

# Colonoscopy detected colon polyps better than air-contrast barium enema or computed tomographic colonography

Rockey DC, Paulson E, Niedzwiecki D, et al. Analysis of air contrast barium enema, computed tomographic colonography, and colonoscopy: prospective comparison. *Lancet*. 2005;365:305-11.

**Clinical impact ratings:** GIM/FP/GP ★★★★★★ Hospitalists ★★★★★☆ Gastroenterology ★★★★★☆ Oncology ★★★★★☆

## QUESTION

In patients at high risk for colonic neoplasia, what is the comparative accuracy of air-contrast barium enema (ACBE), computed tomographic colonography (CTC), and colonoscopy for detecting large colonic polyps?

## METHODS

**Design:** Blinded comparison of ACBE, CTC, and colonoscopy.

**Setting:** 14 centers in the United States.

**Patients:** 614 patients (mean age 57 y, 70% men) with  $\geq 1$  positive test result for fecal occult blood,  $\geq 1$  episode of bright-red blood per rectum in the previous 3 months, iron-deficiency anemia, or a family history of colon cancer or adenoma. Exclusion criteria included active gastrointestinal hemorrhage and serious medical illness.

**Description of tests:** ACBE was done according to standard protocols. Before ACBE, patients were given bisacodyl tablets and a suppository. After infusion of high-density barium and distention of the colon with room air, spot films were taken of all specific colon segments and overhead radiographs were obtained in various positions. 7 to 14 days after ACBE, CTC and colonoscopy were done on the same day. Patients were prepared for CTC with a phosphate-based cathartic. After placement of a rectal tube, the colon was insufflated with either

room air or carbon dioxide with patients in the prone and supine positions. 4-slice or 8-slice multidetector CT scanners were used; nominal slice thickness was 2.5 mm with 1-mm reconstruction intervals. Interpretation of CTC was done before colonoscopy. Colonoscopy was done in a standard manner. Lesions were measured in comparison with open biopsy forceps, photographed, and assessed by a colonoscopist. All tests were interpreted by observers blinded to other test results.

**Outcomes:** Sensitivity, specificity, and likelihood ratios for the detection of large colonic polyps.

## MAIN RESULTS

63 patients had 76 lesions  $\geq 10$  mm in size, 55 of which were adenomas or cancer. 116

patients had 158 lesions 6 to 9 mm in size, 97 of which were adenomas. 155 patients had 234 lesions  $\geq 6$  mm in size, 152 of which were adenomas or cancer. Test characteristics for ACBE, CTC, and colonoscopy are in the Table.

## CONCLUSION

In patients at high risk for colonic neoplasia, colonoscopy was more sensitive and specific than air-contrast barium enema or computed tomographic colonography for detecting large colonic polyps.

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## Test characteristics of air-contrast barium enema (ACBE), computed tomographic colonography (CTC), and colonoscopy for detecting large colonic polyps\*

Test	Lesion size	Sensitivity (95% CI)	Specificity (CI)	+LR	-LR
ACBE	$\geq 10$ mm	48% (35 to 61)	90% (87 to 92)	4.80	0.58
	6 to 9 mm	35% (27 to 45)	Not reported	Not reported	Not reported
	$\geq 6$ mm	41% (33 to 49)	82% (78 to 85)	2.28	0.72
CTC	$\geq 10$ mm	59% (45 to 71)	96% (94 to 98)	14.75	0.43
	6 to 9 mm	51% (41 to 60)	Not reported	Not reported	Not reported
	$\geq 6$ mm	55% (47 to 63)	89% (86 to 92)	5.00	0.51
Colonoscopy	$\geq 10$ mm	98% (91 to 100)	99.6% (99 to 100)	245	0.02
	6 to 9 mm	99% (95 to 100)	Not reported	Not reported	Not reported
	$\geq 6$ mm	99% (95 to 100)	99.6% (98 to 100)	248	0.01

\*Diagnostic terms defined in Glossary; LRs calculated from data in article.

## COMMENTARY

The study by Rockey and colleagues prospectively evaluated ACBE, CTC, and colonoscopy for the diagnosis of colonic neoplasia in high-risk patients. The study showed the accuracy of colonoscopy to be higher than that of ACBE or CTC. Overall, the study was well designed and well done. All investigators were adequately trained to do the tests being evaluated. Each test was interpreted blind, with segmental unblinding during the colonoscopy and independent blinded review of discordant results on any of the 3 tests. All tests were repeated in the event of continued disagreement. This rigorous method minimizes bias in favor of colonoscopy.

The study has 2 limitations. First, no barium stool tagging was used for CTC. Because colonic lesions can be obscured by untagged fluid and stool, this lowers the accuracy of CTC. Second, the Vitrea software used in the study has limited 3-dimensional reconstruction, with lower resolution for polyp conspicuity and less similarity to optical colonoscopy than the Viatronix software in a study by Pickhardt (1).

CTC was better than ACBE for detection of 6- to 9-mm lesions. However, both CTC and ACBE had lower accuracy than colonoscopy,

which also allows tissue biopsy and excision. Even with the anticipated technologic advances, CTC will not be cost-effective for diagnosing colonic neoplasia in high-risk populations because of the frequent need for follow-up colonoscopy. In this study, if CTC were fully accurate, 29% of patients would still have needed colonoscopy to remove or to facilitate biopsy on lesions  $> 6$  mm. Consequently, within its current operational parameters, CTC cannot be advocated as the first-line investigation for patients with a high likelihood of colonic neoplasia. For such populations, CTC should be reserved for patients unwilling or unable to undergo colonoscopy. However, CTC may have a role in low-risk screening populations where most patients will not have colonic neoplasia and will not need a subsequent colonoscopy.

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## Reference

- Pickhardt PJ. *AJR Am J Roentgenol*. 2003;181:1599-606.