Randall W. Burt, MD

Randall W. Burt, MD, Professor of Medicine, University of Utah School of Medicine, is a faculty member of the Division of Gastroenterology, Hepatology, and Nutrition at the University of Utah Health Sciences Center. Dr. Burt's central research interest is to define new colon cancer susceptibility genes. Related projects include study of genetic environmental interactions and gene-gene interactions that give rise to colon cancer. His chief clinical focus is on cancer prevention through appropriate screening for colorectal and other cancers, with particular attention given to increased risk factors in inherited and non-inherited polyposis syndromes. Dr. Burt has been a principal investigator on several large NIH studies of colon cancer and has authored or co-authored numerous textbook chapters and articles in major scientific journals, several of which are considered seminal. He is the recipient of several teaching awards at the University of Utah and is also Senior Director for Prevention and Outreach at Huntsman Cancer Institute and Director of the institute's Familial Colon Cancer Clinic.

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Strategies for Colon Cancer Screening With Considerations of Cost and Access to Care

Screening for colon cancer in the general population 50 years of age and older, as outlined in the NCCN Clinical Practice Guidelines in Oncology in this volume, has been shown to substantially decrease mortality from this malignancy.¹⁻³ Screening also has also been shown to come at an acceptable cost to society.⁴⁻⁷ Colon cancer mortality has decreased in recent years, at least in part due to screening and early detection.⁸ Just as important, the incidence of colon cancer has been decreasing, also attributed in part to detection and removal of adenomatous polyps. Colon cancer screening in large part is actually colon polyp screening and removal, and thus cancer prevention.

Several screening tools for colon cancer now appear to meet the mortality and cost-benefit requirements for the general population and are thus recommended as options. All approaches apply to persons 50 years old or older and include a choice of improved annual fecal occult blood testing (via several methods), every-5-year 60-cm flexible sigmoidoscopy, and every-10-year colonoscopy, although societies differ somewhat regarding specifics.³ More aggressive screening strategies are also considered appropriate for certain sub-populations who have an increased risk of this malignancy. The most common groups at increased risk include those with a personal or family history of colon cancer or adenomatous polyps, those with inflammatory bowel disease, and those with an inherited syndrome of colon cancer.^{9,10}

Several additional screening tools require mention. Barium enema is now only recommended if colonoscopy cannot be done. CT colography (virtual colonoscopy) and fecal DNA are recent developments, but consensus is lacking regarding their suitability for general population screening.³

Colon Cancer Screening Versus Screening for Other Cancers

Perhaps the most important feature of colonic neoplasia that allows screening to be effective is that most colon cancers arise from adenomatous polyps. Adenomatous polyps usually take years to increase in size, to advance histologically, and to finally undergo malignant transformation. In fact present estimates are that this process takes 10 to 20 years. Thus, interval screening can detect and allow removal of polyps and thus prevent cancers that may have developed from these lesions.¹⁰

Conversely, questions have recently arisen about the value of screening for 2 other common cancers, breast and prostate.¹¹ The diagnosis of these cancers has increased remarkably, but mortality has not decreased in correspondingly high numbers. The reason for this discrepancy may be that many early lesions that are detected and vigorously treated may not have needed treatment at all. Additionally, the treatments themselves are associated with considerable morbidity. For prostate, lesions detected in screening include small indolent tumors that themselves may only seldom cause morbidity or mortality. In breast cancer, ductal carcinoma in situ (DCIS) now accounts for 30% of lesions detected on screening that lead to therapy; however, for many DCIS lesions, evidence is lacking that treatment is beneficial. Furthermore, rapidly advancing cancers in either of these organs may evade screening efforts.

One of the same reports that raises these issues for breast and prostate cancer screening notes that colon and cervical cancer screening are much more successful. Much of the success associated with colon cancer screening likely comes from detection and removal of pre-cancerous adenomatous polyps, thus accomplishing cancer prevention.¹ Successful early detection of colon cancer itself undoubtedly also

plays a role. Together, polyp removal and early detection probably both contribute significantly to colon cancer screening success, measured as both decreased frequency and decreased mortality.

The Risk of Over-Treating

The down side of cancer prevention through adenoma removal is that adenomas polyps are very common, eventually occurring in up to 30% to 50% of individuals. Having an adenoma increases the risk of later adenomas and cancers. Following up all persons with these polyps with regular colonoscopic examination presents a significant burden on health care costs and resources and substantially overshadows the costs of initial screening. And, although experts predict that only 5% to 10% of adenomatous polyps would ever become malignant, precisely determining *which* patients with adenomas need more aggressive follow-up than that recommended for the average-risk population is impossible. These overall costs of polyp follow-up must be better studied to appreciate the cost of colon cancer screening to society.

The concept of the “advanced adenoma” has improved this situation somewhat.¹² Advanced adenomas are those that are 1cm or larger in diameter, exhibit substantial villous histology or advanced dysplasia, or include 3 or more adenomas found. These features correlate with a higher risk of advanced lesions and colon cancer at follow-up and therefore necessitate more vigorous follow-up process. Persons with 1 or 2 small tubular adenomas can be followed up at longer intervals, but, even in this lower risk setting, more frequent follow-up is often recommended. Additionally, how often these guidelines are followed is not known.

Successful Screening at Population, Societal, and Personal Levels

Successful early detection and prevention of colon cancer at the population level depends on a number of personal and societal issues.¹³ Even if cost-effectiveness is shown in a study setting, society must be willing to bear the expense of this screening for wide application. At this point, society has generally been willing to support the costs of screening strategies, as well as the costs of evaluation and follow-up procedures when cancers or precancerous polyps are detected. Medicare and most insurance companies support current screening and follow-up recommendations. How this support will be affected by ongoing medical reform is yet to be determined.

In addition to societal support, individual factors are extremely important for a screening program to achieve population-level effectiveness.¹⁴ Patient acceptance and participation in initial screening, follow-up of positive results, and interval screening must be relatively high for success. Study results directed at these issues are mixed. Participation in colon cancer screening, for example, has been low compared with screening for other cancers (breast, cervical, prostate) and remains below 50%.¹³ Even using the inexpensive fecal occult blood test for screening is somewhat ineffective because follow-up of positive tests has often been found to be distressingly low.²

Reasons for individual non-adherence with present colon cancer screening and follow-up guidelines are complex and overlapping, which makes them difficult to sort out. Factors include insufficient education concerning screening, misconceptions about colon cancer and screening tests, personal discomfort in dealing with colorectal issues and procedures, cultural mores that discourage discussion of sensitive body issues, associated costs with or without insurance, and the availability of screening. An additional major factor appears to be failure of the attending physician to recommend appropriate screening!

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Despite demonstrated societal cost-effectiveness, questions remain. For example, are patients willing to pay for insurance programs that support colonoscopy screening? Studies have shown that Medicare coverage increases colon cancer screening and early detection.¹⁵ Can patients afford associated co-pays of screening and follow-up testing? How will an uninsured patient with a positive fecal occult test result found during a community screening effort deal with the costs of follow-up—a fairly frequent event?²²

Accessibility is also a significant issue at the personal level. Although colonoscopy is now widely available in the United States, cost concerns may make it less available to an individual. Do geographic issues play a role? Rural and frontier populations, which are significant in many parts of the country, have a much more difficult (and costly) time getting to colonoscopy sites. Inner city and underserved populations may be closer to appropriate clinics, but costs, inadequate understanding, and cultural issues and fears may make colonoscopy and other screening approaches inaccessible in practice.¹⁴

Many aspects of colon cancer screening have been impressively successful. These successes have allowed wide application of screening and already measurable effects on incidence and mortality associated with this malignancy. Furthermore, the knowledge base accumulated for colon cancer screening now allows us to begin to address behavioral, personal cost, personal acceptance, and availability issues.¹⁶ These considerations may even be more complex than the initial medical issues, but they are just as important if screening is to be successful at a societal level. Investigations of these issues are now underway and are expected to further increase the success of colon cancer screening.

In This Issue

Three currently important issues will be addressed in detail in this volume of *JNCCN*: 1) colonoscopy; 2) stool screening; and 3) familial risk and genetic testing. Colonoscopy has been considered the gold standard for screening, but recent questions about its effectiveness have arisen.^{17,18} Are the effectiveness issues real, and, if so, are they due to the biology of certain polyp types, such as the sessile serrated polyp or polyps that exhibit rapid growth rates? Other possibilities include the quality of colonoscopy examinations and the difficulty in detecting sessile polyps. Each of these issues will be addressed.

Regarding stool screening: the best evidence for lowering colon cancer mortality actually comes from fecal occult blood stool screening investigations. This test's effectiveness, however, is lower than hoped for, and false-positive results are common, particularly outside controlled trials.³ Newly developed stool DNA methods have the potential for more precise detection of both colon cancer and polyps. How close are we to this realization?

The third issue of familial risk and genetic testing is particularly important now. A positive family history increases risk for colon cancer, and a strong family history raises the issue of an inherited syndrome, in which risk is extreme. For example, only a small fraction of the patients and families with Lynch syndrome have been identified, leaving the vast majority at great risk without appropriate screening. Proper physician knowledge concerning the application of testing and surveillance in inherited colon cancer is of great importance for cancer prevention.

We expect that the review of these 3 current and important issues, in addition to the NCCN Clinical Practice Guidelines, all in this issue of *JNCCN*, will assist physicians in improving colon cancer screening and prevention in their practices.

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