

# The role of sigmoidoscopy for asymptomatic patients

Results of three annual screening sigmoidoscopies, polypectomy, and subsequent surveillance colonoscopy in a primary-care setting

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■ A total of 329 asymptomatic patients (aged 50 or older) underwent flexible sigmoidoscopy to screen for colonic neoplasia. Of these, 258 underwent a second examination after 1 year and 143 underwent a third examination after another year. Of 60 patients in whom polyps were found on one of the three examinations, 58 underwent colonoscopy and polypectomy; 77 adenomatous polyps were present in 39 of these patients. The incidence of adenomatous polyps was 7.9% for the first examination, 3.9% for the second, and 2.1% for the third. Of patients with an index polyp found by sigmoidoscopy, 57.5% had synchronous polyps discovered by colonoscopy. Thirty-six of 77 polyps in 24 patients showed dysplasia; 9 were <0.5 cm, 14 were 0.5 cm to 0.9 cm, and 13 were 1 cm or larger. Forty-four surveillance colonoscopies (done after initial colonoscopy and polypectomy) have been performed in 28 patients. Eighteen examinations resulted in finding 30 adenomatous polyps, of which 10 showed dysplasia. This study 1) is the first report of flexible sigmoidoscopy data to support the American Cancer Society recommendation of two serial screening sigmoidoscopies a year apart, 2) reinforces the concept that an index polyp indicates a need for a complete colonoscopy, 3) reinforces the need for ongoing surveillance by colonoscopy after detection of adenomas, and 4) adds to reports of dysplasia in diminutive polyps.

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**C**ANCER of the colon remains one of the leading causes of death from malignancy. As long as survival depends largely on early surgical treatment, and other treatment modalities continue to have disappointing results, success in reducing mortality will depend on early discovery or preven-

tion. Prevention, in turn, depends on identification and elimination of causative environmental and genetic factors. Our incomplete knowledge and the multiplicity of factors involved leave prevention as a goal for the future.

Current methods of screening include examination of the stool for occult blood, air-contrast barium enema examination, and endoscopy (rigid and/or flexible sigmoidoscopy and colonoscopy). Stool testing for occult blood of the asymptomatic patient has a low yield.<sup>1</sup> The air-contrast barium enema examination has been reported by many authorities to have a high sensitivity but poor patient acceptance.

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A diagnostically helpful situation exists in the case of colon cancer in that it is usually preceded by a benign neoplastic lesion, the adenomatous polyp.<sup>2,3</sup> Gilbertsen<sup>4</sup> described an asymptomatic population in which he performed repeated proctosigmoidoscopy and polypectomy. Over a 30-year period, 20,000 persons averaged six examinations each. He found 13, rather than the statistically expected 100, cancers of the rectosigmoid. He attributed this low incidence of cancer to the performance of polypectomies whenever benign neoplastic lesions were found.

Fiberoptic sigmoidoscopy, which is increasingly being used as a screening tool in the asymptomatic patient, is a high-yield procedure for the detection of the asymptomatic adenomatous polyp.<sup>5-7</sup> The American Cancer Society recommends two sigmoidoscopies a year apart as part of the guidelines for colorectal cancer detection in asymptomatic individuals. To the best of our knowledge, this is the first reported study of annual serial screening using the flexible sigmoidoscope. We present data on the frequency, location, pathology, and recurrence of colonic polyps, and the histology of the "diminutive polyp."

#### MATERIALS AND METHODS

##### Patient population

From May 17, 1983, to October 6, 1986, 329 patients, aged 50 and older, from a primary-contact internal medicine practice, were selected for serial screening flexible sigmoidoscopy. The patients came from one of two groups:

1. Those with no complaints who presented for a periodic general physical evaluation.
2. Those with known chronic medical problems, such as hypertension, coronary artery disease, or diabetes, who presented for a periodic general physical evaluation and had no gastrointestinal complaints.

A history was taken for all patients. All underwent general physical examination and the following laboratory studies: urinalysis, CBC, SMA 20, and three occult blood studies using Hemoccult slides.

A total of 730 fiberoptic sigmoidoscopies were performed on 329 patients. An examination was considered satisfactory when an adequately cleansed bowel permitted an examination to a distance of at least 35 cm or, in the case of an inadequately cleansed bowel, a polyp was identified.

The first examination (Exam 1) involved all 329 patients. Of these, 258 patients underwent a second examination (Exam 2), and 143 underwent a third exami-

nation (Exam 3). Exams 2 and 3 were performed 1 or 2 years later, up to August 27, 1988, as the patients returned for their periodic comprehensive examinations. Any patient with an index polyp was referred for colonoscopy and polypectomy. Patients with adenomatous polyps have been entered into the surveillance program of the gastroenterologist and have not been re-examined by flexible sigmoidoscopy. Patients with only hyperplastic polyps as shown by colonoscopy were returned to the sigmoidoscopy study group.

The Exam 1 population had a mean age of  $63.2 \pm 7.4$ . The eligible members of Exam 1 who did not return for Exam 2 had a mean age of  $63.6 \pm 8.4$ . Of this group, four were lost to follow-up, two died of esophageal carcinoma, and one died of a myocardial infarction. The eligible members of Exam 2 (mean age,  $64.7 \pm 7.0$ ) who did not return for Exam 3 had a mean age of  $64.7 \pm 7.6$ . Of this group, seven were lost to follow-up, two died of myocardial infarction, one died of lung cancer, one died of leiomyosarcoma of the ileum, and one died of metastatic carcinoma. Twenty-seven of the "negative" Exam 2 patients were not yet due for re-examination at the time of tabulation of these data.

##### Patient preparation

Preparation for the flexible sigmoidoscopy consisted of two Fleet enemas, self-administered 2 hours and 1 hour before the scheduled examination. Thirty-seven preparations (4.8%) were unsatisfactory and were repeated.

##### Equipment

All office examinations were done with an Olympus OSF 60-cm flexible endoscope. A standard office examination table was used with the patient in the Sims' position. Colonoscopy was performed with standard-size 180-cm instruments.

##### Histologic terminology

The focus of this study was the discovery of the adenomatous (neoplastic) polyp in the asymptomatic patient. Adenomatous polyps were classified as tubular, tubulo-villous, or villous adenomas. The term "tubulo-villous" was used when the villous component of the polyp approximated 25% to 75% of the polyp mass.

While we realize that the grading of dysplasia into specific categories is imprecise and subjective, dysplastic changes were categorized as mild, moderate, or severe. For this report, the term "severe dysplasia" includes cases that may be classified by others as carcinoma in situ. All of the adenomatous polyps were reviewed inde-

pendently by three pathologists, and a consensus diagnosis of type of polyp and degree of dysplasia was reached. Interpretation was unanimous with regard to type of polyp and the use of the terms "moderate" and "severe" dysplasia.

## RESULTS

### Exam 1

Thirty-nine patients (11.9%, 95% confidence interval, 8.4% to 15.4%) were found to have 46 index polyps. Thirty-seven elected to undergo colonoscopy and polypectomy, which resulted in the removal of 56 adenomatous polyps in 26 patients (7.9%, 95% confidence limit, 5.0% to 10.8%). Eleven patients had only hyperplastic polyps.

### Exam 2

Of the 257 patients, 13 (5%, 95% confidence interval, 2.4% to 7.8%) were found to have 13 index polyps. In two of these patients, the polyps were 1.5 and 3 cm. These polyps were at the 50-cm depth, a depth not attained on the examinations 1 year earlier. All elected to undergo colonoscopy and polypectomy, which resulted in the removal of 15 adenomatous polyps in 10 patients (3.9%, 95% confidence interval, 1.5% to 6.3%). Three patients had only hyperplastic polyps.

### Exam 3

Of the 140 patients, nine (6.3%, 95% confidence interval, 1.9% to 9.5%) had nine index polyps. All elected to undergo colonoscopy and polypectomy, which resulted in the removal of six adenomatous polyps in three patients (2.1%, 95% confidence interval, 0% to 4.5%). Six patients had only hyperplastic polyps.

Table 1 defines the population by age, examination, and type of polyp. Figure 1 summarizes the data.

### Polypectomy surveillance colonoscopy

Twenty-eight patients who had adenomatous polyps had 44 surveillance colonoscopies subsequent to their original polypectomy. Eighteen of these 28 had 30 new adenomatous polyps (Table 2).

### Dysplasia

In addition to the histologic classification of tubular, tubulo-villous, and villous adenomas, the pathologists identified varying degrees of dysplasia in some of the polyps. Of the 26 patients with adenomatous polyps discovered from Exam 1, 12 patients had a total of 23 polyps showing dysplasia: 10 mild; 9 moderate; 4 severe

**TABLE 1**  
PATIENTS WITH INDEX AND ADENOMATOUS POLYPS

Age	Exam #1 (IP/AP)	Exam #2 (IP/AP)	Exam #3 (IP/AP)
50-59	114 ( 9/ 8)	64 (1/0)	22 (1/1)
60-69	153 (21/11)	135 (7/5)	84 (7/2)
≥70	62 ( 9/ 7)	59 (5/5)	37 (1/0)
TOTALS	329 (11.9%/7.9%)	258 (5.0%/3.9%)	143 (6.3%/2.1%)
(Overall percentage)			

IP = index polyp and AP = adenomatous polyp.

**TABLE 2**  
POSTPOLYPECTOMY SURVEILLANCE COLONOSCOPY

First year after polypectomy
18 negative
10 with adenomatous polyps
Second year (negative on first examination)
0 negative
1 with adenomatous polyps
Second year (adenomatous polyps on first examination)
2 negative
2 with adenomatous polyps
Third year (negative on first examination)
5 negative
2 with adenomatous polyps
Third year (adenomatous polyps on second examination)
0 negative
2 with adenomatous polyps
Fourth year (negative on second examination)
1 negative
1 with adenomatous polyps

(carcinoma in situ). Five of the 10 patients with adenomatous polyps discovered from Exam 2 had eight polyps showing dysplasia: two mild; four moderate; two severe (carcinoma in situ). The three patients with adenomatous polyps discovered from Exam 3 had a total of five polyps showing dysplasia: two mild; two moderate; one severe (carcinoma in situ). Of the 30 polyps removed at postpolypectomy surveillance colonoscopy, 10 (33.3%) showed dysplasia: 4 mild; 6 moderate.

## DISCUSSION

The 11.9% discovery rate of index polyps on Exam 1 is in keeping with other reports.<sup>5,6</sup> We are unaware of reports of serial examinations wherein we show an index polyp discovery rate of 5% and 6.3% for Exams 2 and 3.

The discovery of adenomatous polyps during colonoscopy and polypectomy in 7.9% of the Exam 1 population is also in keeping with other reports.<sup>5,6</sup> Adenomatous polyps were discovered at a rate of 3.9% and 2.1% at colonoscopy subsequent to Exams 2 and 3. We are unaware of any reports of such serial studies.

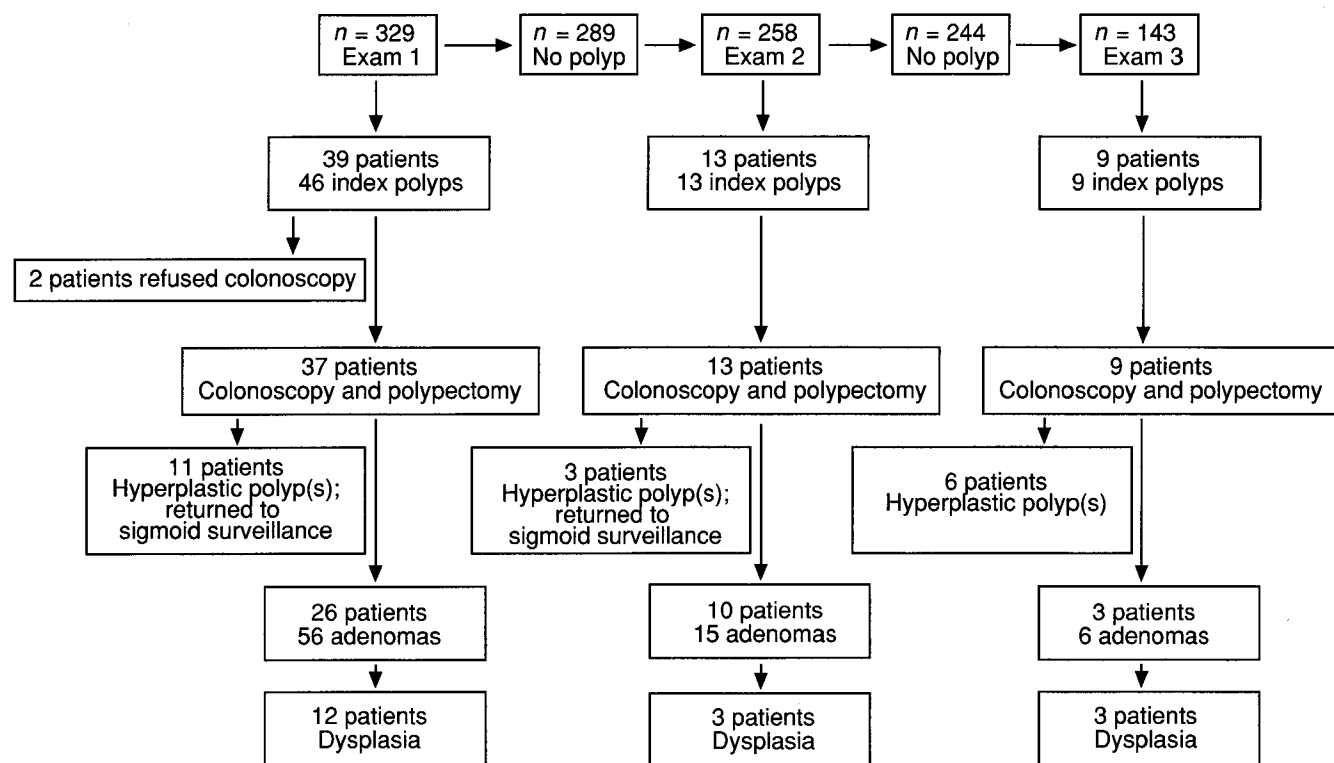


FIGURE 1. Results of serial screening flexible sigmoidoscopy.

The high incidence of adenomatous polyps found during Exam 2 (3.9%) is surprising. If new adenomatous polyps developed within 1 year at this rate, one would expect a similar incidence at the time of Exam 3, but the incidence we found was 2.1%. The number of adenomatous polyps found during Exam 2 suggests that they may have been present at the time of the previous examination. Varying examiner experience, bowel preparation, patient cooperation, or a minuscule polyp may have been among the confounding factors affecting the yield at Exam 1. If so, a higher yield at Exam 2 may be due to discovery of existing lesions upon further searching, rather than the presence of new lesions.

Of the eight patients who had a negative Exam 1 and were found to have an adenomatous polyp by Exam 2 within the area examined during Exam 1, five had an adenomatous polyp <7 mm and three had a polyp of 1 cm. From our postpolypectomy surveillance colonoscopy data, we found that 18 of 28 patients had a total of 30 adenomatous polyps (2 mm to 8 mm) within 3 years of their original polypectomy; some at 1 year, some at 2,

and the others at 3, with an intervening normal colonoscopy. All of the colonoscopies were performed by an experienced endoscopist (K.D.). One must be aware of the existence of patients in whom one finds a new adenomatous polyp as early as 1 year after removing all previous polyps. Similar to the experience of Neale et al<sup>8</sup> and Tedesco et al,<sup>9</sup> neither endoscopist was able to accurately classify a polyp as adenomatous or hyperplastic by gross appearance. Tedesco et al,<sup>9</sup> Grandqvist et al,<sup>10</sup> and Feczko et al<sup>11</sup> reported that 49% to 72% of polyps <0.5 cm were adenomatous.

The American Cancer Society Guidelines for Colorectal Cancer Detection in Asymptomatic Individuals recommend: "Persons older than age 50 should have a sigmoidoscopic examination every 3 to 5 years after they have had two initial examinations with normal findings 1 year apart." (Emphasis added.) Repeat examination at 1 year helps to compensate for examiner error or suboptimal preparation and detects the patient in whom neoplastic changes occur at a rapid rate. Miller and Lehman<sup>12</sup> and Laufer et al<sup>13</sup> report "miss" rates up to

**TABLE 3**  
ADENOMATOUS POLYPS WITH DYSPLASIA FOUND ON INITIAL COLONOSCOPY (IN CM)

	Mild dysplasia			Moderate dysplasia			Severe dysplasia		
	<0.5	0.5–<1	1+	<0.5	0.5–<1	1+	<0.5	0.5–<1	1+
21 tubular	1	5	2	4	4	1	0	0	4
14 tubulo-villous	3	1	0	0	4	3	1	0	2
1 villous adenoma	0	0	0	0	0	0	0	0	1
TOTALS	4	6	2	4	8	4	1	0	7

Of 36 polyps showing dysplasia, 24 (67%) were <1 cm in size and 9 (25%) were <0.5 cm in size.

11% in the detection of polyps on the first examination by colonoscopy. This further supports the concept of a follow-up examination a year later. Our 7.9% discovery rate for adenomatous polyps on Exam 1 and 3.9% for Exam 2 in an asymptomatic population supports the American Cancer Society recommendation of a repeat examination 1 year after the initial negative examination (Table 1).

Sixteen of the 26 patients with an adenomatous polyp found during Exam 1 had additional adenomatous polyps removed at colonoscopy. Five of the 10 patients with an adenomatous polyp found during Exam 2 had additional adenomatous polyps removed at colonoscopy. Two of the three patients with an adenomatous polyp found during Exam 3 had an additional adenomatous polyp removed at colonoscopy. Miller et al<sup>14</sup> reported synchronous polyps in 50% of patients undergoing colonoscopy, and Gillespie et al<sup>15</sup> reported a 35% incidence of synchronous polyps. Our finding is 57.5% and further supports the contention that a patient with an index polyp found by sigmoidoscopy must be considered as potentially harboring synchronous polyps in the more proximal colon.

Our protocol for postpolypectomy surveillance, with one exception, consisted of a colonoscopy 1 year after initial polypectomy for adenomatous polyps. Patients with an adenomatous polyp at surveillance were recalled 1 year later; those without an adenomatous polyp were recalled 2 years later. The frequency of metachronous adenomatous polyps (Table 2), of which one third showed dysplasia, illustrates the need for continuing surveillance. Carlsson et al<sup>16</sup> reported that multiplicity of adenomatous polyps indicates a higher risk for metachronous lesions.

Table 3 classifies the dysplastic polyps by type and size. Of the 36 dysplastic polyps, 24 were <1 cm and 9 were <0.5 cm.

This study, as others cited previously, found a significant number of colonic adenomatous polyps in an asymptomatic population. Of all adenomatous polyps removed, 71.5% were in the descending colon, sigmoid, or rectum; 18.5% in the transverse colon; and 10% in the ascending colon. These data do not permit any conclusion regarding the actual distribution of adenomatous polyps in the general population. Our study only analyzed patients with an index polyp discovered by 60-cm sigmoidoscopy. We do not know if patients with negative results after undergoing sigmoidoscopy had polyps of the more proximal colon. Tedesco et al,<sup>17</sup> Shinya and Wolff,<sup>18</sup> and Winawer et al<sup>19</sup> report 49% to 66% of polyps potentially within the range of the 60-cm sigmoidoscope. Because of such issues as telescoping or stretching of the bowel, the marking on the scope at the anal orifice is not necessarily an accurate indicator of the extent of the anatomic area examined. In this study, 39% of the index polyps were above 35 cm as indicated by the markings on the scope at the anal orifice.

Issues still under study are whether all adenomas, single or multiple, progress to malignancy and whether some adenomas may even regress. Invasive carcinoma in polyps under 0.5 cm is rare. It is currently thought that malignancy risk increases as size and degree of dysplasia and villous component increase. The maturation and aging of polyps appears to be expressed by degree of dysplasia and villous change. This is supported by increasing degrees of both in larger polyps.<sup>20</sup> Polyp age, multiplicity of polyps, and villous components seem to be associated with increasing dysplasia independent of polyp size.

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