

Impact of Flexible Sigmoidoscopy on Physician Compliance with Colorectal Cancer Screening Protocol

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The flexible sigmoidoscope may represent a partial solution to the longstanding problem of physician and patient noncompliance with sigmoidoscopy for the detection of colorectal cancer. A three-year longitudinal audit of medical records revealed at least a sevenfold increase in the number of sigmoidoscopies performed after the introduction of flexible sigmoidoscopy to a salaried medical group. This procedure has made a significant contribution to patient care and resident education in the UCLA family practice residency program.

There is a wealth of published support for the routine use of proctosigmoidoscopy by the primary care physician.¹⁻⁵ Much of this support stems from the concept that detecting colon cancer prior to the onset of signs and symptoms prolongs survival. The American Cancer Society currently recommends that all men and women over 50 years of age have a sigmoidoscopic examination every three to five years after two initial negative examinations one year apart.¹ This recommendation is not universally accepted, but it has been and is the standard of practice within the University of California, Los Angeles (UCLA), Family Practice Group.

It is obvious that there exists a "reality gap,"³ with the promise of preventive medicine continuing to be oversold by many, but actually being delivered by few. A Gallup poll conducted for the American Cancer Society found that only 36 percent of those over the age of 50 years had ever received a sigmoidoscopic examination.⁶ In 1978, at a conference on colorectal cancer screening, the procedure of proctosigmoidoscopy was not discussed in detail because of its widely acknowl-

edged poor acceptance.⁷ Seventy-two percent of 89 New Zealand family physicians reported that they never performed sigmoidoscopy in their practice.⁸ Hoogewerf,⁹ on the basis of cost-benefit analysis, recently recommended discontinuation of the rigid sigmoidoscopic examination. Green¹⁰ has cited poor patient compliance and long intervals between screenings as cause for no longer recommending this procedure.

Numerous explanations have been advanced for physician reluctance in performing this relatively simple outpatient procedure. Lack of physician expertise in performing sigmoidoscopy properly has been noted,^{11,12} which may be a reflection of inadequate training or deterioration of skills resulting from disuse. Patient morbidity has also been cited, although the risk of perforation is extremely rare (5 perforations and no deaths in 103,000 reported cases³). The thought of subjecting an asymptomatic patient to the discomfort associated with sigmoidoscopy may also be a deterring factor.

The UCLA Family Practice Residency Group, although stressing preventive medicine in its curriculum, has observed a similar reluctance on the part of its resident physicians in performing sigmoidoscopy on a routine basis. In a previous study, a prevalence of one sigmoidoscopic examination in 182 randomly audited adult patient medical records was noted. One year later, despite

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renewed faculty commitment and special resident education activities, resident compliance with the utilization of this procedure was found to be nil in 189 audited charts.¹³

Flexible sigmoidoscopy has been called the "best screening test available" for colorectal cancer.¹⁴ Its diagnostic superiority over rigid sigmoidoscopy is well established, detecting 2.5 to 6 times the number of polyps and 2 to 3 times the number of cancers.¹⁵⁻¹⁸ Teaching the procedure to resident physicians is enhanced by the "larger, clearer, and closer view of pathology" provided by fiberoptic magnification and the teaching side arm.¹⁴ In addition, patient discomfort during the procedure is said to be less than that with the rigid sigmoidoscope.^{19,20}

The UCLA Family Practice Residency Group acquired a 60-cm flexible sigmoidoscope in 1980. The diagnostic and teaching potential of this instrument became readily apparent after a brief period of use. It was felt that the addition of the flexible sigmoidoscope would increase physician compliance with accepted colorectal screening procedures. Baseline data have been acquired to examine whether the presence of gastrointestinal symptoms increases physician compliance.

Methods

The UCLA Family Practice Residency Group charts incorporate a problem-oriented medical record and a health maintenance inventory sheet. The health maintenance inventory sheet includes the patient's problem list, current medications, allergies, surgeries, and a place for entering the results of certain health maintenance procedures as stool guaiac testing, sigmoidoscopy, pneumococcal vaccine, tonometry, self-breast examination instruction, or rectal examination. This record system is described yearly to all incoming residents during a four-week orientation.^{13,21} All physicians are salaried, and patient care revenues are collected by UCLA.

Retrospective chart audits were completed at the end of the 1979, 1980, and 1981 academic years.

The patient's hospital identification number, sex, age, concomitant serious illnesses, and primary provider were recorded. The number of physician-patient encounters was recorded as an index of activity. The health maintenance inventory sheet was reviewed to determine if sigmoid-

oscopy, stool guaiac testing, and rectal examinations* were recorded. The chart was reviewed to determine if sigmoidoscopy, stool guaiac testing and rectal examinations were recorded in the progress notes.

A chart was excluded if the patient was younger than 18 years of age. Any chart audited for 1979 (N = 182) was excluded if there was less than one patient visit in the academic year 1979. Any chart audited for 1980 (N = 189) was excluded if there was less than one patient visit in the academic year 1980. Additionally, any chart was excluded from the 1980 audit if that chart was one of the 1979 charts audited. Charts audited for 1981 (N = 192) were taken only from those patients who were new to the practice in the academic year 1981. Two or more patient visits were present in 185 charts. Thus, all audited charts over the three periods were mutually exclusive.

Charts were selected from the files at random based on the previous criteria. Audits were performed by two allied health personnel trained by the senior author. The initial 20 records and every 10th record thereafter were audited by both auditors as well as the senior author. This served as a control for intraobserver agreement. Several interventions took place over the period of the audit:

Based upon the 1979 audit and its results, the faculty initiated the following steps beginning in academic year 1980:

1. Two didactic sessions on preventive medicine practices in ambulatory care settings were introduced into the family medicine core curriculum rotations for all residents.

2. Residents were asked to participate in chart audits at least once during the year.

3. Full-time faculty were prompted once by memorandum and by announcement at a faculty meeting to address preventive medicine issues as part of their clinical teaching duties.

At the beginning of the 1981 academic year (July 1980), the procedures listed for 1980 were continued, and the following additional interventions were introduced:

1. A one-hour teaching session of flexible sigmoidoscopy was presented at Family Practice Grand Rounds during the first month.

*Rectal examination data were not originally gathered in the 1979 and 1980 study groups. Random portions of these study groups were retrieved and re-audited to provide data for comparison.

2. Four full-time family practice faculty members trained in teaching flexible sigmoidoscopy were available at all times during clinic hours.

3. A 60-cm flexible sigmoidoscope with a standard teaching eye piece was made available in the model clinic.

The audit groups were compared for sex, average age, number of visits, and level of training of primary provider. Outcome results were compared for sigmoidoscopy and stool guaiac examination for patients older than 50 years of age, and compared for rectal examination for patients older than 40 years in each of the audit years. The total number of sigmoidoscopies billed in the Family Health Center was compared for the academic years 1980 and 1981 as a gross cross-check measure to insure that there was no selection bias.

A subset of high-risk patients was identified by noting the presence of age (40 years or older for rectal examination, 50 years or older for stool guaiac examination and sigmoidoscopy) in combination with two or more of the following: (1) abdominal pain, (2) gas, (3) constipation, (4) diarrhea, (5) change in bowels, (6) loss of weight, (7) pelvic pain, (8) appetite loss for longer than 1 week, (9) rectal bleeding (includes guaiac positive), (10) hemorrhoids, and (11) other miscellaneous gastrointestinal complaints. These risk factors were noted by review of the problem lists and all daily clinic notes.

All initial data analysis was performed utilizing the UCLA Department of Biostatistics' Statistical Package for Social Science version H computer program. Tests for statistical significance for proportional data were hand computed. Hand computation was necessary, since cell frequencies of zero caused a violation of the statistical assumption of normality for some of the data. In cases in which low cell frequency caused the pooled estimate for standard error to be nonnormally distributed, the nonzero proportion was used for the purposes of producing the estimate of error variance. This method of statistical analysis leads to conservative results.

Results

There were no significant age or sex differences in the 1979 and 1980 study groups. Level of provider training was similar in the 1979 and 1980 groups. The 1981 study group differed in that a

significant increase ($Z > 1.96$, $P = .05$) in the number of patients aged 50 years or older was noted in 1981 ($100/192 = 52.1$ percent) when contrasted with 1979 ($62/182 = 34.1$ percent). The 1980 ($82/189 = 43.4$ percent) group was not significantly different from the 1981 group. The average 1981 chart contains 4.6 visits as compared with 1979 (14.2 visits) and 1980 (12.1 visits) ($P < .05$ by Student's t test). First- and second-year residents' medical records formed 92.0 percent of the 1981 group, whereas they were 36.4 percent of 1979 and 28.8 percent of 1980 ($Z > 1.96$, $P < .05$).

These differences are explainable in that the 1981 group (as outlined in the methods section) is a group of patients new to the clinic after July 1980. These new patients made an average of greater than four visits to the clinic in their first year. New patients who are seen two or more times within a year are more likely to be older, and new patients are more often assigned to junior residents in this clinic system.

There was a favorable trend for increasing physician compliance in all three screening strategies in the 1981 study group. Twenty-one percent of patients in the 1981 group who were over 50 years of age received a sigmoidoscopy examination compared with 0.0 percent (0/82) and 1.6 percent (1/62) for the 1980 group and the 1979 group, respectively (Table 1).

Patients were identified as being in a high-risk group according to age and the presence of two or more gastrointestinal symptoms. The results for physician performance in the high-risk subgroup from 1981 are shown in Table 2. As would be expected, physicians were more inclined to perform the detection procedures of rectal examination, sigmoidoscopy, and stool guaiac testing in symptomatic individuals. However, many symptomatic individuals went without the benefit of these detection procedures. Twenty-three of 34 (67.7 percent) symptomatic patients aged 50 years or older did not have sigmoidoscopy performed, nor were the results of stool guaiac testing in their charts. This was a significant improvement over physician performance prior to introduction of the flexible sigmoidoscopy (Table 3).

Discussion

The data presented in this audit support the hypothesis that the introduction of the flexible

Table 1. Colorectal Cancer Detection Procedures

	1979 Total Chart* No. (%)	1980 Total Chart* No. (%)	1981 Total Chart No. (%)	Statistical Significance: 1980 vs 1981
Rectal examination noted at age 40 years or older	7/22 (31.8)	35/59 (59.3)	88/135 (65.2)	NS
Guaiac cards present at age 50 years or older	14/62 (22.6)	20/82 (24.4)	30/100 (30.0)	NS
Sigmoidoscopy performed at age 50 years or older	1/62 (0.6)	0/82 (0.0)	21/100 (21.0)	Z > 1.96 P < .05
Average of visits	14.2	12.1	4.6	

Note: Raw data cited; total chart column denotes procedure notation being found anywhere (including health maintenance inventory) in the entire medical record
*Figures are based on partial reaudit of 1979 and 1980 group

Table 2. Two or More Gastrointestinal Symptoms (1981) and Procedures Performed as Found in the Total Chart

	Symptoms Present No. (%)	Symptoms Not Present No. (%)	Significance
Aged ≥40 years			
Rectal examination done	28/34 (82.4)	60/100 (60.0)	Z > 1.96 P < .05
Aged ≥50 years			
Guaiac cards present	11/26 (42.3)	19/73 (26.0)	NS
Sigmoidoscopy performed	11/26 (42.3)	10/72 (13.9)	Z > 1.96 P < .05

Table 3. Before (1980) and After (1981) Flexible Sigmoidoscopy in Patients 50 Years or Older with Gastrointestinal Symptoms

	1980 No. (%)	1981 No. (%)	Significance
Guaiac cards present	8/23 (34.8)	11/26 (42.3)	NS
Sigmoidoscopy performed	1/23 (4.4)	11/26 (42.3)	Z > 1.96 P < .05

sigmoidoscope will have a major impact on the longstanding problem of physician noncompliance with proctosigmoidoscopy. Although some of the change noted may be attributed to a change in the medical record (eg, the health maintenance inventory sheet), the change in medical record format cannot be totally credited for the increased physi-

cian compliance because only 8 of the 27 examinations were for screening and 12 of the 27 sigmoidoscopies (44.4 percent) were not even recorded in the health maintenance inventory (but were found in the progress notes). The flexible sigmoidoscope appears to have been associated with an increased physician awareness and com-

pliance with rectal examinations and stool guaiac testing.

Generally, time in service and exposure to a training environment have been coupled with passage of a written examination to certify medical competence. Pinkerton's work has recently challenged this concept.^{22,23} The concept of performance-based residency training is an important one in terms of increasing physician compliance with preventive medicine practices. Thus, the authors have continued their longitudinal study of physician-trainee performance as noted in the medical record.

The physician provider population studied is statistically junior to the 1979 and 1980 group. Decreased training would be generally thought to correspond to decreased attainment of performance-rated objectives. That more preventive medicine practices were performed despite fewer visits and less training suggests increased effectiveness of the intervention strategy. The possibility of senior resident compliance decay will be studied in 1982 and 1983.

The diagnostic superiority of the flexible sigmoidoscope has been discussed elsewhere.¹⁴⁻²⁰ Carter's statement that increased time in training is required is representative of the literature to date.²⁴ Previous comment has been made on the advantages of (1) improved teaching of the procedure with the addition of a second student eyepiece, which makes simultaneous student-teacher viewing possible, (2) significantly increased patient tolerance allowing teaching to be done, and (3) improved mechanical design facilitating biopsy.¹⁸ More detailed data describing the initial 400 cases will follow, and there has been no patient morbidity to date.

The UCLA family practice faculty group is concerned that symptomatic, age-eligible patients still are not receiving appropriate evaluations. Clearly, more development of training methods with outcome assessments are needed to help define the most appropriate way to teach residents an approach to colorectal symptoms and screening. The introduction of the flexible sigmoidoscope is a partial solution for this problem of non-compliance. The second teaching eyepiece allows the resident and faculty to observe simultaneously. There is less patient and examiner discomfort compared with the rigid sigmoidoscopy. The diagnostic yields are approximately two to three times

greater. Improved mechanical design facilitates biopsy technique. Increased physician compliance now appears to be another advantage of flexible sigmoidoscopy. The flexible sigmoidoscope has made a significant contribution to patient care and resident education in this family practice residency program.

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