Virtual Colonoscopy Accepted As Primary Colon Cancer Screening Test

By Nancy J. Nelson

For several years, colonoscopy has been considered the most accurate method for detecting colon cancer. However, the technology for another screening option, virtual colonoscopy—also known as computerized tomographic (CT) colonography—has been improving rapidly since its introduction in the mid-1990s.

In a recent trial known as the ACRIN (American College of Radiology Imaging Network) National CT Colonography Trial, researchers used the latest imaging software and specially trained radiologists at 15 sites across the country to determine whether CT colonography can detect suspicious colon polyps as accurately as conventional colonoscopy. The answer seems to be a resounding yes, as reported in the September 18 issue of the New England Journal of Medicine.

“In the largest CT colonography study published to date, the results show that CT colonography can be adopted into mainstream clinical practice as a primary option for colorectal cancer screening,” said C. Daniel Johnson, M.D., of the Mayo Clinic in Scottsdale, Ariz., and principal investigator of the ACRIN trial. “We hope that this additional, less-invasive option for cancer screening will lead more people to get screened and will ultimately result in fewer deaths from colorectal cancer.”

The trial, sponsored by the National Cancer Institute, enrolled 2,600 participants considered to be at average risk of developing colon cancer. People who were aged 50 years or older, who had no symptoms of colorectal disease, and who had not had a colonoscopy in the past 5 years were eligible for the trial. Each participant received both exams. The CT colonography, essentially an x-ray of the colon, was done first. After the colonography, a colonoscopy was performed without the physician’s having knowledge of the CT colonography results. Colonoscopy results and the examination of the tissue removed during the procedure were used as the reference standard. A positive result for CT colonography was defined as a lesion of 5 mm or larger that was seen with both procedures and corroborated with a biopsy.

The trial showed that the accuracy of CT colonography was similar to that of conventional colonoscopy. Ninety percent of the polyps seen by colonoscopy that were 10 mm or larger—the ones most likely to develop into cancer—were also detected with CT colonography. Intermediate-sized polyps, ranging from 6–9 mm, were detected by CT colonography with a sensitivity of 90% for 9-mm polyps, 87% for 8-mm polyps, 84% for 7-mm polyps, and 78% for 6-mm polyps.

The procedure for CT colonography takes about 10–15 minutes. As the patient is lying down, a scanner takes a series of x-rays of the entire colon and rectum that are assembled by a computer into a 3-D image and reviewed by a radiologist. Unlike the conventional colonoscopy, in which the colon is examined by inserting a lighted tube into the rectum, no sedation or recovery time is required for CT colonography. However, like a standard colonoscopy, there’s no way to avoid the bowel preparation for now—both tests require drinking laxatives and clear liquids the day before the procedure to cleanse the colon.

CT colonography has many benefits over standard colonoscopy. The procedure is short, and the person being screened can return to work the same day. There is no chance of puncturing the intestine with a probe as it travels through the intestine. Finally, it’s cheaper—CT colonography is about one-third the cost of a colonoscopy. However, the one disadvantage of CT colonography occurs when a suspicious polyp is seen. In that case, a follow-up colonoscopy equipped with a tool for removing polyps is needed.

The investigators found that about 4% of the participants had large precancerous adenomas (10-mm polyps) or cancer, and about 8% had polyps ranging in size from 6 mm to 9 mm. Physicians agree that polyps that are 10 mm or larger should be referred to colonoscopy for their removal, but there is less consensus on the 6-to-9-mm group. If the cutoff for referral to colonoscopy was 6 mm or larger, then on the basis of this study, 12% of people in this average risk population would be advised to undergo another procedure.

In a previous study comparing the two technologies, David H. Kim, M.D., a radiologist from the University of Wisconsin Medical School in Madison and principal investigator, reported that about 8% of participants at average risk had polyps of at least 6 mm in size. On the basis of these two studies, nearly all of those at average risk screened with CT colonography would be spared the cost and inconvenience of having a subsequent colonoscopy.
Like Johnson, Kim believes that CT colonography technology has matured to the point where it is equivalent to colonoscopy. Either method is fine. “The important point is to get screened for a deadly, but preventable, cancer,” Kim said.

Colon cancer is the third most common type of nonskin cancer in both men and women and is the second-leading cause of cancer death in the U.S. after lung cancer. This year about 150,000 new cases will be diagnosed and about 50,000 people will die from the disease. However, because colon tumors grow slowly, and precancerous lesions and localized cancers can be detected and removed with colonoscopy before the disease spreads, colon cancer may qualify as one of the most preventable cancers.

Even though most professional organizations recommend regular screening beginning at age 50 years, many people don’t comply with these recommendations. According to a recent issue of Morbidity and Mortality Weekly Report, 60.8% of the U.S. population aged 50 years or older had a colon cancer screening test in 2006.

But it is uncertain whether the availability of a cheaper, less-invasive, and faster screening test will encourage more people to get screened, said Frank A. Sinicrope, M.D., professor of medicine and oncology at the Mayo Clinic in Rochester, Minn. “It’s not clear to me whether CT colonography will affect colon cancer screening rates.” He said that it is important that patients understand the advantages and limitations of both screening tests and are aware that if CT colonography shows an abnormality, then a colonoscopy is needed. “We have to evaluate the utilization of the test,” he concluded. “We definitely need another screening modality because we don’t have the capacity to screen all the patients that are candidates for colonoscopy testing.”

Carrie N. Klabunde, Ph.D., of the division of cancer control and population sciences at the National Cancer Institute, is even more circumspect. She is one of the authors of the latest National Health Interview Survey published this July in Cancer Epidemiology, Biomarkers, and Prevention that looked at colon cancer test use in the U.S. and the reasons for not having a test. Her group found that the main reason people don’t comply with recommendations is simply a lack of awareness of the need for screening. “We have been tracking this for several years and the reasons haven’t changed,” Klabunde said. “People just don’t know that they need to be screened.

The second reason they give is that their doctor didn’t order it.”

She explained that most people who go to see their primary care physician are usually going for a particular problem—not for preventive health care. The visits are relatively brief, and the doctor is focused on the primary problem. “If there’s time, and the doctor thinks of it, and if the office has good documentation and sees that someone is not up to date on preventive services, they can bring that up with the patient,” Klabunde said. Most primary care practices, however, are small, and many don’t have electronic records. “It’s still somewhat of a cottage industry. How do you change that? It’s pretty daunting.”

Despite these obstacles, some steps have already been taken to encourage the use of CT colonography. Five professional organizations—the American Cancer Society, three gastroenterology societies, and the American College of Radiology—issued joint screening guidelines in March recommending CT colonography for the first time. They cited the data from the ACRIN and other large trials as the reason for its inclusion. The new guidelines endorse seven screening tests but encourage people to undergo one of the four tests for detecting precancerous polyps as well as cancer. (See Box.)

Colon Cancer Tests Endorsed in New Guidelines

New colon cancer screening guidelines from several professional medical organizations now recommend CT colonography along with six other screening methods.

**Tests for detecting cancer and precancerous polyps**

- Optical colonoscopy: The rectum and entire colon are examined using a lighted instrument along with a tool to remove polyps.
- Virtual colonoscopy or CT colonography: 3D x-rays of the rectum and entire colon are taken.
- Flexible sigmoidoscopy: The rectum and lower third of the colon are examined with a lighted instrument.
- Double-contrast barium enema: The colon is coated with high-density barium and visualized through multiple radiographic images.

**Tests for detecting cancer only**

- Guaiac-based fecal occult blood test: Detects peroxidase in blood in stool.
- Fecal immunochemical test: Detects the protein globin in blood in stool.
- Stool DNA: Tests for several DNA markers of cancer cells.
However, as this article was going to press, the U.S. Preventive Services Task Force announced that there was insufficient evidence for including CT colonography in their colon cancer screening recommendations.

Paul J. Limburg, M.D., a gastroenterologist at the Mayo Clinic in Rochester and an author of the ACRIN paper, said that most professional societies endorse colorectal cancer screening in general and then encourage physicians and patients to decide together which test is appropriate for an individual.

Not everyone agrees with the new guidelines, though. Peter Lance, M.D., from the Arizona Cancer Center in Tucson argues in the September 2008 issue of *Cancer Epidemiology, Biomarkers, and Prevention* that the guidelines are needlessly complex. He would eliminate four of the tests: sigmoidoscopy and barium enema because both are rapidly disappearing from practice in the U.S.; guaiac-based fecal occult blood test because its sensitivity for asymptomatic colorectal cancers is 26% compared with that of the fecal immunochemical test, which approaches 66%; and stool DNA testing because the technology is still evolving, data are lacking for widespread testing in a population setting, and there is no commercially available DNA test.

Because any patient who tests positive in a test other than colonoscopy will be referred for further testing, Lance recommends that patients have a colonoscopy, if available, and CT colonography, if colonoscopy is declined or unavailable. A fecal immunochemical test is acceptable, he said, if colonoscopy and CT colonography are unavailable.

Some physicians hope that coverage by Medicare and Medicaid will promote the use of CT colonography. Providing Medicare coverage for colonoscopy in 2001 may have contributed to the increase in colonoscopy testing from 2000 to 2005, Klabunde said. The Centers for Medicare and Medicaid Services is analyzing the use of CT colonography to see if coverage is warranted. Right now, most states will reimburse for CT colonography only if a colonoscopy is “incomplete,” meaning that something is blocking the colon, such as a tumor or adhesions from a previous surgery.

It is unclear whether the availability of a new screening test, the new screening recommendations, or Medicare coverage will increase the rates of colon cancer, but experts agree on the importance of getting people screened by any of the approved methods. “Colorectal cancers,” said Kim, “represent one of the few cancers that truly can be prevented.”