Virtual Colonoscopy/CT Colonography

Description

Computed tomography (CT) colonography, also known as “virtual colonoscopy,” is an imaging technique of the colon involving thin-section helical CT to generate high-resolution 2-dimensional axial images of the colon. Three-dimensional images, which resemble the endoluminal images obtained with conventional endoscopic colonoscopy, are then reconstructed off-line. CT colonography has been investigated as an alternative to conventional endoscopic (“optical”) colonoscopy, specifically as an alternative screening technique for colon cancer. While CT colonography requires a full bowel preparation, similar to conventional colonoscopy, no sedation is required, and the examination is less time consuming. However, the technique involves gas insufflation of the intestine, which may be uncomfortable to the patient, and training and credentialing of readers may be needed to achieve optimal performance.

Related Policies

7.02.01 Monitored Anesthesia Care (MAC)

Policy

*This policy statement applies to clinical review performed for pre-service (Prior Approval, Precertification, Advanced Benefit Determination, etc.) and/or post-service claims.

Computed tomography (CT) colonography may be considered medically necessary in patients for whom a conventional colonoscopy is indicated but who are unable to undergo conventional colonoscopy for medical reasons or in patients with an incomplete conventional colonoscopy because of colonic stenosis or obstruction.

Except as noted in the policy statement above, CT colonography is considered not medically necessary for the purposes of colon cancer screening because the clinical outcomes with this screening strategy have not been shown to be superior to other approaches including optical colonoscopy.
Rationale

Colon cancer screening prevents morbidity from colon cancer by the detection of early colon cancers and the detection and removal of cancer precursors such as polyps. The detection of cancer and removal of polyps initially or ultimately require an optical colonoscopy. Computed tomography (CT) colonography (“virtual colonoscopy”) is an imaging procedure that can identify cancers or polyps. The effectiveness and efficiency of virtual colonoscopy is dependent on its capability to accurately identify cancer or polyps, so that all or most patients who have such lesions are appropriately referred for colonoscopy for ultimate diagnosis and treatment and that polyps or cancer are not falsely identified.

Diagnostic accuracy of CT colonography

The diagnostic characteristics of CT colonography as a colon cancer screening test have been investigated in many studies in which patients who are referred for optical colonoscopy agree to first undergo a CT colonoscopy. Using a second-look unblinded colonoscopy aided by the results of the CT colonoscopy as the reference standard, the diagnostic characteristics of CT colonography and the blinded colonoscopy can be calculated and compared. The sensitivity of CT colonography is a function of the size of the polyp; sensitivity is poorer for smaller polyps. A 2004 TEC Assessment (1) found variable sensitivity and specificity of CT colonography at that time, with many studies showing poor sensitivity. A subsequent meta-analysis of studies that examined the diagnostic performance of CT colonoscopy showed variation between studies but increasing sensitivity for larger polyps. (2) Sensitivity was 48% for detection of polyps smaller than 6 mm, 70% for polyps 6 to 9 mm, and 85% for polyps larger than 9 mm. Characteristics of the CT scanner explained some of the variation between studies. In contrast, specificity was homogeneous (92% for detection of polyps smaller than 6 mm, 93% for polyps 6 to 9 mm, and 97% for polyps larger than 9 mm).

Diagnostic performance of CT colonography is highly dependent on the technology and techniques used. Thus, many of the older studies reviewed may no longer represent currently possible diagnostic performance of the test. A large study published in 2003 showed diagnostic test performance of CT colonography for polyps to be equivalent to that of optical colonoscopy. (3) Other studies showed variable performance, with 2 large studies showing much lower sensitivity than optical colonoscopy. (4,5) Results from the largest study of a screening population (n>2,500), the American College of Radiology Imaging Network (ACRIN) 6,664 trial, (6) were recently published and reviewed in a 2008 TEC Assessment. (7) This study used 16- to 64-row detector CT scanners, stool-tagging techniques, and minimum training standards for interpreters of the test. The results of this study showed 90% sensitivity of CT colonography for polyps 10 mm or larger and 86% specificity; positive and negative predictive values were 23% and 99%, respectively.

The results of the ACRIN trial may have been dependent on the technical standards required for performance of the test and the training and skill of the interpreters of the test. If these practices can be replicated in the community, then it is likely that improved health outcomes similar to those in the trial can be achieved. Standards of performance and interpretation of CT colonography consistent with those reported in the ACRIN trial will be necessary for CT colonography to be an effective screening test.
A meta-analysis published in 2011 by de Haan et al. (8) of diagnostic characteristics of CT colonography in screening populations showed summary sensitivities and specificities that were similar to prior studies. Estimated sensitivities for polyps or adenomas 10 mm or larger were 83.3% and 97.9%, respectively.

Conclusions: There is some variability in the diagnostic accuracy of CT colonography in the literature; this is likely due to the improvement in technical performance over time. The most recent studies have reported that diagnostic accuracy for CT colonography is high and in the same range as optical colonoscopy. This is especially true for large polyps greater than 10 mm, for which the diagnostic performance of CT colonography is likely to be as good as optical colonoscopy.

CT colonography in patients with contraindications to optical colonoscopy

CT colonography may also be indicated in patients who have contraindications to conventional colonoscopy or in patients who have incomplete conventional colonoscopy because of colonic obstruction or stenosis. A case series by Yucel and colleagues (9) reported on 42 patients older than 60 years (mean: 71 years; range: 60–87 years) referred for CT colonography because of contraindications to the conventional procedure (n=12) or incomplete colonoscopy (n=30). Contraindications included anticoagulation therapy (n=8), increased anesthesia risk (n=3), or poor tolerance for colonoscopy preparation (n=1). The most common reasons for incomplete colonoscopy included diverticular disease, colonic redundancy, adhesions, and residual colonic content. Optimal distension of the entire colon was achieved in 38 patients (90%), and 39 (93%) of the patients had abnormal findings. Extracolonic findings potentially requiring further evaluation or treatment were observed in 26 patients (62%).

Impact of CT colonography on health outcomes

There is no direct evidence that evaluates the impact of CT colonography on health outcomes compared to optical colonoscopy. Modeling studies, generally done as part of cost-effectiveness analyses, can provide some insights into the health outcome benefits of CT colonography, as well as provide relevant data on cost-effectiveness.

Given the chain of logic and other underlying evidence that supports the practice of accepted colon cancer screening techniques such as optical colonoscopy, a 90% sensitivity of CT colonography for detection of polyps 10 mm or larger is consistent with an improvement in health outcomes. The 86% specificity of CT colonography would result in some false-positive tests, which, in turn, would result in some unnecessary follow-up colonoscopies. However, compared with optical colonoscopy, there are several other types of health outcomes that may differ in terms of convenience, detection of unrelated health problems, and radiation exposure. These are difficult to quantify and are probably small in magnitude compared to the health benefit of identifying and removing cancer precursors.

There are no long-term comparative studies that directly report on outcomes of CT colonography compared to optical colonoscopy. The determination of comparative outcomes of CT colonography and optical colonoscopy is complex, due to the differing patterns of follow-up associated with each strategy. Studies of cost-effectiveness have modeled outcomes of the two procedures and generally
conclude that outcomes are similar, or that optical colonoscopy results in better outcomes. These analyses assume equal participation rates between the two strategies.

**Practice Guidelines and Position Statements**

A 2006 statement by ACS and the U.S. Multi-Society Task Force on Colorectal Cancer on colonoscopy surveillance after cancer resection recommended that in patients with obstructing colon cancers, CT colonography with intravenous contrast may be used to detect neoplasms in the proximal colon. (10)

A position statement by the American College of Gastroenterology in 2006 (prior to the publication of the ACRIN 6664 trial) also expressed concerns over additional areas of uncertainty such as the radiation risk, interpretation, and management of extracolonic findings. (11)

**Summary**

The available evidence supports the conclusion that the diagnostic accuracy of CT colonography is in the same range as optical colonoscopy, with a moderate to high sensitivity and a high specificity for larger polyps. As a result, screening with CT colonography may provide similar diagnostic results to screening using conventional colonoscopy. The majority of modeling studies report that the overall health outcome benefits of a strategy that uses optical colonoscopy likely exceed the benefits of a strategy using CT colonography. However, these analyses assume equal participation rates in screening between the two strategies. Participation in screening may be higher with CT colonography than with optical colonoscopy, and this may ameliorate or offset any improved outcomes associated with optical colonoscopy.

For patients who have contraindications to colonoscopy, such as the need for continuous anticoagulation and/or high anesthetic risk, or in patients with an incomplete colonoscopy due to colonic obstruction or stenosis, CT colonography is a reasonable alternative, and therefore may be considered medically necessary.

Except as noted above, CT colonography is considered not medically necessary for the purposes of colon cancer screening because the clinical outcomes with this screening strategy have not been shown to be superior to other approaches including optical colonoscopy.

**References**


**Policy History**

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**Keywords**

CT Colonography  
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This policy was approved by the FEP Pharmacy and Medical Policy Committee on March 8, 2013 and is effective April 1, 2013.

Signature on file  
Deborah M. Smith, MD, MPH