ENDOSCOPY AROUND THE WORLD

ABSTRACTS

Cost-effectiveness of colonoscopy in screening for colorectal cancer

SONNENBERG A, DELCO F, INADOMI JM
Ann Intern Med 2000;133:573-84.
Country of Origin: *United States*

Cost-effectiveness of screening colorectal cancer in the general population

FRAZIER AL, COLDITZ GA, FUCHS CS, KUNTZ KM
JAMA 2000;284:1954-61.
Country of Origin: *United States*

By using a computer model of a Markov process, Sonnenberg et al. analyzed the lifetime costs of colon screening in persons age 50 years and older. The Markov model simulates the evolution from normal colon to adenoma to cancer over time and superimposes the impact of a screening intervention, which could allow for detection and removal of polyps and/or early detection of colorectal cancer. They compared annual fecal occult blood test (FOBT), flexible sigmoidoscopy every 5 years, and colonoscopy every 10 years. They recognized several levels of compliance in the model: (1) compliance with initial test; (2) compliance with repeat testing if initial test is negative; and (3) compliance with evaluation of positive screening test. The baseline analysis assumes 100% compliance at each level, and this is varied in the sensitivity analysis. The findings are reported as incremental cost-effectiveness ratio. This ratio compares the relative cost-effectiveness of different interventions and the additional cost incurred to gain an additional unit of benefit (i.e., mortality reduction). Colonoscopy dominates over FOBT and sigmoidoscopy in this model under most assumptions. A key assumption is that colonoscopy every 10 years could reduce colorectal carcinoma (CRC) incidence by as much as 75%, thus reducing the burden of cancer care.

Frazier et al. perform a similar analysis with hypothetical subjects who begin screening at age 50 and continue for 35 years or until death. Findings are reported as an incremental cost-effectiveness ratio. The model compared 22 strategies, finding that annual rehydrated FOBT plus flexible sigmoidoscopy every 5 years was the most effective strategy, but not by much. Other strategies were either more expensive or less effective in terms of life years gained. In general, FOBT strategies prevailed over endoscopic strategies with flexible sigmoidoscopy alone or colonoscopy. A key assumption was the ability of FOBT (with 60% compliance) to reduce colon cancer incidence by nearly 40% and colon cancer mortality by 55% to 65%.

Comment. Methodology for modeling outcomes over time has grown more sophisticated. The impact of an intervention on natural history depends on a wide range of assumptions about operating characteristics of the test (sensitivity and specificity), compliance, and predictions of benefits. Both these analyses are performed from the societal perspective, meaning that all related costs and benefits are included over a lifetime regardless of who incurs the cost or receives the benefit. From the societal perspective, what happens over the course of a lifetime is important; if an investment in screening can result in less cancer care during life, this could benefit society. However, payers may be reluctant to incur large up-front costs to achieve a benefit (cancer prevention) that will occur later in life under the care of a different payer (Medicare). The Panel on Cost-Effectiveness in Health and Medicine has recommended that cost-effectiveness analyses be performed from the societal perspective.[1]

Perhaps the most difficult of all variables to model is compliance, which has many different levels. The model developed by Sonnenberg et al. acknowledges these levels, and it tests variation in their sensitivity analysis. Compliance includes adherence to the initial screening test, interval screening tests if initial tests are negative, and appropriate evaluation of positive screening tests. Not surprisingly, FOBT is more sensitive to changes in compliance rates. Frazier et al. fix compliance at 60% in the base model for each screening and 80% for evaluation of positive tests. The impact

of patients dropping out and reentering screening is difficult to assess but is probably greatest for the FOBT, which is performed annually. The randomized trials with FOBT have all found that many of the cancers discovered in the screened group were not the result of screening.

How can some of the differences be accounted for in these analyses? It comes down to some key assumptions. Sonnenberg et al. assume that colonoscopy every 10 years could prevent up to 75% of potential cases of CRC, compared with 16% for FOBT over a lifetime. In this model, colonoscopy dominates other screening programs because of high rates of mortality reduction from prevention and reduced cost of cancer care over life. Colonoscopy continues to dominate as compliance drops. These estimates may be optimistic. Reduction in incidence is attributed to complete colon evaluations with polypectomy. Not all colon examinations and polypectomies are complete. The cost burden of cancer care may be offset partially by the cost burden of some other disease state, which may develop in the absence of colorectal cancer. For example, men living longer without colon cancer may develop clinically apparent prostate cancer and incur costs of treatment for this malignancy. Estimating attributable colon care costs (i.e., the incremental additional cost due to colorectal cancer) is tricky.

In contrast, Frazier et al. assume that colonoscopy can reduce cancer incidence by 58% compared with 39% for FOBT (with 60% compliance). FOBT strategies tend to dominate in this model, largely because of the extraordinary rate of cancer prevention associated with FOBT. The evidence that FOBT will be associated with cancer prevention has been demonstrated in the Minnesota Colon Cancer Control Study.[2] However, the rates assumed by Frazier et al. would require excellent long-term compliance at each level (initial testing, interval testing, and evaluation of positive tests). The program favored by Frazier et al. (annual rehydrated FOBT and sigmoidoscopy every 5 years) is the program most subject to problems with compliance. A recent analysis of screening in the United States found that only 9.5% of the public had these screening tests at the recommended intervals.[3] Frazier et al. note that colonoscopy every 10 years is nearly as effective as the combined FOBT-sigmoidoscopy program and acknowledge that a single colonoscopy at age 55 could offer substantial mortality reduction.

Therefore, the results of these analyses are not so different. Both conclude that colon screening with any of the recommended programs is cost-effective relative to other medical interventions. Both hint that if procedure costs decline and cancer care costs increase, screening could be cost-saving for society. Another recent cost analysis also concluded that screening could be cost-saving.[4] When these analyses are combined with other recently published cost-effectiveness studies,[4-6] there is a compelling story: colon screening saves lives and is cost-effective. Because programs are so sensitive to compliance, the next great frontier for research is development of methods to improve currently low rates of compliance.

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Gastric mucosal responses to intrahepatic portosystemic shunting in patients with cirrhosis

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The aim of this study was to determine the effect of transjugular intrahepatic portosystemic shunts (TIPS) on gastric mucosal lesions, portal hypertensive gastropathy (PHG), and gastric vascular ectasia (GVE) in cirrhotic patients. Fifty-four patients with gastric varices and mild PHG (n = 30), severe PHG (n = 10), or GVE (n = 14) had TIPS placed for prevention of recurrent GI bleeding. In each patient, clinical and laboratory evaluation, upper GI endoscopy, and Doppler US were performed before TIPS placement and 6 weeks, 3 months, and 6 months after placement. Endoscopic resolution of gastric lesions was observed in 64% of patients with mild PHG at 6 weeks and in 85% and 89% at 3 and 6 months, respectively. In patients with severe PHG, the endoscopic response was slower, but resolution