Virtual colonoscopy performed poorly in detecting colorectal neoplasia


Clinical impact ratings GP/FP/Primary care ★★★★★ IM/Ambulatory care ★★★★★ Gastroenterology ★★★★★★★

In patients presenting for colonoscopy, what is the accuracy of computed tomographic (CT) colonoscopy (virtual colonoscopy [VC]) in detecting colorectal neoplasia?

**METHODS**

**Design:** blinded, non-inferiority comparison of VC with conventional colonoscopy.

**Setting:** 8 clinical centres in the US and 1 centre in the UK.

**Patients:** 615 patients (mean age 61 y, 55% women) presenting for colonoscopy because of overt and occult rectal bleeding, change in stool habit, abdominal pain, or surveillance after polypectomy. Patients who had had colonoscopy within the past 3 years were excluded.

**Description of tests:** the colon was insufflated with room air or carbon dioxide. VC was done using 2 and 4 section CT scanners with nominal slice thicknesses of 2.5 or 5 mm and reconstruction increments of 1.5 or 1 mm, depending on equipment. Scans were read in 2 dimensional slices and 3 dimensional snapshot reconstructions when necessary. Radiologist interpretations were recorded in a sealed envelope for each colon segment. Endoscopists were blinded to VC results during insertion of the colonoscope. After each segment was examined and results recorded, the VC results for that segment were revealed, allowing the endoscopist to reexamine any discrepancy.

**Diagnostic standards:** initial VC results, additional findings on conventional colonoscopy after segmental unblinding to the VC results, and results of additional diagnostic tests done later when clinically indicated.

**Outcomes:** sensitivity and specificity of VC and conventional colonoscopy in detecting lesions ≥6 mm.

**Source of funding:** Office of Naval Research, US Department of Defense.

**Setting:** Charleston, SC, USA. cottonp@musc.edu

**For correspondence:** Dr P B Cotton, Medical University of South Carolina, Charleston, SC, USA. cottonp@musc.edu

**Test characteristics of virtual colonoscopy (VC) and conventional colonoscopy (CC) in detecting colorectal neoplasia**

<table>
<thead>
<tr>
<th>Test</th>
<th>Lesion size</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>+LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC</td>
<td>1–5 mm</td>
<td>14% (10 to 18)</td>
<td>91% (87 to 94)</td>
<td>1.42</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>≥6 mm</td>
<td>39% (30 to 48)</td>
<td>91% (88 to 93)</td>
<td>4.11</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>6–9 mm</td>
<td>30% (20 to 40)</td>
<td>93% (91 to 95)</td>
<td>4.35</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>≥10 mm</td>
<td>55% (40 to 70)</td>
<td>96% (94 to 98)</td>
<td>13.75</td>
<td>0.47</td>
</tr>
<tr>
<td>CC</td>
<td>1–5 mm</td>
<td>97% (95 to 99)</td>
<td>100%</td>
<td>=</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>≥6 mm</td>
<td>99% (97 to &gt; 99.9)</td>
<td>100%</td>
<td>=</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>6–9 mm</td>
<td>99% (96 to &gt; 99.9)</td>
<td>100%</td>
<td>=</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>≥10 mm</td>
<td>100%</td>
<td>100%</td>
<td>=</td>
<td>0.0</td>
</tr>
</tbody>
</table>

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

**827 lesions were detected in 308 patients. The prevalence of lesions 1–5 mm, 6–9 mm, and ≥10 mm was 79%, 14%, and 6.5%, respectively. The sensitivity of VC for detecting lesions of any size was much less than that of conventional colonoscopy (table).**

**CONCLUSION**

In patients presenting for colonoscopy, virtual colonoscopy was inferior to conventional colonoscopy in detecting colorectal neoplasia.

Abstract and commentary also appear in ACP Journal Club.

**Commentary**

Is it time for VC to be included among the screening options? If I had had only the Pickhardt study to guide me, I might have been tempted. But the Cotton study reminds us that the test is not yet ready for general use. Sensitivity and specificity in ordinary circumstances are not high enough. Also, cost and the consequences to patients with abnormal results have not yet been vigorously examined. Abnormal VC results must be followed up with another procedure (conventional colonoscopy), with its own demanding preparation and costs. As for the strength of the evidence of effectiveness, there are no studies of whether screening VC prevents colorectal cancer deaths. However, the medical community seems willing to accept that polyp detection by any means, followed by removal, leads to fewer cases colorectal cancer — by generalising from studies in which both polyp or cancer detection rates and colorectal cancer deaths have been reported.

VC is already available in some centres and marketed to the general public. But it is not yet included in guidelines. As the technology continues to improve and if more studies of recent generation technology are as persuasive as the Pickhardt study, it may be just a matter of time before VC is added to the list of accepted screening options. The Pickhardt study suggests that the time might not be far away, and the Cotton study reminds us that the time has not yet arrived.

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