Patent Owner's Ex. 2012, Page 1
THE AMERICAN JOURNAL OF GASTROENTEROLOGY
Vol. 96, No. 10, 2001
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ISSN 0002-9270/01/$20.00
Published by Elsevier Science Inc.
PII S0002-9270(01)03240-3

Colorectal Cancer Screening Compliance by Medicine Residents: Perceived and Actual

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OBJECTIVE: Implementation of colorectal cancer (CRC) screening with widely available techniques can result in a significant reduction in CRC-related mortality. Clinical practice paradigms are often ingrained in physicians during residency. We, therefore, investigated both compliance and perceived obstacles to CRC screening in the practices of physicians-in-training.

METHODS: We conducted a retrospective analysis of medical records of patients who were receiving their primary care in the internal medicine resident clinics at the University of Nebraska Medical Center and were at average risk for CRC. In addition to demographics, data on the use of screening mammography, Pap smear, cholesterol, fecal occult blood testing (FOBT), and flexible sigmoidoscopy (FS) were collected. A questionnaire was also distributed to all internal medicine residents to assess their CRC screening knowledge and perceived screening compliance.

RESULTS: One hundred eight patient charts were reviewed. The percentage of patients appropriately screened for each test was as follows: mammography 66%, Pap smear 65%, cholesterol 53%, FOBT 13%, and FS 16%. Residents dramatically overestimated their perceived FS and FOBT screening rates, 78% and 88%, respectively. Most residents identified barriers to FS screening. Although rudimentary CRC screening knowledge appeared adequate, a number of knowledge-based deficiencies were identified.

CONCLUSIONS: Internal medicine residents at our institution demonstrate poor CRC screening compliance especially when compared with other health care maintenance interventions. This cannot be entirely accounted for by inadequate knowledge; discrepancy between the perceived and actual implementation of CRC screening may be important. Efforts to improve screening compliance should include a focus on physicians-in-training. (Am J Gastroenterol 2001; 96:3004–3008. © 2001 by Am. Coll. of Gastroenterology)

INTRODUCTION

Colorectal cancer (CRC) is the second leading cause of cancer mortality in the United States. Approximately 135,400 new cases of CRC and 56,700 CRC-related deaths are forecast in 2001 (1). When diagnosed at an early stage, colon cancer is almost invariably curable. Unfortunately, CRC is often asymptomatic until it has reached an advanced stage. Screening strategies have been designed to enable early diagnosis of colon cancer and prevention of this malignancy through removal of its precursor lesion, the adenomatous polyp (2). Flexible sigmoidoscopy (FS), fecal occult blood tests (FOBT), air-contrast barium enema, and colonoscopy have been recommended as acceptable screening techniques in a recent consensus statement; of these, only FS and FOBT are widely available, relatively inexpensive, and have been unequivocally demonstrated to reduce mortality (3).

Despite these screening strategies and the increased attention that preventive care has received in the public and medical communities, most colon cancers still present at relatively advanced stages. As clinical practice paradigms are often ingrained in physicians' during their training, we wished to assess whether screening strategies were being properly employed in the ambulatory care practice of our internal medicine residents. Assessment was made of the rate of compliance with CRC screening in comparison with other well-established preventive healthcare techniques. Finally, because little data exist on factors related to CRC screening (4), we wanted to identify potential obstacles to the implementation of CRC screening programs in this setting.

MATERIALS AND METHODS

Ambulatory Care Resident Education

The University of Nebraska Medical Center Internal Medicine residency program is a traditional, accredited 3-yr program consisting of both hospital and ambulatory-based training. The ambulatory care portion consists of two half-day clinics weekly throughout all 3 yr of training. Thirty-six medicine residents provide longitudinal care each year in these clinics. Formal lectures addressing preventive care cancer screening are interspersed throughout the academic year. Specifically, two lectures focus on colon cancer with an emphasis on screening in the average-risk patient. Furthermore, all residents rotate, at least once, on the gastroenterology inpatient consult service where didactic and practical instruction is given on FOBT and FS. Residents

Table 1. CRC Screening According to Gender and Race

	Total Offered		Performed		Refused	
	FS (%)	FOBT (%)	FS (%)	FOBT (%)	FS (%)	FOBT (%)
Total (n = 108)	21 (19)	28 (26)	17 (16)	14 (13)	4 (4)	14 (13)
Gender						
Male (n = 36)	10 (28)	10 (28)	8 (22)	5 (14)	2 (6)	5 (14)
Female (n = 72)	11 (15)	18 (25)	9 (13)	9 (13)	2 (3)	9 (13)
Race						
White (n = 67)	18 (27)	20 (30)	13 (19)	10 (15)	5 (7)	10 (15)
Black (n = 41)	3 (7)*	8 (20)	3 (7)	4 (10)	0 (0)	4 (10)

* $p = 0.01$.

perform screening video FS in a dedicated procedure room located in the outpatient clinic facility. All procedures are performed under the supervision of general internal medicine attending physicians.

Study Population

A retrospective chart review of patients who received their care in the internal medicine resident clinics at the University of Nebraska Medical Center over a consecutive 4-wk period was performed. Patients considered appropriate candidates for CRC screening included those aged >50 yr at average risk for developing CRC and who had been followed by an internal medicine resident over a period of at least 6 months duration during which they had a minimum of two clinic visits. Exclusion criteria included patients who were at increased risk to develop CRC (family or personal history of adenomatous polyps, CRC, or polyposis syndromes), ongoing GI complaints necessitating colonic evaluation, severe comorbid illness for which screening was believed to be inappropriate, a previous lower GI evaluation by colonoscopy or barium enema in the preceding 3 yr, medical care provided directly by an attending physician, and patients who were only evaluated on a single occasion for a specific problem. The study was approved by the Institutional Review Board of the University of Nebraska Medical Center.

Data Collection

Two hundred consecutive medical records of patients seen in internal medicine residents clinics were screened by two investigators (D.L.Z. and J.K.D.), using a standardized form. Those charts that met the eligibility criteria were reviewed in further detail. Data recorded included patient demographics and details regarding performance of FOBT, FS, and other well-accepted preventive health care techniques (mammography, breast exam, pelvic exam, Pap smear, cholesterol testing, and rectal exam). An acceptable screening interval for each test was defined as follows: mammography, breast exam, cholesterol, and FOBT performed on a yearly basis; pelvic exam and pap smear performed every 3 yr; and sigmoidoscopy performed every 5 yr. Screening methods were considered offered and/or completed if there was documentation in the medical record.

Questionnaire

After pilot testing, a questionnaire, comprised of 25 questions, was distributed to all internal medicine residents. The survey was designed to assess: 1) habits regarding preventive care screening; 2) CRC screening knowledge; 3) perceived CRC screening compliance; 4) specific barriers to performing FS including difficulty scheduling/staffing procedures, technical problems with the equipment, residents uncomfortable performing the procedure and residents' perception of patients' reluctance to undergo the procedure, and/or the bowel preparation required before the procedure; and 5) personal attitudes toward performing FS.

Statistical Analysis

Data were analyzed using the SAS statistical program (SAS Institute, Cary, NC). The Fisher's exact test and χ^2 test were used to compare the proportion of patients receiving colon cancer screening with screening for other diseases. Student's t test was used to compare age between screening groups. Analysis of variance was used to compare age for the FOBT. Statistical significance was defined as $p < 0.05$. Analysis of the questionnaire was determined by calculations of the percentage of correct answer.

RESULTS

One hundred eight patients were considered appropriate for detailed chart review. The study population consisted of 36 men with a mean age of 60.3 yr (range = 51–77 yr) and 72 women with a mean age of 62.2 yr (range = 50–80 yr). Sixty-seven (62%) of the patients were white, and 41 (38%) were black. The residents performed FOBT in 13% of the patients and FS in only 16%. Table 1 depicts patient characteristics in terms of gender and race. No differences in CRC screening were present between men and women. Although whites were offered FS more often than blacks, no differences were identified in the actual performance rate. In contrast to CRC screening, the same residents appropriately performed mammography in 66%, cholesterol testing in

Table 2. Perceived and Actual Screening Rates by Medicine Residents

	Perceived Offered (%)	Actually Performed (%)	*p*
Mammography	100	66	ns
Cholesterol	100	53	ns
Pap smear	100	65	ns
FOBT	88	13	<0.05
Sigmoidoscopy	78	16	<0.05

53%, and Pap smear in 65% of patients. Table 2 demonstrates the residents perceived rate of offering various preventive care services compared with the actual rates of those services being performed.

Nineteen of 36 (53%) questionnaires were returned after a single mailing with the following breakdown by postgraduate year (PGY): four PGY-1, nine PGY-2, and six PGY-3. According to the report, residents believed they offered screening FS and FOBT to their patients most of the time; however, only 26% of the residents believed their patients were actually completing FS greater than half of the time. When asked to identify barriers to CRC screening using FS, 16 (84%) of the residents responding to the survey listed difficulty scheduling the procedure as the dominant barrier despite having a dedicated FS room and equipment available (Fig. 1).

All of the responding residents correctly identified both the age at which CRC screening should begin in an average-risk patient and the recommended interval between successive FOBT and FS screening after a negative initial exam. In contrast, only 50% correctly identified the appropriate means of follow-up for a positive FOBT, and 60% were unaware that the number of positive guaiac cards is irrelevant when deciding on the appropriate next step in management.

DISCUSSION

We demonstrate that the rate of CRC screening with FOBT and FS by our internal medicine residents was remarkably poor. Indeed, our data indicate that most of the patients in our analysis received inadequate CRC screening. This is particularly alarming as these simple and inexpensive tests have been unequivocally demonstrated to reduce mortality. For instance, Mandel *et al.* demonstrated a 33% decrease in mortality with yearly FOBT, whereas Selby *et al.* showed a 60% reduction in deaths from cancers in the surveyed bowel with sigmoidoscopy (2, 5). Moreover, a more recent report by Mandel *et al.* suggests that FOBT can actually decrease the incidence of cancers, presumably through detection and removal of premalignant lesions (6). Unfortunately, the dismal screening rate found in this study is consistent with the national average. During 1973–1997, Ries *et al.* reported that only 30.6% of adults aged >50 yr had undergone a sigmoidoscopy/proctoscopy in the preceding 5 yr (7). Furthermore, the FOBT rate found by Ries *et al.* (7) was 15% in 1987 and, despite vigorous patient education campaigns, only improved to 18% by 1998.

Data similar to ours have been reported in other internal medicine residency programs. Borum recently showed that only 29% and 13% of traditional 3-yr internal medicine residents at her program appropriately used screening FOBT and FS, respectively (8). In contrast, residents in a primary care track program performed CRC screening at a considerably higher rate with FS and FOBT performance rates of 71% and 81%, respectively. This indicates that we may be able to achieve substantially higher screening by modifying physician training. Although issues of patient reluctance to undergo procedures performed by physicians-in-training have been offered to explain poorer screening rates, recent data suggest that patient satisfaction is comparable when FS is perfomed by residents or staff physicians (9).

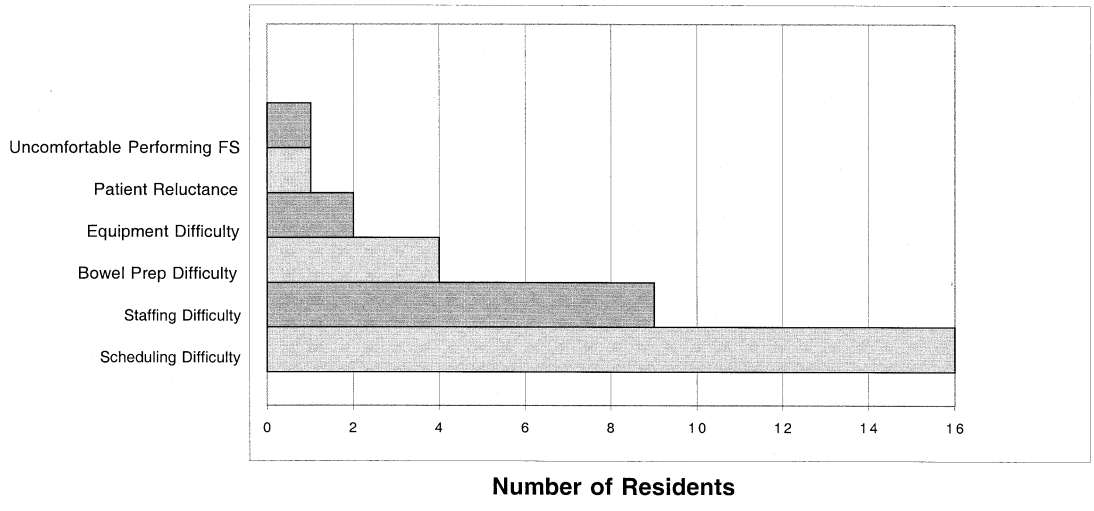

Figure 1. Resident perception of barriers to performing screening FS.

Our data suggest a difference in the rate of CRC screening offered to blacks compared with whites. Racial bias in screening may, possibly, be at least one of the reasons that blacks have more advanced CRC at diagnosis than whites and, hence, a poorer prognosis (10). Although it is difficult to assess the significance of this finding, given our relatively small patient population, similar results have been described with regards to cardiovascular screening in blacks (11). Indeed, given the higher incidence of colon cancer among blacks, it has been demonstrated that CRC screening is most cost-effective in the black population (12). Further studies are needed to clarify this issue.

The low level of FS and FOBT implementation in this study is in dramatic contrast to the adequate use of other health care maintenance strategies, such as mammography, cholesterol testing, and Pap smears. The clinical/public health consequences of the discrepancy between colon cancer screening and other screening practices is underscored by recent data, which suggest that CRC screening is slightly more cost-effective than a variety of other health care interventions including pneumococcal vaccinations and treatment of hypertension, whereas it is markedly more cost-effective than breast cancer screening (13). Indeed, a recent analysis indicates that the costs incurred by FS will be offset by the savings from early diagnosis and prevention of CRC (14).

The reason for the discordance between CRC screening and other health care maintenance practices reported in this study remains unclear. Previous reports on cancer screening practices among resident physicians have suggested that both physician and patient factors may be important. Myers *et al.* recently reported that there was substantial variability in physician intention to recommend colon cancer screening based on the physicians' perception of CRC screening effectiveness, board certification, and length of time in practice (15). Although our residents appeared to have a solid grasp of screening indications and strategies, fewer than half were able to appropriately manage a positive FOBT. This is consistent with results from a recent survey of primary care physicians in which only one-half of practitioners answered questions correctly regarding the evaluation of a heme-positive stool (16). Moreover, a survey of CRC screening knowledge in 168 internal medicine residents at four institutions demonstrated remarkably similar results, with only 29% recommending colonoscopy to evaluate a positive FOBT (17). Findings from our study suggest that at least part of the problem with poor screening rates appears to be a misperception by the residents of their colon cancer screening implementation. This may reflect both patient and physician reluctance to aggressively deal with colon cancer because of social norms reflecting distaste for CRC.

There are several caveats to the interpretation of these data. First, chart reviews have intrinsic weaknesses including their retrospective nature and their reliance upon information being appropriately documented. Nevertheless, Montano and Phillips recently demonstrated that, in cancer screening, the correlation between chart audits and patient surveys was very high (18). This methodology is also supported by a report from Luck *et al.* in which an assessment of quality of care was determined through chart review of encounters with standardized patients (19). They demonstrated that scores from chart review underestimated actual quality of care by only 14%, thus suggesting that the magnitude of the differences found in our study would not be adequately explained solely by these methodological differences alone (19). Secondly, the size of our patient population was modest and, despite a concerted effort, the internal medicine resident survey response rate was only 53%. This poor rate is, however, comparable with that seen in most physician surveys. Finally, our exclusion of patients having undergone full colonic evaluation within the last 3 yr only is more conservative than the screening guidelines currently recommended (*i.e.*, barium enema every 5 yr or colonoscopy every 10 yr); however, none of our 108 patients had previously undergone either study.

Despite these limitations, our data suggest that physicians have an important role in the underuse of colon cancer screening. With regard to physicians, it is particularly disturbing that residents, despite lectures on CRC and preventive medicine, had a screening rate comparable with the national average. It can be speculated that if these clinical habits are not ingrained during a residency program, they are even less likely to be nurtured in a busy primary care practice. Potential ways to improve physician implementation might include enhancing education on colon cancer and its prevention as well as offering structured FS instruction. Improved teaching aides, such as a virtual reality FS simulator, may also be helpful (20). The importance of having confidence in the performance of the procedure is underscored by the finding of Lewis *et al.*, who determined that the main reason that half of primary care physicians, who were trained in FS, did not perform this examination was self-perceived technical inadequacy (21). Finally, targeting differences in the perceived *versus* actual frequency of CRC implementation is also possible. Data from our institution suggest that an automated computer-based reminder system improves CRC cancer screening and other facets of health care maintenance (22).

In summary, in this audit of internal medicine resident practices, we have demonstrated that implementation of CRC screening guidelines was poor, especially when compared with other health care maintenance techniques. Factors that may account for this poor compliance include deficiencies in certain elements of CRC screening knowledge and differences between actual and perceived rates of CRC screening. Our study suggests that, in addition to increasing public awareness, an aggressive focus on physicians-in-training is important. This should include both didactic practical instruction and also feedback on CRC screening implementation. Further studies are necessary to determine how to optimize CRC screening compliance.

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Received Dec. 26, 2000; accepted June 5, 2001.

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