, 1989.
22. National Cancer Institute. Working guidelines for early cancer detection rationale and supporting evidence of decreased mortality. Bethesda, Md: National Cancer Institute, 1987.
23. American College of Physicians. Clinical efficacy assessment project. Screening for colorectal cancer. Philadelphia, Pa: American College of Physicians, 1990.
24. American Society for Gastrointestinal Endoscopy. Appropriate use of gastrointestinal endoscopy. Manchester, Mass: American Society for Gastrointestinal Endoscopy, 1986.
25. Atkin WS, Morson BC, Cuzick J. Long-term risk of colorectal cancer after excision of rectosigmoid adenomas. N Engl J Med 1992; 326:658–62.
26. Johnson RA, Quan M, Rodney WM. Continued assessment of flexible sigmoidoscopy in a family practice residency. J Fam Pract 1984; 18:723–7.
27. Vellacott KD, Hardcastle JD. An evaluation of flexible fiberoptic sigmoidoscopy. BMJ 1981; 265:1583–6.
28. Winnan G, Berci G, Panish J, Talbot T, Overholt BF, McCallum RW. Superiority of the flexible to the rigid sigmoidoscope in routine proctosigmoidoscopy. N Engl J Med 1980; 302:1011–2.
29. Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. N Engl J Med 1993; 328:1365–71.
30. Berge T, Ekelund G, Mellner C, Pihl B, Wenckert A. Carcinoma of the colon and rectum in a defined population. An epidemiological, clinical, and post-mortem investigation of colorectal carcinoma, and coexisting benign polyps in Malmo, Sweden. Acta Chir Scand 1973; 438(suppl):1–86.
31. Ekelund G, Pihl B. Multiple carcinomas of the colon and rectum. Cancer 1974; 33:1630–4.
32. Schwabe AD, Lewin KJ. Benign tumors of the colon. In: Berk JE, Haubrich WS, Kalser MH, Roth JLA, Schaffner F, eds. Gastroenterology. Philadelphia, Pa: WB Saunders, 1985:2491.
33. Neugut AI, Pita S. Role of sigmoidoscopy in screening for colorectal cancer: a critical review. Gastroenterology 1988; 95:492–9.
34. Selby JV, Friedman GD. Sigmoidoscopy in the periodic health examination of asymptomatic adults. JAMA 1989; 261:595–601.
35. Rumans MC, Benner KG, Keffe EB, Custis JM, Lockwood DR, Craner GE. Screening flexible sigmoidoscopy by primary care physicians: effectiveness and costs in patients negative for fecal occult blood. West J Med 1986; 144:756–8.
36. Warden MJ, Petrelli NJ, Herrera L, Mittelman A. The role of colonoscopy and flexible sigmoidoscopy in screening for colorectal carcinoma. Dis Colon Rectum 1987; 30:52–4.
37. Ransohoff DF, Lang CA. Screening for colorectal cancer. N Engl J Med 1991; 325:37–41.
38. Neugut AI, Forde KA. Screening colonoscopy: has the time come? Am J Gastroenterol 1988; 83:295–7.