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Colonoscopy vs Sigmoidoscopy Screening
Getting It Right

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The world of cancer screening has been rocked recently by controversy. Long-standing recommendations on screening for breast, cervical, and prostate cancer have all been questioned based on either new data or reanalyses of older data. A similar controversy is also emerging for colorectal cancer screening.

In the 1980s, sigmoidoscopy screening was common despite lack of evidence for its efficacy. In ensuing decades, case-control studies established that sigmoidoscopy was associated with reduced incidence and mortality from left-sided but not right-sided colon malignancies.1,2 The results of a randomized trial of sigmoidoscopy screening reported by Atkin et al3 established the efficacy of sigmoidoscopy in reducing mortality due to colorectal cancer. As in the case-control studies, the randomized trial found that this effect was limited to the distal colon.

In the mid to late 1980s, colonoscopy was still relatively new and primarily was used for evaluation of gastrointestinal symptoms or for screening in high-risk patients, such as those with strong family histories of colon cancer. Sigmoidoscopy was widespread and apparently efficacious; out of this environment emerged the opinion, first articulated in 1988, that colonoscopy should also be considered as a potential tool for screening average-risk adults for colorectal cancer.4 This was eventually incorporated into screening guidelines, and reimbursement was initiated by Medicare in 2001. Even though colonoscopy and sigmoidoscopy are equally acceptable options in guidelines from the US Preventive Services Task Force and the US Multisociety Task Force, colonoscopy was granted preferred status in guidelines published by the American College of Gastroenterology.5 A recent colon screening program by the New York City Department of Health highlighted these changes by encouraging colonoscopy screening to the exclusion of other modes and has been successful in stimulating such screening. In contrast, sigmoidoscopy screening has declined in the United States such that it is difficult to obtain in many urban areas today, and lower reimbursement has accelerated its obsolescence.

Even though colonoscopy has achieved a predominant role in colon cancer screening, the logic and justification for its use remains largely theoretical based on its extended range within the colorectum and consequent increased yield in the detection of adenomatous polyps. Despite the increased adverse effect profile of colonoscopy, including higher perforation rate, need for sedation, time and bother commitment of the patient (who must adhere to an arduous bowel preparation and miss a day of work), and increased cost, the presumed mortality benefit of colonoscopy has been used as a justification to outweigh these negatives.

Thus, it is disconcerting to recognize that even today limited evidence demonstrates reduced mortality for those who undergo colonoscopy vs sigmoidoscopy. In a case-control study from Canada,6 colonoscopy was associated with a reduction in colorectal cancer mortality (odds ratio [OR], 0.63; 95% confidence interval [CI], 0.57-0.69), but this reduction was limited to left-sided cancers (OR, 0.33; 95% CI, 0.28-0.39) with no reduction in right-sided cancers (OR, 0.99; 95% CI, 0.86-1.14). In 2 subsequent observational studies, the association between colonoscopy and reduced colorectal cancer risk was limited to the distal colon.7,8 Instead of meeting its expectations, colonoscopy has not yet proven to be more effective than sigmoidoscopy (TABLE).

A third approved screening mode for colorectal cancer is the fecal occult blood test (FOBT), which has had efficacy proven in randomized trials.3 In trials reporting site-specific mortality, less than 5% of patients had a positive FOBT result and underwent diagnostic colonoscopy, and mortality benefits were similar for right- and left-sided colon lesions.10 Whether sigmoidoscopy plus FOBT is a superior screening strategy vs sigmoidoscopy alone remains a question.

There has been considerable speculation as to the reason(s) for the apparent lack of efficacy of colonoscopy on right-sided colon neoplasia. Explanations include molecular aberrations associated with more aggressive tumorigenesis, difficulty of achieving adequate bowel preparation in the proximal colon, preponderance of flat (and difficult-to-identify) lesions in the proximal colon, and technical difficulty of reaching the cecum. Such concern may be particularly salient in the context of recent studies, in which a significant proportion of colonoscopies were performed by nongastroenterologists.

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From a public health and policy perspective, these apparent limitations of colonoscopy can no longer be ignored. The accumulating evidence has not established the long-held belief that colonoscopy carries greater benefits than sigmoidoscopy.

How should the medical establishment advise the public given this conflict between widespread belief and current evidence? Waiting for the results of a randomized trial of screening colonoscopy is not practical; 2 such trials are ongoing, but the results will not be available until 2021 and 2026 (http://www.clinicaltrials.gov; identifiers NCT00906997 and NCT00883792, respectively). In the absence of these data, 2 initial approaches are in order. First, the promise of colonoscopy should not be overstated. Patients undergoing colonoscopy should be advised that it is not perfect; a relative risk reduction of 50% to 60% is consistent with observational data. Second, in the absence of convincing data demonstrating the superiority of sigmoidoscopy, colonoscopy should not be relegated to a nonpreferred tier, as was done in the American College of Gastroenterology guidelines.3

Colonoscopy, similar to other screening tests, came into widespread use based on a common sense appeal to clinicians regarding its potential efficacy. Much of medicine operates in a similar absence of definitive evidence, and this is not unreasonable. However, as evidence subsequently accumulates, physicians must be prepared to reevaluate even a long-standing clinical practice. If de novo decisions were being made today about whether to initiate colonoscopy as a screening tool in place of sigmoidoscopy for average-risk individuals, in light of the available evidence (Table) doing so would probably be inappropriate. However, because colonoscopy is well established with a high acceptance rate among both clinicians and patients, the level of evidence necessary to modify an existing standard-of-care practice is higher.

It is crucial to explore further the potential benefits and limitations of colonoscopy and to develop methods to improve its efficacy in the proximal colon. Nonetheless, if further evidence supports a lack of efficacy of colonoscopy for reducing incidence and mortality for right-sided colorectal cancer, the medical community should be prepared to consider returning to sigmoidoscopy for endoscopic screening of average-risk individuals.

### REFERENCES