

Why Flexible Sigmoidoscopy Instead of Rigid Sigmoidoscopy?

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Representative outcome studies describing the procedures of rigid sigmoidoscopy and use of the 60-cm flexible sigmoidoscope are summarized. Subspecialist outcomes are compared with those obtained by family physicians. Family physicians consistently obtain similar insertion depths and diagnostic yields, although comparison is difficult because of referral bias and inconsistency regarding the reporting of hyperplastic polyps. No complications have been reported to date. Low physician and patient compliance with suggested guidelines for sigmoidoscopic examination may be partially responsible for unchanged five-year survival rates for colorectal cancer over the last 30 years. Preliminary studies indicate that the 60-cm flexible sigmoidoscope has improved compliance in at least one setting. Longitudinal cost-benefit studies should be performed in primary care settings.

There has been a recent explosion in the teaching of flexible sigmoidoscopy at the primary care level. The clinical use of the instrument was first described by Overholt in 1969. Comparative studies demonstrating the superiority of flexible sigmoidoscopy over rigid sigmoidoscopy were first published in the mid-1970s. Following several years of successful courses by state and local medical societies, as well as private educational groups, the American Academy of Family Physicians (AAFP) responded to a deluge of member requests by presenting the first national-level

course at its scientific assembly in 1982. Now, in the mid-1980s, it is important to review the scientific and intraprofessional forces surrounding the procedure of sigmoidoscopy.

With the introduction of any technology, it is necessary to question whether a need exists, whether patient care benefits outweigh the risks of performing the procedure on the patient, and if so, whether society is willing to participate in the procedure (patient compliance). It is necessary to determine how health care providers will be trained and whether the performance of this procedure should be limited to a subspecialty. Finally, society's willingness to assume the financial burden for performance of the procedure must be assessed.

Established Need Persists

Despite agreed-upon screening guidelines,

Presented to the First National Conjoint American Academy of Family Physicians-American Society for Gastrointestinal Endoscopy Workshop on Flexible Sigmoidoscopy, Los Angeles, California, September 24, 1983. From the Department of Family Medicine, San Bernardino County Medical Center, University of California, Irvine, California. Requests for reprints should be addressed to Dr. Wm. MacMillan Rodney, Department of Family Medicine, 780 East Gilbert Street, San Bernardino, CA 92415-0935.

widespread public education efforts, and the availability of potentially curative treatment, there has been little impact on the survival data for colorectal carcinoma over the past 25 years.¹ In a five-year prospective longitudinal study of physician behavior within a family medicine training program, the base-line data were very disappointing. Rigid sigmoidoscopies were performed on only two of 144 patients, both of whom had at least one characteristic that placed them at high risk for colorectal carcinoma.²

In Abramson's study³ of female military dependents, patients were more than twice as likely to have received a pelvic examination as a sigmoidoscopic examination. Patients aged over 50 years were more likely to have been screened with barium enema than with sigmoidoscopy. Only rigid sigmoidoscopy was available to the populations described in these studies. In a recent Family Practice Grand Rounds, neither of the high-risk index cases received sigmoidoscopy during the investigation of their signs and symptoms.⁴ Ultimately, both patients were discovered to have significant colorectal neoplasia.

Limitations of Rigid Sigmoidoscopy

The most commonly described measure of sigmoidoscopic examination is insertion depth. In a prospective study of 1,000 patients in which the procedure was terminated at the first report of discomfort by the patient, an average insertion depth of 19.5 cm was obtained.⁵ In another surgeon-provider study from Great Britain, the average insertion depth was 17.7 cm.⁶ In a study of family practice residents and their instructors, the averages were 16.0 cm and 19.1 cm, respectively.⁷ A recent report by gastroenterologists reported an average rigid examination of 20 cm.⁸

Unfortunately, insertion depth is not a pure measure. It is a blend of patient tolerance, intestinal anatomy, and physician skill, which in turn is dependent upon training, native intelligence, hand-eye coordination, and other factors. Substantial pain and discomfort to the patient have been described with attempts to insert the full length of the rigid sigmoidoscope.⁵ Although some reports describe the pain or discomfort of the procedure as approximately the same regardless of which method (rigid sigmoidoscopy or flexible sigmoidoscopy) is used,⁹ the experience of the au-

thors has shown less discomfort with the flexible instrument.¹⁰

Demonstrated Superiority of Flexible Sigmoidoscopy by Gastroenterologists and Colorectal Surgeons

The gastroenterologists Winnan et al,⁸ in a comparative study of rigid sigmoidoscopy vs flexible sigmoidoscopy in 342 patients, noted the diagnostic yield for colorectal disease to increase from 4.1 percent to 26.1 percent when the flexible instrument was used. Of 1,012 patients referred to colorectal surgery clinic, the diagnostic yield was more than tripled in the flexible sigmoidoscopy group. By extracting diverticular disease from the data, the diagnostic yields are 37.9 percent (flexible sigmoidoscopy) and 15.5 percent (rigid sigmoidoscopy). The yield ratio is approximately 2.5 times greater in the flexible sigmoidoscopy group.¹¹

The hospital-based specialist literature was reviewed to establish a basis for meaningful comparison of the performance of the procedure (flexible sigmoidoscopy) in other practice settings.^{12,13} As hospitals frequently charge \$25 to \$60 for the use of a room especially equipped for the performance of endoscopic procedures, it would be of benefit if the same high diagnostic yield could be obtained in the office.

In his discussion of 1,464 office examinations with the 60-cm sigmoidoscope, Carter¹⁴ describes his diagnostic yield of 10.9 percent polyps. Several carcinomas, as well as 16 hyperplastic polyps, are included within his total of 159 polyps. A 3.4 percent prevalence of "ulcerative disease" was noted during the initial 412 cases. If hyperplastic polyps are excluded and the prevalence for inflammatory bowel disease is presumed to remain constant, the total diagnostic yield for neoplasms and inflammatory bowel disease would be 12.5 percent. These authors reported that biopsies were regularly taken when indicated, patient acceptance was good, and no complications were noted.

A diagnostic yield of 28.8 percent in an office-based series of 1,121 60-cm examinations has been reported by Hilsabeck.¹⁵ A "rigid scope range" of 25 cm has been used in describing those lesions that presumably could have been found with the rigid sigmoidoscope. Of 323 lesions, 167 were thought to have been within reach of the rigid sig-

Table 1. Sigmoidoscopy Outcomes From Four Nongeneralist Studies

Senior Author	No. of Patients	Symptomatic No. (%)	Cancer RS/FS	Neoplastic Polyps (RS/FS)	Diagnostic Yield (%)	Duration of Examination (min)
Winnan ⁸	342	205 (60)	1/3	6/36	16.1	12
Marks ¹¹	1,012	809 (80)	11/26	110/253	25.9*	5
Hilsabeck ¹⁵	1,121	most?all	13/21**	91/230**	28.4*	11.2
Carter ¹⁴	1,464	most?all	NR	70/159**†	12.5††	< 10

RS = rigid sigmoidoscopy, FS = flexible sigmoidoscopy, NR = not reported

*These diagnostic yields exclude the authors' data for the prevalence of diverticular disease. The figures represent interpretation of the prevalence of malignancy, inflammatory bowel disease, and polyps of all types. Note a separate category for hyperplastic (nonneoplastic) polyps was not created by these authors. Cases in which more than one polyp was found were counted twice, further increasing absolute percentage of diagnostic yield

**Neither Hilsabeck nor Carter did strict rigid sigmoidoscopy and flexible sigmoidoscopy studies. Their data represent comparisons of lesion location with the assumption that lesions beyond 25 cm would be found only by flexible sigmoidoscopy. Lesions located up to and including 25 cm from the anal verge were designated as being within the range of rigid sigmoidoscopy

†Sixteen hyperplastic polyps are distributed in an unknown manner within the rigid sigmoidoscopy and flexible sigmoidoscopy groups

††The diagnostic yield has been recalculated after excluding the hyperplastic polyps

midoscope. Although they were not formally described as hyperplastic, 146 of 230 polyps were reported to be 1 to 4 mm in size. If these polyps are excluded, neoplasms and inflammatory bowel disease total 146 cases for a diagnostic yield of 13.0 percent. Those patients who had previously experienced rigid sigmoidoscopy rated the flexible 60-cm procedure as being 25 percent as painful as rigid sigmoidoscopy. Biopsies, without prior coagulation studies being obtained, were routinely performed as indicated. There were no complications. Overall the authors calculated a diagnostic yield ratio (flexible sigmoidoscopy vs rigid sigmoidoscopy) of 1.9:1.

Table 1 depicts data that have been extracted from the four gastroenterologic and colorectal surgeon studies discussed. The following features of their design should be noted. Both office-based studies seek implicitly to compare their 60- to 65-cm flexible sigmoidoscope data with what might have been found with the rigid 25-cm sigmoidoscope. By utilizing 25 cm as the assumed average depth of insertion of the rigid instrument, the rigid scope data are speciously inflated by at least 20 percent. Thus, implied diagnostic-yield comparison ratios (flexible sigmoidoscopy vs rigid sigmoidoscopy) are conservative and low.

As in the hospital-based specialist series, the

majority of the examined patients have been referred because of pre-existing gastrointestinal disease or symptoms. The extrapolations of the diagnostic yield in asymptomatic patients whose only risk factor is age cannot be made from such studies. The inclusion of hyperplastic polyps within the diagnostic yield creates problems for interpretation of and comparison among these studies. The adenoma-carcinoma sequence is less well established for these histologically benign yet macroscopically common hyperplastic polyps.¹⁶

In summary, diagnostic yields are significantly improved, patient acceptance is better, and morbidity is negligible when flexible sigmoidoscopy is utilized. Furthermore, these results are equally good for the office-based subspecialist.

Competency Demonstrated by Family Physicians

Johnson et al¹⁰ published the first family practice outcome study revealing a diagnostic yield for neoplasms (adenomas and carcinomas) and inflammatory bowel disease of 14 percent. Although biopsies were limited, there were no complications in this series of 150 patients. As in the experience of Carter, the physicians had received minimal training with actual patients. Based on their prior

Table 2. Learning Curve For Family Medicine Faculty and Residents

Number of Procedures Performed (n = 450)	Average Depth of Insertion (cm)
First 10 procedures	34
Second 10 procedures	44
Third 10 procedures	49
Current group average	50.5

Note: In addition to the learning curve described above, the average insertion depth attained is similar to that published by gastroenterologists. Furthermore, there have been no complications in 450 cases.¹⁸

experience with routine office surgical procedures (including rigid sigmoidoscopy), a learning curve for the endoscopic neophyte was recorded and published (Table 2). A teaching eyepiece was used to optimize the amount of experience any one faculty could derive from the clinical material. Despite examination times of 20 to 30 minutes and no analgesia, patient acceptance remained good.

In another study by Hocutt et al⁷ based at a family practice residency training program 159 patients were examined by flexible sigmoidoscopy. In separate groups rigid sigmoidoscopy, 35-cm flexible sigmoidoscopy, and 60-cm flexible sigmoidoscopy were compared (Table 3). Although the patient demographics and formal methodology were not described, Hocutt and colleagues had no complications. Furthermore, in 36 patients who had had previous experience with rigid sigmoidoscopy, 94 percent preferred flexible sigmoidoscopy.

In a report of over 150 65-cm flexible sigmoidoscopy examinations by a family physician group, ease of use and applicability to office-based general practice are endorsed.¹⁷ The diagnostic yield of the 60-cm flexible sigmoidoscope was felt to be more than twice that of both the rigid and the 35-cm flexible sigmoidoscope. Thus, preliminary outcome studies by family physicians seem to parallel those of office-based gastroenterologists. An additional 450 residency training cases have been reported and data describing an additional 1,000 community-based family physician cases have been compiled.¹⁸ Examination and acceptance of these findings should help to establish the

feasibility of office-based primary care physicians performing this procedure with a subsequent favorable benefit-risk ratio.

Compliance Issues for Patients and Physicians

"Susceptibility to a serious problem for which there exists a solution" has been proposed as an educational paradigm that could motivate patients to be more cooperative with disease prevention and disease treatment strategies. Curriculum change, faculty agreement, and availability of the equipment did not effect a change in physician and patient noncompliance with colorectal carcinoma screening protocols within a residency training practice.² In particular, compliance with the performance of rigid sigmoidoscopy was practically nil. During the same period, compliance with cervical cancer screening protocols increased 60 percent.

Prior to year 3 of a five-year longitudinal chart audit in the same family medicine training program, flexible sigmoidoscopy was introduced. At the end of year 3, a statistically significant increase in physician and patient compliance with the recommendations for sigmoidoscopy was noted.¹⁹ Further data describing physician compliance for colorectal carcinoma screening are presented in Table 4. Compliance with Pap smear did not increase in years 4 and 5 whereas flexible sigmoidoscopy frequency more than doubled.

These data should be viewed from the perspective that the majority of the physicians are in years 1 and 2 of postgraduate training. Although the opportunity to provide continuity of care is a required feature of the family medicine training program, most of the data have been generated on the basis of the initial four to six visits with a resident.

The medical records of patients aged 50 years or older were examined to determine whether commonly accepted preventive medicine strategies were implemented.^{2,19} These records suggest that the residency-trained family physician may be willing and able to create a change in the colorectal carcinoma survival rates. Whether this change in colorectal cancer survival will be of a magnitude similar to that brought about by the advent of the Papanicolaou smear is not known. Incorporation of rigorously structured training within primary care residencies will be needed, but first, faculty

Type of Sigmoidoscope	Number of Patients	Percentage With Polyps	Percentage With Cancer	Percentage With Spasm
Rigid	62	4.8	0	45.2
Flexible, 35 cm	102	8.0	2.0	11.8
Flexible, 65 cm	57	19.3	1.8	24.6

Procedure	Percentage of Patients Aged 50 Years or Older Screened				
	Year 1	Year 2	Year 3	Year 4	Year 5
Stool guaiac cards	23	24	30	62	69
Sigmoidoscopy	2	0	21	34	55
Pap smear control	34	59	55	60	47
Average number of visits in each audited record	14	5	5	5	6

Note: Data are derived from a university-based family medicine residency. Measures are based primarily on resident care patterns in patients new to the practice in any given year. Year 1 base-line data are derived from established patients. Pap smear percentages are for all adult female patients. Flexible sigmoidoscopy was introduced after year 2.

must be trained. Workshops offered at the California Medical Association Scientific Assemblies have been pioneer efforts whereby broad-based medical societies offer high-quality training to the community physician. It is hoped that the first conjoint American Academy of Family Physicians (AAFP)-American Society for Gastrointestinal Endoscopy (ASGE) course on flexible sigmoidoscopy will rekindle the spirit of collegiality and shared learning through preceptorship that formerly abounded within the medical profession at large.

Economic Issues Regarding Flexible Sigmoidoscopy

At present, insertion of a sigmoidoscopic instrument beyond 32 cm into the human colon merits the appellation of "modified colonoscopy" under the California Standard Nomenclature system of reimbursement for medical and surgical

services.* As it is a surgical procedure, physicians are entitled to fees for performance of it. These fees seem disproportionately large in the case of ambulatory patients. Third-party payers are likely to restructure this value system if fee-for-service medicine survives. Family physicians have restructured, and thereby lowered, fees as described below.

Given the information in Table 5, procedures using the 60- to 65-cm flexible sigmoidoscope could be valued at three times the prevailing community charges for rigid sigmoidoscopy. It would be consistent to bill two times the prevailing rigid sigmoidoscopy community rate for the performance of 35-cm flexible sigmoidoscopy. Society grapples with its conscience and its pocketbook regarding reimbursement for the delivery of pre-

*After this article was written, a new billing code number (45330) was created for the procedure of flexible sigmoidoscopy.

Table 5. Advantages and Disadvantages of Flexible Sigmoidoscopy Compared With Rigid Sigmoidoscopy

		Comments
Advantages of Flexible Sigmoidoscopy		
Diagnostic yield, polyps		2-6 times as great ^{7,11}
Diagnostic yield, cancer		2-3 times as great ^{7,11}
Patient acceptance		75% discomfort reduction ¹⁵
Training methods		94% prefer flexible sigmoidoscopy ⁶
Documentation		Improved—fiberoptic teaching eyepiece Improved—with availability of relatively low-cost Polaroid capability
Biopsy technique		Easier
Disadvantages		
Physician time		2-4 times as long
Cost of equipment		5-20 times as expensive
Maintenance of equipment		More difficult
Iatrogenic infection risk		Not disposable
Neutral Considerations		
Complications		Extremely low for both flexible sigmoidoscopy and rigid sigmoidoscopy
Training difficulty		Flexible sigmoidoscopy more structured and demanding
Training availability		Flexible sigmoidoscopy more available even in its infancy Rigid sigmoidoscopy never systematically taught, nor was competence measured

ventive medicine services. The medical profession must voluntarily assume an active leadership role in cost containment. With the increasing percentage of the elderly within the population, cancer prevention and early detection may be of increasing potential benefit. The dollar cost of terminal management of metastatic Duke's D colorectal carcinoma more than offsets the dollar cost of flexible sigmoidoscopy.

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