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SURGICAL ENDOSCOPY
and Other Interventional Techniques

Screening colonoscopy in the asymptomatic 50- to 59-year-old population

A. Mehran,[1,4] P. Jaffe,[1] J. Efron,[3,5] A. Vernavay,[2] A. Liberman[1]

[1] Department of Surgery, Cleveland Clinic Florida, 6101 Pine Ridge Road, Naples, FL 34119, USA
[2] Division of Gastroenterology, Cleveland Clinic Florida, 6101 Pine Ridge Road, Naples, FL 34119, USA
[3] Department of Colorectal Surgery, Cleveland Clinic Florida, 6101 Pine Ridge Road, Naples, FL 34119, USA
[4] Department of Surgery, University of California, Los Angeles, 10833 Le Conte Avenue, Los Angeles, CA 90095, USA
[5] Division of Gastroenterology, University of Connecticut Health Center, 263 Farmington Avenue, Farmington, CT 06030, USA

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Abstract
Background: In an effort to decrease the death rate from colorectal cancer, a multitude of medical societies and task forces recommend routine screening for colorectal cancer beginning at age 50. Yet, there is no consensus as to the best and most cost-effective screening method. Medicare now pays for screening colonoscopies for its average risk beneficiaries [3]. Many insurance companies, however, will not cover this test in younger patients. We therefore reviewed our institution's colonoscopy experience with asymptomatic 50- to 59-year-olds, with negative fecal occult blood tests and negative family histories.
Methods: Between January 1999 and January 2002, 4779 colonoscopies were performed at our institution. The charts for 619 persons 50–59 years of age were retrospectively reviewed, with 91 patients meeting the strict requirements of this study. We defined polyps with high-grade neoplasias as those with villous or tubulovillous components, and cancerous lesions included those with carcinoma in situ. The distal colon was defined as the rectum and sigmoid colon.
Results: There was a 58% incidence of neoplastic polyps in this younger asymptomatic population. More than 4% of our subjects had high-grade neoplasias or cancerous lesions. In the absence of any distal findings, flexible sigmoidoscopy would have missed up to 38% of these polyps.
Conclusions: The findings generally support the recommendations by the American College of Gastroenterology for average-risk patients to preferentially undergo a screening colonoscopy at age 50 in lieu of other methods.

Key words: Mass screening — Colonoscopy — Colorectal neoplasms — Cancer — Age groups

Colorectal cancer is the second most common cancer in the United States. More than 135,000 new cases are diagnosed every year, with 56,000 deaths. The lifetime risk of developing colorectal cancer is 6%, with 60% of patients having nodal involvement or distal disease at the time of diagnosis or surgery. The annual cost to the economy for its treatment is around $6 billion [4, 10, 21].

It is estimated that 30% of the population have colonic polyps, with 5–10% of persons over age 50 harboring advanced colonic neoplasias [1, 16]. Early detection leads to a higher cure rate, and up to 90% of deaths can be prevented by the timely removal of the precancerous polyps [1, 19]. A multitude of medical societies and task forces recommend routine screening for colorectal cancer, starting at age 50, for average-risk persons. However, the compliance rate is still less than 30%, compared to 70–80% for screening mammograms or Pap smears [15]. There is no consensus as to the best and most cost-effective screening method. Recommendations vary between annual fecal occult blood tests (FOBT), sigmoidoscopy, barium enemas, colonoscopy, or a combination of any of the above at various time intervals.

Medicare now pays for screening colonoscopies for its average-risk beneficiaries. However, fewer than 5% of insurance companies cover the costs of a screening colonoscopy [20]. Legislation mandating private insurance coverage for screening colonoscopy is currently pending in a few states, and there are regional differences in private coverage. For most average-risk individuals under 65 years of age, however, this remains a large out-of-pocket expense [14]. This is in spite of several recent papers discussing colonoscopy's advantages over other

Correspondence to: A. Liberman

screening modalities [4, 6, 7, 12]. Some of these studies, however, included all patients regardless of age, symptoms, family history, etc. We therefore analyzed our institution's experience with asymptomatic 50- to 59-year-olds, with negative fecal occult blood tests and family histories, who underwent a screening colonoscopy over a 3-year span. Our goal was to evaluate the prevalence and pathology of colorectal neoplasms in this specific population.

Methods

In the period between January 1999 and January 2002, approximately 4779 colonoscopies were performed at the Cleveland Clinic Hospital Florida, Naples. Attending physicians of the Gastroenterology, Colorectal, and General Surgery services either performed or supervised all procedures. Approval from our institution's IRB committee was obtained and a retrospective review was conducted of the database created by Pentax Endopro software (Pentax Corporation, Orangeburg, NY, USA). Of patients who underwent colonoscopy, 619 were between the ages of 50 and 59. Their charts were thoroughly reviewed for exclusion criteria (Table 1). Of these patients, 91 met the requirements and were included in the study. Our institution's Pathology Department had examined all biopsy/polypectomy specimens. Advanced lesions were defined as those with high-grade neoplasia (villous or tubulovillous) or malignancy (including carcinoma in situ). The distal colon was defined as the rectum and sigmoid colon.

Results

Ninety one patients, 45 men and 46 women, met the required criteria. Only six subjects had a normal colonoscopy. Of the patients, 53 (58%) had neoplastic polyps, two (2.2%) had high-grade neoplasias, and two (2.2%) harbored a malignancy. The rest had hyperplastic polyps. A total of 114 polyps were detected: 46 hyperplastic, 64 adenomatous, and four with more advanced histology. Both cancerous lesions were located in the rectum, and the two high-grade neoplastic lesions were found hi the hepatic flexure and the rectum (Tables 2 and 3).

Discussion

The role of colonoscopy as a tool for colorectal cancer screening has been examined in several recent papers [1, 6, 8, 12, 16, 19, 22, 23]. However, many included symptomatic or high-risk subjects across a wide age range. In Lieberman et al.'s large series of 3121 colonoscopies, 5.7% of the 50- to 59-year-olds had advanced disease. Furthermore, data from the National Polyp Study [13] revealed a 6.7% incidence of high-grade dysplastic polyps in this particular age group. These two studies, however, included symptomatic patients. Most recently, Imperiale et al. reported a 4.1% incidence of advanced neoplasias in 1533 asymptomatic 50- to 59-year-old persons. However, the subjects' FOBT and family history status were not indicated [7]. And finally, Rex et al. had reported a 13.3% and 5.8% incidence of neoplastic and advanced lesions, respectively, in 241 asymptomatic patients in their fifties [17]. We specifically looked at asymptomatic 50- to 59-year-olds with no family history of colorectal cancer or positive fecal occult blood tests. In our group of 91 such patients, 58% had neoplastic polyps and 4.4% had high-grade or cancerous lesions. The relatively small sample size and retrospective design of this study may account for the relatively large percentage of neoplastic polyps discovered. A larger number of patients meeting these selection criteria are needed to accurately assess the true prevalence of neoplastic and advanced lesions in this group.

Table 1. Exclusion criteria

Positive fecal occult blood test (FOBT)
Prior history of polyps or colon cancer
Family history of FAP or HNPCC
Family history of colon cancer
History of melena or hematochezia
History of positive fecal occult blood test (single or 3-card test)
History of inflammatory bowel disease
History of "irritable bowel syndrome"
Unexplained major change in bowel habits
Unintentional weight loss
Anemia workup
Abdominal pain not related to GERD or biliary tract
Incomplete documentation (? reasons for testing, missing endoscopy reports, etc.)

FAP, familial polyposis coli; GERD, gastroesophageal reflux disease; HNPCC, hereditary non-polyposis colorectal cancer

Various other screening methods for colorectal cancer have been advocated but have inherent limitations. Fecal occult blood test alone is an unreliable screening method with high false positive/negative and low compliance rates [11, 15, 17, 18]. The combination of sigmoidoscopy and FOBT, too, is only 75% sensitive in detecting neoplastic lesions, assuming a subsequent colonoscopy is performed to follow up on distal polyps seen on sigmoidoscopy [8, 11, 12, 15]. Approximately 60% of the polyps removed in our study were neoplastic. As shown in Table 4, in the absence of any distal findings, flexible sigmoidoscopy would have missed 38% of the neoplastic and 25% of the more advanced lesions (1.1% of the patients). These results were comparable to the missed rates reported in previous studies: 19–50% for all proximal lesions and 1.5–3.7% for the advanced ones [6, 8, 11, 12].

As with any other retrospective review, our study is limited by the accuracy of information documented during routine practice, as well as the lack of detailed information regarding size and histology for all neoplastic lesions. The relatively small number of patients meeting the strict entry criteria also prevents us from making statistically valid conclusions regarding the precise value of colonoscopy compared to conventional screening methods. In addition, we could not assess the prevalence of confounding factors such as dietary fiber, calcium, and red meat intake or the proportion taking nonsteroidal antiinflammatory drugs. However, the finding of four advanced colorectal lesions and a large number of adenomatous polyps in this relatively young, average-risk group highlights the importance of colonoscopic screening at an early age. This study was not designed to assess the cost-efficacy of screening colonoscopy in this group or its value in prolonging survival.

Table 2. Characteristics of patients with advanced colonoscopic findings

Sex	Age	Family history	FOBT	Location	Neoplasm	Other findings
Male	53	Negative	Negative	Rectum	Carcinoma in situ	Tubular adenoma in descending colon
Female	56	Negative	Negative	Rectum	Villous adenoma	None
Female	58	Negative	Negative	Hepatic flex	Tubulovillous adenoma	None
Female	57	Negative	Unknown	Rectum	Adenocarcinoma	None

FOBT, fecal occult blood test

Table 3. Location of all nonhyperplastic polyps

	No.
Rectum	9
Sigmoid colon rectosigmoid junction	22
Descending colon and splenic flexure	11
Transverse colon	6
Right colon and hepatic flexure	20

Table 4. Proximal findings in the absence of any distal lesions

No. of neoplastic lesions	% of all neoplastic lesions	No. of adv. lesions (%)	% of adv. lesions
25	38	1	25

Our data do, however, support the recommendations by the American College of Gastroenterology for average-risk individuals to preferentially undergo a screening colonoscopy at age 50 in lieu of other methods [2].

An argument can be made that the discovery of small adenomas in patients in their 50s is clinically insignificant if they undergo a screening colonoscopy in the subsequent decade. However, it is estimated that around 5% of tubular adenomas will progress to a malignancy, and there is no way to clearly identify all high-risk polyps or predict the precise time course for progression [18]. In fact, some of the diminutive polyps removed in our study were subsequently found to be adenomatous, emphasizing the need to remove them all regardless of size [9, 22]. A large, long-term, prospective randomized trial including a group with diminutive polyps that are not removed but followed over time would be needed to definitively answer this question. It is likely that such a study will never occur because of technical and ethical concerns [23].

It is known that screening the general population is an effective way to decrease the death rate from colorectal cancer. The compliance rate, however, remains low, and there is no consensus among the various medical societies/task forces as to the best and most cost-effective screening method. Recently, more attention has been paid to this issue, by the media (the ''Katie Couric'' effect) as well as by the government (March is the National Colorectal Cancer Awareness Month). It will invariably lead to a larger demand for screening by colonoscopy in the future. Its impact on the health-care economy is unknown, and various recommendations have been made in anticipation of this need [16, 21]. Meanwhile, the more informed patients and referring physicians will continue to request colonoscopy as the primary screening method for colorectal cancer.

In summary, we found a 58% incidence of neoplastic polyps in this younger asymptomatic average-risk population who underwent screening colonoscopy. More than 4% of our subjects had high-grade neoplasias or cancerous lesions. In the absence of any distal findings, flexible sigmoidoscopy would have missed at least 38% of the neoplastic and 25% of the more advanced lesions.

References

1. American College of Gastroenterology. Now Medicare covers a test that could save your life. Patient education brochure. American College of Gastroenterology, Arlington, VA
2. American College of Gastroenterology, Recommendations Brochure. www.acg.gi.org
3. Florida Medicare Part A: Local Medical Review Policy, www.floridamedicare.com and http://www.medicare.gov/health/awareness.asp
4. Gannon CJ, Malone DL, Royal SE, Schreiber M, Bass BL, Napolitano LM (2002) Advanced proximal colon cancer: paucity of distal lesions validates screening colonoscopy. Surg Endosc 16: 447–449
5. Hammer K, Hammer J, Oesterreicher C, Potzi R (2001) Advanced distal colonic lesions as predictors of advanced lesions in the proximal colon [abstract]. Gastrointes Endosc 53: 397–398
6. Imperiale TF, Wagner DR, Lin CY, Larkin GN, Rogge JD, Ransohoff DF (2000) Risk of advanced proximal neoplasms in asymptomatic adults according to distal colorectal findings. N Engl J Med 343: 169–174
7. Imperiale TF, Wagner DR, Lin CY, Larkin GN, Rogge JD, Ransohoff DF (2002) Results of screening colonoscopy among persons 40 to 49 years of age. N Engl J Med 346: 1781–1785
8. Kadakia SC, Wrobleski CS, Kadakia AS, Meier NJ (1996) Prevalence of proximal colonic polyps in average risk asymptomatic patients with negative fobt and flexible sigmoidoscopy. Gastrointest Endosc 44: 112–117
9. Khan A, Shrier I, Gordon PH (2002) The changed histologic paradigm of colorectal polyps. Surg Endosc 16: 436–440
10. Lieberman DA (2002) Screening for colorectal cancer. Clin Cornerstone 4: 1–10
11. Lieberman DA, Weiss DG (2001) One-time screening for colorectal cancer with combined fecal occult-blood testing and examination of the distal colon. N Engl J Med 345: 555–560
12. Lieberman DA, Weiss DG, Bond JH, Ahnen DJ, Garewal H, Chefjec G (2000) Use of colonoscopy to screen asymptomatic adults For colorectal cancer. N Engl J Med 343: 162–168
13. O'Brien MJ, Winawer SJ, Zuaber AG, Diaz B, Dickersin GR, Ewing S, Geller S, Kasimian D, Komorowski R, Szporn A, The National Polyp Study Work Group (1990) National Polyp Study: patient and polyp characteristics associated with high-grade dysplasia in colorectal adenomas. Gastroenterology 98: 371–379
14. Pignone M, Saha S, Hoerger T, Mandelblatt J (1999) Patient preferences for colon cancer screening. J Gen Intern Med 14: 432–437
15. Ransohoff DF, Sandier RS (2002) Screening for colorectal cancer. N Engl J Med 346: 40–44
16. Rex DK, Lieberman DA (2001) Feasibility of colonoscopy screening: discussion of issues and recommendations regarding implementation. Gastrointest Endosc 54: 662–667

17. Rex D, Lehman GA, Ulbright TM, Smith JJ, Pound DC, Hawes RH, Helper DJ, Wiersema MJ, Langefeld CD, Li W (1993) CoIonic neoplasia in asymptomatic persons with negative FOB: influence of age, gender, and family history. Am Gastroenterol 88: 825–831
18. Schulick R, Guillem JG, Wu JS, Fazio VW (2001) Neoplastic colorectal conditions. In: Carson J, Williamson R (Eds.) Surgery Mosby Publishers, Canada
19. Thiis-Evensen E, Hoff GS, Sauar J, Langmark F, Mjak BM, Vatn MH (1999) Population based surveillance by colonoscopy: effect on the incidence of colorectal cancer. Telemark Polyp Study 1. Scand J Gastroenterol 34: 414–420
20. Wild D (2002) Insurers may cover costs of regular colon cancer screening. Gen Surg News 29: 6
21. Winawer SJ (2001) A quarter century of colorectal cancer screening: progress and prospects. J Clin Oncol 19: 6s–12s
22. Winawer SJ, Zauber AG, O'Brien MJ, Gottlieb LS, Sternberg SS, Stewart ET, Bond JH, Schapiro M, Panish JF, Waye JD, Kurtz RC, Shike M, Ho MN, The National Polyp Study Group (1992) The National Polyp Study: design, methods, and characteristics of patients with newly diagnosed polyps. Cancer (supplement) 70: 1236–1245
23. Winawer SJ, Zauber AG, Ho MN, O'Brien MJ, Gottlieb LS, Sternberg SS, Waye JD, Stewart ET, Bond JH, Schapiro M, Panish JF, Kurtz RC, Ackroyd F, Shike M, Kurtz R, Hornsby-Lewis L, Gerdes H, Stewart ET, The National Polyp Study Group (1993) Prevention of colorectal cancer by colonoscopic polypectomy. N Engl J Med 329: 1977–1981