Clinical Review Criteria

Virtual Colonoscopy or CT Colonography

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Criteria

For Medicare Members

The local coverage decision document has been retired as of 4/15/2011 for Part B services. See the National Coverage Determination (NCD) for Computed Tomography (220.1).

L26195 CT Colonography for facility based services using UB to bill is now retired

For Non-Medicare Members

Computed tomographic (CT) colonography, also known as virtual colonoscopy, utilizes helical computed tomography of the abdomen and pelvis to visualize the colon lumen, along with 2D or 3D reconstruction. The test requires colonic preparation similar to that required for fiberoptic colonoscopy, and air insufflation to achieve colonic distention.

CT colonography is indicated only in patients having ONE of the following qualifying conditions:

1) Instrument colonoscopy of the entire colon is incomplete and/or contraindicated due to colon obstruction;
2) A coagulation disorder known to increase bleeding risk;
3) Lifetime anticoagulation or long-term anticoagulation therapy with increased patient risk if discontinued;
4) Significant medical or surgical complications from previous standard colonoscopy;
5) Medical condition that places the patient at increased risk with use of conscious sedation;
6) CT colonography is not a covered service when utilized in preoperative cancer staging, and in this clinical situation as standard CT or MRI is the preferred imaging study, or for screening or diagnostic evaluation in the absence of one of the above indications.

Patient personal preference or patient refusal to undergo colonoscopy, in the absence of one of the qualifying conditions noted above, even if signs or symptoms of colon disease are present, is not a covered indication for CT colonography.

Background

Colorectal cancer is the third most common cancer and the second leading cause of cancer-related deaths in the United States. A majority of cases can be prevented with colonoscopic removal of the precursor adenomatous polyp. With early detection, patients with cancer limited to the colonic wall will have a corrected 5-year survival of around 90%, whereas for those with lymphatic spread this figure drops to 30%. Although standard colonoscopy is a total colonic examination that allows lesion biopsy and resection, it is an invasive procedure, may fail to demonstrate the entire colon in up to 5% of cases examined by an experienced gastroenterologist, and could miss up to 20% of all adenomas. (Yee J, 2001).

Computed tomography colonography, commonly referred to as virtual colonoscopy, is a new method of imaging the colon. It uses data from thin sections helical computed tomography of the clean, air-distended colon, combined with advanced imaging software to create two-dimensional and three-dimensional images of the colon that simulate the endoluminal view seen at endoscopy. Since first introduced by Vining and colleagues in 1994, its performance has improved due to the development of fast helical CT scanners, and advances in the computer software for image reconstruction.

A variety of techniques have been described, but all share the same basic principles: Full bowel cleaning, air distension of the colon using a rectal enema tube, taking thin-section images of the colon in the supine and prone positions, and image interpretation using a combination of axial and multiplanar or endoluminal reconstructions.

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The concept of virtual colonoscopy is appealing and appears to many as a potentially attractive method of screening for colorectal cancer. Compared to the standard optical colonoscopy, virtual colonoscopy is less invasive, does not require sedation, analgesia, or recovery time, and allows the entire colon to be visualized in the majority of patients. It might also provide additional information by evaluating colonic wall thickness and imaging abdominal structures outside the colon and may be more acceptable to patients.

However there are a number of potential limitations to this procedure. First of all, it requires a complete and thorough colon cleansing. Poor colonic preparation or distension limits the accuracy of CT colonography. Colonic lavage preparation often results in excess residual fluid or stools in the colon, that may simulate or cover the presence of a lesion. Another significant limitation is that virtual colonoscopy may be less effective at detecting smaller polyps and flat adenomas. In addition, unlike conventional colonoscopy, virtual colonoscopy is only a diagnostic test; the detected polyps cannot be resected during the procedure. If suspicious lesions are detected, the patient undergoes further testing, usually by conventional colonoscopy. (Hawes 2002).

The original MTAC review in June 2001 evaluated virtual colonoscopy as a screening tool, and for evaluation of high-risk patients. The second review in October 2002 focused on virtual colonoscopy for detecting of colorectal polyps among high risk, elderly or frail patients. At both meetings, virtual colonoscopy failed MTAC diagnostic test criteria. The current review is on virtual colonoscopy as a screening method for average risk asymptomatic individuals and was initiated in response to the publication of the Pickhardt study on virtual colonoscopy in a screening population.

Medical Technology Assessment Committee (MTAC)

Virtual Colonoscopy
06/13/2001: MTAC REVIEW

Evidence Conclusion: The available evidence suggests that virtual colonoscopy is not yet as effective as conventional colonoscopy at identifying colorectal polyps and carcinomas. Virtual colonoscopy may be relatively effective at identifying lesions ≥ 10 mm in size, but further study is needed to verify this. No studies to date have examined the use of virtual colonoscopy for general screening or compared the acceptability of virtual compared to conventional colonoscopy.

Articles: The literature search yielded 57 articles. Articles that were opinion pieces, reviews, dealt with technical aspects of virtual colonoscopy, or had small sample sizes were excluded. There were 4 empirical studies with sample sizes ≥ 50. The two studies with the strongest methodologies were reviewed. Fenlon HM, Nunes DP, Schroy PC, Barish MA, Clarke PD, Ferrucci JT. A comparison of virtual and conventional colonoscopy for the detection of colorectal polyps. N Engl J Med 1999; 341: 1496-503. See Evidence Table. Spinzi G, Belloni G, Martegani A, Sangiovanni A, Del Favero C, Minoli G. Computed tomographic colonography and conventional colonoscopy for colon diseases: A prospective, blinded study. Am J Gastroenterol 2001; 96: 394-400. See Evidence Table.

The use of Virtual Colonoscopy for colon cancer screening failed Group Health Medical Technology Assessment Criteria

10/09/2002: MTAC REVIEW

Virtual Colonoscopy

Evidence Conclusion: Previously, virtual colonoscopy did not meet GHC Medical Technology Assessment Committee as a screening tool for colorectal polyps and carcinomas. The purpose of the current re-review is to evaluate the use of the technology among high-risk patients, the frail, and the elderly. The available literature does not provide evidence for the use of virtual colonoscopy for the elderly and frail patients. The study (Laghi 2002) currently reviewed, as well as the Fenlon study reviewed for MTAC in June 2001, show that the sensitivity of virtual colonoscopy was good for colorectal carcinomas and large colorectal polyps in the selected symptomatic or high risk patients. The two studies were appropriate for comparison of diagnostic tests and measured the performance of CT colonography relative to conventional colonoscopy. Virtual colonography was able to detect 100% of the colorectal carcinomas identified by conventional colonoscopy in the two studies. In Laghi’s study the sensitivity was 92% for the detection of polyps 10 mm diameter or larger, 82% for those 6-9 mm, but as low as 50% for those less than 5 mm diameter, with an overall sensitivity of 78%. The corresponding values in Fenlon’s study were almost similar with a slightly less overall sensitivity most probably because of the higher rate of the smaller polyps in the population studied. The sensitivity in Fenlon’s study was (91%, 82%, 50% and 71% respectively). In both studies the sensitivity of virtual colonoscopy dropped considerably for polyps with a diameter of 5 mm or less. There is no clear consensus as to the importance of identifying and removing such tiny polyps. The per-patient specificity was 97% in Laghi’s study and 84% in Fenlon’s study. These high-risk patients with detected lesions may
still need to undergo conventional colonoscopy for biopsy or removal of lesions. Neither study examined the impact of CTC on colorectal cancer morbidity, mortality or patient management. The inter-observer variability was not examined or discussed.

**Articles:** The literature search yielded 84 articles. The majority were opinion pieces, reviews, or dealing with technical aspects of virtual colonoscopy. There were 5 empirical studies, one had a very small sample size and poor methodology, and two were conducted in the same center by the same researchers but one included more patients. The study with the larger size was selected for critical appraisal. The remaining two were retrospective studies conducted on frail or elderly patients, one used non-helical CT scan, and the other was conducted to evaluate the accuracy of CT scans in detecting caecal carcinomas using oral contrast media and minimal preparation. The study critically appraised is: Laghi A, Iannaccone R, Carbone I, et al. Detection of colorectal lesions with virtual computed colonography. *Am J Surg* 2002;183:124-131. See Evidence Table.

The use of virtual colonoscopy in colorectal screening for the frail elderly does not meet the Group Health Medical Technology Assessment Criteria.

**02/11/2004: MTAC REVIEW**

**Virtual Colonoscopy**

**Evidence Conclusion:** The two best new studies were evaluated. Pickhardt found a higher sensitivity and specificity of virtual colonoscopy than Johnson. Both included asymptomatic populations, but individuals in the Johnson study were at higher than average risk of colorectal neoplasia (i.e. personal or strong family history of colorectal neoplasia). The difference in the study population does not explain the lower sensitivity in Johnson because any bias introduced by having a higher risk sample would tend to increase, not decrease the sensitivity. The populations in the Pickhardt and Johnson studies may actually have been quite similar. The prevalence of adenomatous polyps $\geq 1$ cm was 4% in Pickhardt and 5% in Johnson. The better performance of virtual colonoscopy in the Pickhardt study may be due in part to the routine use of virtual colonoscopy as the reference standard whereas Pickhardt used a reference standard developed for the study—conventional colonoscopy enhanced by information from the virtual colonoscopy. Neither of the new studies included polyps $< 5$ mm which many experts believe are not clinically significant. Previous studies of virtual colonoscopy evaluated by MTAC have found low sensitivity for these smaller polyps. In summary, the Pickhardt study is the first to suggest that virtual colonoscopy has comparable sensitivity and specificity to conventional colonoscopy in asymptomatic individuals. The Johnson study suggests that the sensitivity of virtual colonoscopy is relatively low and that interobserver variability is high. Replication of the findings obtained in the Pickhardt study would strengthen the evidence.

**Articles:** The search yielded 103 articles, many of which were reviews, opinion pieces or dealt with technical aspects of the procedure. There were five prospective blinded studies comparing the diagnostic accuracy of virtual colonoscopy to conventional colonoscopy in asymptomatic populations. The two largest studies, each of which had samples larger than 700 individuals, were critically appraised. The others had sample sizes of 205, 158 and 80. The following articles were reviewed: Johnson CD, Harmsen WS, Wilson LA. Prospective blinded evaluation of computed tomographic colonography for screen detection of colorectal polyps. *Gastroenterol* 2003; 125: 311-319. Pickhardt PJ, Choi JR, Hwang I. et al. Computed tomographic virtual colonoscopy to screen for colorectal neoplasia in asymptomatic adults. *N Engl J Med* 2003; 349: 2191-2000. See Evidence Table.

The use of virtual colonoscopy in colorectal screening does not meet the Group Health Medical Technology Assessment Criteria.

**06/18/2009: MTAC REVIEW**

**Virtual Colonoscopy**

**Evidence Conclusion:** Diagnostic accuracy in the Regge et al., 2009 study is not dramatically different than previous studies, particularly when considering that it was conducted in a population at increased risk of CRC. There is still no high-grade evidence on the impact of screening with CT colonography on CRC mortality. Although it is not invasive like colonoscopy, CT colonography requires the same colonic preparation and involves exposure to radiation, and patients who test positive still require a colonoscopy for polyp removal.

**Articles:** Regge D, Laudi C, Galatola G et al. Diagnostic accuracy of computed tomographic colonography for the detection of advanced neoplasia in individuals at increased risk of colorectal cancer. *JAMA* 2009; 301: 2453-2461. See Evidence Table 6 and Evidence Table 7.

Update of evidence but the evidence does not change the previous review.
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