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Virtual Colonoscopy May Be Used First in Screening for Colorectal Cancer **CME**

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October 10, 2007 — Computed tomographic colonography (CTC), also known as virtual colonoscopy, produced similar rates of detection for advanced neoplasia vs optical colonoscopy (OC), researchers report. The results of this large comparative study, which appears in the October 4 issue of the *New England Journal of Medicine*, suggest that primary CTC along with selective OC should be considered as a preferred screening strategy.

"Virtual colonoscopy is an effective method of colorectal screening, with less risk of complications as compared to optical colonoscopy," said lead author David H. Kim, MD, from the Department of Radiology at the University of Wisconsin, Madison. Seven colonic perforations were observed in the optical colonoscopy group, and 4 patients required surgery to repair the injury. However, there were no perforations or any other serious procedure-related complications observed in the CTC group. "CTC is less invasive and some patients prefer to go this route," he told *Medscape Oncology* in an interview. "The screening population is a very heterogeneous group and some patients prefer one method over another."

"A common question from the referring physicians is why would patients want to have a virtual colonoscopy if they are going to eventually need both," said Dr. Kim. "It seems to be a common misconception."

In reality, most patients undergoing a primary screening CTC would not need to have an OC. "About 87% of test results are negative," he said, "And only 13% are positive, of which only 8% have undergone therapeutic colonoscopy. Thus, only about 8 out of 100 patients would need to undergo both tests."

However, despite the fact that colorectal cancer can be prevented in many cases by removing advanced adenomas before they progress to cancer, screening compliance remains less than optimal. "There are probably 40 million people over the age of 50 that are not screened," said Dr. Kim. "Both methods are going to be needed in order to make a positive impact."

Dr. Kim and colleagues compared the diagnostic yield from parallel studies of CTC and OC by comparing primary CTC screening in 3120 consecutive patients with primary OC screening in 3163 consecutive patients. The main outcome measures were to compare the rates of detection for advanced adenomas and adenocarcinomas, as well as the overall rates for polypectomy.

At the University of Wisconsin, there are 2 clinically established programs for colorectal cancer screening. "We have screening based on CTC which operates independent of screening by traditional optical colonoscopy," Dr. Kim explained. "That's what allowed this study to be done. We have the results of 2 programs that are operating and drawing from the same geographical group of patients, the same referring physicians, and a choice of procedure that was made by the patient in consultation with their physician."

Patients were referred for polypectomy if CTC detected a polyp that was at least 6 mm in size. Those with smaller polyps, in the range of 6 to 9 mm, were also offered the option of continued CTC surveillance as an alternative to polypectomy. Patients who

underwent a primary OC had nearly all detected polyps removed during the procedure, regardless of the size of the polyps, in accordance with established guidelines.

A total of 123 advanced neoplasms were detected during CTC, including 14 invasive carcinomas. During OC, 121 advanced neoplasms were detected, with 4 invasive carcinomas. Among patients who received CTC screening, 246 (7.9%) were referred for colonoscopy.

Confirmation of advanced neoplasia was similar between the 2 groups: 100 (3.2%) patients who received primary CTC, and 107 (3.4%) who received primary OC. These numbers did not include 158 individuals with 193 unresected small polyps that were detected on CTC who had chosen to undergo surveillance.

"There is more data than people realize suggesting that surveillance can be done safely," explained Dr. Kim. "If our patients have polyps that are 6 to 9 millimeters, they are given an option — they can have them removed or we offer them imaging surveillance as part of an IRB [Institutional Review Board]-approved research protocol."

The number of polypectomies performed differed significantly between the 2 groups, although the overall outcomes were similar. In the CTC group, a total of 561 polyps were removed vs 2434 among patients who underwent OC.

Currently, screening colonoscopy removes all detected polyps, regardless of the size of the polyps, but with a screening CTC, the patient needs to have a second procedure if a sizeable polyp or multiple polyps are detected, Dr. Kim emphasizes. "If we are able to filter out the patients with high-risk polyps for referral to colonoscopy, we can save on cost, complications, and resource utilization," he continues. "Selection polypectomy strategies at CTC allow removal of high-risk polyps and surveillance for low-risk subgroups. In our study, these strategies allow similar detection yields of advanced neoplasias yet with a marked savings in terms of polypectomies."

Limited follow-up data are currently available for the patients opting for surveillance screening. The majority of patients are awaiting interval CTC examination, and among those with 1 or 2 polyps of 6 to 9 mm, 54 have returned for follow-up CTC with findings of 70 small polyps. Within this cohort, the majority of polyps (96%) were found to have either remained stable or have decreased in size. Only 3 polyps increased in size and were removed, although they did not reach the 10-mm threshold, and on histologic examination, none displayed a high-grade dysplasia.

At the present time, Medicare does not cover CTC for screening purposes, only for diagnostics. However, 1 advantage to not having national reimbursement is that individuals doing research with CTC have been able to really maintain quality, Dr. Kim pointed out.

"As this rolls out, I think that there will be guidelines that make sure physicians are adequately trained, and quality metrics for programs are in place, so that each facility will be held to a certain standard," he said.

The American College of Gastroenterology (ACG) issued a press release in response to this study's publication in the *New England Journal of Medicine*, in which it emphasized that "colonoscopy remains the best test and the current gold standard for colorectal screening and prevention." It points out colonoscopy offers detection and removal of polyps in a single intervention, and there is a "tremendous body of evidence" to show that clearing the colon of polyps significantly reduces colorectal cancer mortality. "There is no evidence that any radiographic test, including CT colonography, prevents the development of colorectal cancer," commented ACG president David Johnson, MD.

Dr. Johnson also questioned whether any conclusions could be drawn from the latest study, as the fact that it was nonrandomised is "problematic. The higher rate of cancer in the OC group suggests that the study populations were different, and a higher percentage of patients in the OC group might have received previous negative screening test results — such testing would select for a lower rate of cancers and advanced adenomas in the colonoscopy group and potentially bias to higher detection in the CTC cohort. Also, the rate of perforation in the colonoscopy arm was twice that expected in a screening population. Thus, we need additional information to interpret this nonrandomized comparison before we can generalize the results to clinical practice."

Three of the study authors have disclosed various financial relationships with C.B. Fleet, Viatronix, Medicsight, Philips Medical Systems, and AstraZeneca. The remaining study authors have disclosed no relevant financial relationships.

N Engl J Med. 2007;357:1403-1412.

Despite Advances in the Accuracy of CT Colonography in Detecting Polyps, Digestive Health Experts Urge Patients to Consider Risks and Realities [press release]. Bethesda, Maryland: American College of Gastroenterology; October 4, 2007.

Learning Objectives for This Educational Activity

Upon completion of this activity, participants will be able to:

1. List criteria for advanced adenoma.
2. Compare computed tomographic colonography vs optical colonoscopy in primary screening for advanced neoplasia of the large intestine.

Clinical Context

Colorectal cancer is an attractive target for screening because of the presence of defined benign precursor lesions and a relatively

long interval in the progression from adenoma to cancer. Advanced adenomas are at particularly high risk for progression to cancer, and the current study defines such lesions as those that are 10 mm or greater in size, those with a villous component, or those with the presence of high-grade dysplasia.

CTC has emerged as a potential screening tool to detect the precursor lesions of colorectal cancer. The current study compares the use of CTC and OC in the primary detection of advanced adenomas and carcinomas in a screening population.

Study Highlights

- Researchers compared results from 3120 patients referred for CTC during a 25-month period, with 3163 patients evaluated with OC during a 17-month period. Patients referred for polyp surveillance were excluded from study analysis, as were those with a history of bowel disorders or a family history of hereditary nonpolyposis colorectal cancer syndrome.
- CTC was performed in accordance with a defined protocol, and patients with evidence of polyps at least 6 mm in size were offered same-day OC for polypectomy. Patients with 1 or 2 polyps between 6 and 9 mm in size per CTC were given the option of CTC surveillance.
- Polyps discovered during primary OC were generally excised.
- The primary outcome was the prevalence of advanced neoplasia and invasive adenocarcinoma in the CTC and OC groups.
- The mean ages of the participants in the CTC and OC groups were 57 and 58.1 years, respectively, and the respective rates of a positive family history of colorectal cancer were 5.1% and 8.4%. There was a preponderance of women in both groups.
- The total numbers of polyps removed in the CTC and OC groups were 561 and 2434, respectively. 7.9% of participants in the CTC group were referred for therapeutic OC.
- The respective numbers of advanced neoplasias were 123 and 121, a nonsignificant difference. Rates of advanced adenomas were also similar between groups, with no difference between groups with respect to the size of the detected adenomas.
- The numbers of invasive carcinomas detected were 14 and 4 in the CTC and OC groups, respectively. This difference was statistically significant.
- 158 participants in the CTC group had polyps between 6 and 9 mm in size and decided to undergo CTC surveillance. The study authors calculated that if these polyps were eventually diagnosed as advanced adenomas, CTC would still be as effective as OC in screening for colorectal cancer.
- Most adenomas were classified as advanced based on size alone, and advanced adenomas were spread throughout the entire colon. All proved adenocarcinomas were large, with a mean size of 34.9 mm. High-grade dysplasia without carcinoma was found in only 0.2% of subjects.
- Extracolonic cancers were found in 0.3% of the CTC cohort. Colonic perforation occurred in 0.2% of subjects in the OC group and in no patients in the CTC group.

Pearls for Practice

- Advanced adenomas are defined by a size of at least 10 mm, the presence of villous elements, or features of high-grade dysplasia.
- The current study by Kim and colleagues finds that CTC and OC are similarly effective in detecting advanced neoplasia in primary screening for colorectal cancer.

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This article is intended for primary care clinicians, gastroenterologists, oncologists, and other specialists who care for adults who are at risk for colorectal cancer.

Goal

The goal of this activity is to provide medical news to primary care clinicians and other healthcare professionals in order to enhance patient care.

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