Detection of Colorectal Polyps by Computed Tomographic Colography: Feasibility of a Novel Technique

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Background & Aims: Computed tomographic colography (CTC) represents a novel technique for colorectal polyp detection. A prospective study was undertaken to determine the optimal CTC scanning parameters based on an artificial colon model and to assess the feasibility of CTC to detect clinically significant colorectal polyps. Methods: A colon model was scanned by helical computed tomography at multiple parameters. Reformatted two-dimensional and three-dimensional images were then graded for polyp detection and image quality. Subsequently, 10 patients with known colon polyps underwent CTC immediately before colonoscopy. The number of polyps detected by two radiologists using CTC were compared with colonoscopy results that served as the gold standard. Results: The optimal scanning parameters in the colon model were 5-mm collimation, 5 mm/s table speed, and 1-mm reconstruction interval. Ten patients had 30 polyps (range, 0.2–2.0 cm) by colonoscopy, and all polyps ≥0.5 cm were adenomas. Polyp detection by CTC for both observers was 100% (5 of 5) ≥1 cm, 71% (5 of 7) between 0.5 and 0.9 cm, and 11%–28% (2–5 of 18) <0.5 cm. Conclusions: Based on this small, unblinded pilot study, CTC is feasible for colorectal polyp detection ≥0.5 cm in diameter.

In industrialized nations, colorectal cancer is the second leading cause of deaths from malignancy. Most large bowel malignancies arise from preexisting adenomas, a concept supported by a decreased cancer incidence following colonoscopic polypectomy. Unfortunately, widespread colorectal screening and preventive efforts are hampered by several practical impediments, including limited resources, methodological inadequacies, poor patient acceptance, and therefore poor compliance. Recently, “virtual colonoscopy,” a technique that creates computer-simulated intraluminal flights through the colon, was introduced for colorectal polyp detection. This technique combines helical computed tomographic (CT) imaging of a prepped, air-insufflated colon with specialized three-dimensional imaging software that extracts and displays the mucosal surface. Although virtual colonoscopy has conceptual appeal for polyp detection, no clinical data have yet been published.

Our laboratory has developed a novel technique, CT colography (CTC), that processes and displays two-dimensional helical CT images at cross sections and orthogonal angles to the center of the colon, potentially providing quicker and more accurate polyp detection than an intraluminal three-dimensional surface rendering (virtual colonoscopy). A prospective study was undertaken to determine the optimal CTC scanning parameters based on an artificial colon model and to assess the potential of CTC to detect clinically significant colorectal polyps in patients with known polyps.

Materials and Methods

To determine optimal CTC scanning parameters, an artificial colon model with simulated polyps was created by affixing five vitamin E capsules (length, 1.5 cm; diameter, 0.7 cm) inside 43 cm of tygon plastic tubing (external diameter, 3.0 cm; internal diameter, 2.4 cm). The tube was bent into a U-shaped configuration and then sealed in a plastic container surrounded by 5 L of ultrasound gel. The colon model was scanned in a GE HiSpeed Advantage helical CT scanner (General Electric, Milwaukee, WI) so that axial images depicted simultaneous cross sections of both tube ends (i.e., the longitudinal axis was perpendicular to tube rotation). Images were acquired with collimations of 3–10 mm, table speeds of 3–10 mm/s (pitch of 1), reconstruction intervals of 1–10 mm, matrix of 512 × 512, and field of view of 38 cm, 70 mA, and 120 kVp (Table 1). After grading these parameters, the colon model was rescanned using the optimally determined parame-
tion for air insufflation of the colon using a hand pump. When

Statistical Analysis

colonoscopy later the same day. found and exact 95% confidence intervals for the true propor-

formed and patients subsequently underwent video-recorded For each size range, an estimation of the proportion of polyps

patient rotated to a supine position. CT imaging was per-

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reached maximal tolerance, the rectal tip was removed and thePolyps were divided into three groups based on size:

the patient verbally indicated that air administration had

SD, 63.8

ters (collimation, 5 mm; reconstruction interval, 1 mm) but with an increased pitch of 1.3.

After transferring the original CT images to a computer workstation, an extraluminal three-dimensional volume ren-

dering of the colon model was performed using commercially available software (ANALYZE; Biomedical Imaging Resource, Mayo Foundation, Rochester, MN). Simulated polyps were manually segmented from the two-dimensional images, and polyp location was visualized through translucent renderings of the tube wall.

All original two-dimensional and three-dimensional volume-rendered images were analyzed in a blinded fashion by two radiologists. Two-dimensional and three-dimensional images were each graded in two categories, tube edge definition and polyp edge definition, and graded on a scale of 0–4 (0, not seen; 1, poor; 2, fair; 3, good; 4, excellent). In addition, two-dimensional images were graded for polyp detection using the 0–4 scale to represent the average number of images that detected each polyp. For example, a grade of 1 indicated that each polyp was seen on average in only one two-dimensional slice, whereas a grade of 4 meant each polyp was seen on average in four or more two-dimensional images. All five cate-
gories were then averaged for an overall image quality score.

Once the in vitro imaging parameters were optimized, scanning was performed in 10 patients (7 men and 3 women) with known colon polyps and ranging in age from 51 to 80 years (mean ± SD, 63.8 ± 9.9 years). Seven of 10 patients were recruited following a positive barium enema, 1 of 10 following a positive proctoscopic examination, 1 of 10 following a posi-
tive colonoscopy without polypectomy, and 1 of 10 for follow-up of a patient with known familial polyposis. Patients selected for the study were required to be between 40 and 80 years of age, scheduled for colonoscopic polypectomy, and able to give written consent. Patients with colostomies, inflammatory bowel disease, acute diverticulitis, a colon biopsy performed in the previous 72 hours, a polypectomy in the previous 6 weeks, a glucagon allergy, or severe claustrophobia were ex-
cluded. This study was approved by our institutional review board.

All patients underwent a standard oral colonoscopy prepara-
tion (polyethylene glycol electrolyte solution and bisacodyl tablets). Five minutes before the CT scan, 1 mg of glucagon was injected subcutaneously to minimize bowel peristalsis. After the injection, the patient assumed a left lateral decubitus posi-
tion for air insufflation of the colon using a hand pump. When the patient verbally indicated that air administration had reached maximal tolerance, the rectal tip was removed and the patient rotated to a supine position. CT imaging was performed and patients subsequently underwent video-recorded colonoscopy later the same day.

All CTC examinations were performed using a GE HiSpeed Advantage helical CT scanner (GE Medical Systems). After colon insufflation, a breath-hold AP scout was obtained to assess luminal distention and to prescribe axial slices through the entire large bowel. Images were acquired with 5-mm colli-
mation, table speed of 5 mm/s (pitch of 1), 1-mm reconstruc-
tion intervals, matrix 512 × 512, field-of-view to fit, 70 mA, 120 kVp, and 20-second breath-holds. Three to four breath-holds were performed within 2 minutes, producing 350–400 axial images. The calculated effective total body radiation dose was 582 mrad for women and 423 mrad for men. A 75% reduction in radiation dose was achieved by reducing the tube current from 280 mA to 70 mA after phantom studies at our institution showed near equivalent air-tissue contrast at both doses.

Image processing was performed with a computer worksta-
tion (SPARC20; SUN Microsystems, San Jose, CA) using soft-
ware developed at our institution. Image processing consisted of manual definition of the colon centerline with automatic generation of multiple reformatted two-dimensional images. Centerline definition and evaluation each required approxi-
mately 10 minutes.

In the first step, the colon centerline was manually defined by drawing a series of points on any one of several images: two-dimensional (Figure 1A) or three-dimensional (Figure 1B) axial, coronal, or sagittal CT images or images of a mathemati-
cally straightened version of the colon (Figure 1C). Midline centering could be adjusted on a reformatted cross-sectional two-dimensional image that was both perpendicular to and centered at the end of the trace (Figure 1D). After the center-
line was identified, the entire colorectum was essentially straightened and “cut” in cross section, coronal, and sagittal orientations (Figure 2).

A multiple image display program allowed interactive eval-
uation of the reformatted images for polyp detection. Observers could cine through designated colon segments or rotate the straightened colon 0–360° to allow inspection of the entire circumference of the colon wall. Polyp location was localized on three-dimensional colon renderings and reported as a distance measurement from the anal verge. Image evaluation required approximately 10–15 minutes per patient.

Two radiologists not blinded to colonoscopy results inde-
pendently identified the number and location of polyps found by CTC to compare with the number and location of polyps found at colonoscopy. In the case of the patient with familial polyposis, only those polyps that were sampled and measured pathologically were included in the analysis. Polyp size was determined from pathology (n = 20) or from colonoscopic estimates (n = 10).

Statistical Analysis

Polyps were divided into three groups based on size: ≈1 cm in diameter, between 0.5 and 0.9 cm, and <0.5 cm. For each size range, an estimation of the proportion of polyps found and exact 95% confidence intervals for the true propor-
tion based on the cumulative binomial distribution were ob-
tained. Similarly, an estimation of the proportion of patients correctly diagnosed with polyps and exact 95% confidence intervals for the true proportion based on the cumulative binomial distribution were obtained. It was decided that if ≈80%
of polyps ≥1 cm were detected by CTC, then a prospective trial would be considered appropriate.

**Results**

When tested on the colon model, the technique using a 5-mm collimation, 5 mm/s table speed, and 1-mm reconstruction interval produced the highest image quality score of 4.0 (Table 1). Increased reconstruction intervals and table speeds caused degradation of both two-dimensional and three-dimensional image quality. Although all reconstruction intervals ≤2.5 mm received an excellent two-dimensional polyp detection grade, image quality was poor with reconstruction intervals ≥5 mm. Similarly, the image quality of the three-dimensional volume renderings decreased as the reconstruction interval increased past 1 mm. Implementing a higher pitch (increased table speed) also degraded two-dimensional and three-dimensional image quality.

Ten study patients underwent helical CT followed by colonoscopy to the cecum. A total of 30 polyps were detected by colonoscopy with the observed patient distribution: 1 patient without polyps, 1 patient with 1 polyp, 3 patients with 2 polyps each, 1 patient with 3 polyps, and 4 patients with 5 polyps each. Polyp location was as follows: 7 in the ascending colon, 1 in the transverse colon, 8 in the descending colon, 13 in the sigmoid colon, and 1 in the rectum. Polyps ranged in size from 0.2 to 2.0 cm with 5 (17%) ≤1 cm in diameter, 7 (23%) between 0.5 and 0.9 cm, and 18 (60%) <0.5 cm. Eighteen of 30 lesions were sent for pathological analysis, and the remaining 12 were fulgurated. Fifteen of 18 specimens (83%) were neoplastic: 10 of 18 (55%) were tubular adenomas with low-grade dysplasia, 4 of 18 (22%) were tubulovillous adenomas with low-grade dysplasia, and 1 of 8 (6%) was a tubulovillous adenoma with focal high-grade dysplasia. The remaining 3 polyps were hyperplastic. All polyps ≥0.5 cm were adenomas. Four of 7 polyps <0.5 cm were adenomas.

The ability of CTC to detect individual polyps and to establish patient diagnosis was determined by comparing CTC results with colonoscopy results (Table 2). Both observers detected 5 of 5 polyps (100%) ≥1 cm and 5

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**Figure 1.** Centerline identification program and navigation aids. (A) Original two-dimensional axial CT slices and reformatted coronal and sagittal slices. (B) Three-dimensional depth-shaded volume renderings of the air-filled colon in axial, coronal, and sagittal views. (C) Horizontal and vertical views of a mathematically straightened version of the colon. (D) Two-dimensional cross section perpendicular and centered at the end of the colon centerline. The cross hair on this image represents the position of the colon centerline. The observer can interactively adjust the position by a point-and-click function.

**Figure 2.** Cross section and orthogonal views to the colon centerline in a patient with a pedunculated polyp. This diagram shows the orientation of the three views constructed at each 2.5-mm interval along the colon centerline. Cross-sectional, horizontal, and vertical orthogonal images are shown of an actual colon polyp (1.0 cm).
Table 1. Colon Model Results

<table>
<thead>
<tr>
<th>Sequencea</th>
<th>No. of slices</th>
<th>Tube edge definition</th>
<th>Polyp definition</th>
<th>Polyp detection</th>
<th>Tube smoothness</th>
<th>Polyp definition</th>
<th>Overall image qualityb</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/3/3</td>
<td>66</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
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<td>130</td>
<td>3</td>
<td>4</td>
<td>4</td>
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<td>3.8</td>
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<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>5/5/2.5</td>
<td>78</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
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<td>190</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>7/7/7</td>
<td>30</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
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<td>59</td>
<td>4</td>
<td>2</td>
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<td>2</td>
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<td>2.0</td>
</tr>
<tr>
<td>7/7/1</td>
<td>203</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3.6</td>
</tr>
<tr>
<td>10/10/10</td>
<td>21</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1.2</td>
</tr>
<tr>
<td>10/10/5</td>
<td>41</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>10/10/2.5</td>
<td>81</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>5/6.5/5</td>
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<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>5/6.5/1</td>
<td>196</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2.8</td>
</tr>
</tbody>
</table>

NOTE. Grading scale is as follows. Definition and smoothness: 0, not seen; 1, poor; 2, fair; 3, good; 4, excellent. Detection: 0, 0 images per polyp; 1, 1 image per polyp; 2, 2 images per polyp; 3, 3 images per polyp; 4, ≥4 images per polyp. When tested on the colon model, the technique using a 5-mm collimation, 5 mm/s table speed, and 1-mm reconstruction interval produced the highest image quality score of 4.0.

aCollimation (mm)/table speed (mm/s)/reconstruction interval (mm).
bComputed by averaging the scores from two-dimensional and three-dimensional analysis.

of 7 polyps (71%) between 0.5 and 0.9 cm using CTC. Observer B noted 3 more polyps <0.5 cm (5 of 18; 27.8%) than observer A (2 of 18; 11.1%) with 2 measuring 0.3 cm and 1 measuring 0.4 cm. The smallest polyp detected by CTC was 0.3 mm. A total of 2 false-positive results occurred in 2 separate patients. The identical false-positive results were reported independently by both observers and were estimated to be between 0.5 and 0.9 cm in diameter on CTC.

In the patient with familial polyposis, approximately 30 polyps between 2 and 6 mm were reported by colonoscopy with 2 diminutive polyps on which biopsies were performed measuring 0.2 cm. Although multiple small polyps were noted on the CTC examination, we were unsure if these abnormalities represented one of the polyps on which a biopsy was performed. Therefore, it was assumed that the 2 polyps on which biopsies were performed were not detected by CTC.

Four of 4 patients (100%) with polyps ≥1 cm were detected by CTC, as were 5 of 7 patients (71%) with polyps between 0.5 and 0.9 cm. Observer A diagnosed 2 of 7 patients (28.6%) with polyps <0.5 cm compared with 3 of 7 patients (42.8%) diagnosed by observer B (Table 2).

Seven of 10 patients had barium enema examinations performed preceding CTC and colonoscopy. One barium enema examination was performed at an outside institution and was not included in this analysis. Sixteen polyps were found by colonoscopy in the remaining 6 patients: 3 of 16 (19%) ≥1.0 cm, 4 of 16 (25%) between 0.5 and 0.9 cm, and 9 of 16 (56%) <0.5 cm. Polyp detection by barium enema, CTC, and colonoscopy in this patient subset is shown in Table 3.

Discussion

CTC uses the same helical CT images as virtual colonoscopy but produces multiple reformatted two-dimensional CT images instead of a three-dimensional intraluminal perspective for colorectal polyp detection.

Table 2. Polyp Detection and Patient Diagnosis Comparing CTC and Colonoscopy

<table>
<thead>
<tr>
<th>Polyp size (cm)</th>
<th>CTC/colonoscopy</th>
<th>Sensitivity (%)</th>
<th>95% confidence interval (%)</th>
<th>Patient diagnosis (n = 10)</th>
<th>CTC/colonoscopy</th>
<th>Sensitivity (%)</th>
<th>95% confidence interval (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥1</td>
<td>5/5</td>
<td>100</td>
<td>47.8–100</td>
<td>4/4</td>
<td>100</td>
<td>39.8–100</td>
<td></td>
</tr>
<tr>
<td>0.5 ≤ x &lt;1</td>
<td>5/7</td>
<td>71.4</td>
<td>29.0–96.3</td>
<td>5/7</td>
<td>71.4</td>
<td>29.0–96.3</td>
<td></td>
</tr>
<tr>
<td>&lt;0.5—observer A</td>
<td>2/18</td>
<td>11.1</td>
<td>1.4–34.7</td>
<td>2/7</td>
<td>28.6</td>
<td>3.7–71.0</td>
<td></td>
</tr>
<tr>
<td>&lt;0.5—observer B</td>
<td>5/18</td>
<td>27.8</td>
<td>9.7–53.5</td>
<td>3/7</td>
<td>42.8</td>
<td>9.9–81.6</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Polyp Detection: Barium Enema, CTC, and Colonoscopy

<table>
<thead>
<tr>
<th>Polyp size (cm)</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Barium enema</td>
</tr>
<tr>
<td>≥1</td>
<td>7</td>
</tr>
<tr>
<td>0.5 ≤ x &lt;1</td>
<td>3</td>
</tr>
<tr>
<td>&lt;0.5</td>
<td>2</td>
</tr>
</tbody>
</table>

CTC was developed to provide improved polyp visualization and localization in less time and at less cost than virtual colonoscopy. CTC enhances polyp visualization through the excellent anatomic detail of two-dimensional images (Figures 1–3) and simplifies detection by the multiple image display tool. Unlike virtual colonoscopy, CTC can indicate the exact colon location of polyps by three-dimensional display or as a distance measurement. In addition, CTC uses approximately $20,000$ of computer hardware and produces reformatted images within 10 minutes, whereas virtual colonoscopy requires upwards of $100,000$ of computer hardware for image production. This study was undertaken to determine the optimal scanning parameters for CTC and the feasibility of this technique to detect clinically significant colorectal polyps.

In vitro studies to determine optimal CT imaging techniques indicated that slice thickness in excess of 5 mm, reconstruction intervals $>1$ mm, and table speeds more than a pitch of 1 degraded both two-dimensional and three-dimensional image quality. The best overall image quality was obtained using 5-mm collimation, 5 mm/s table speed (pitch of 1), and 1-mm reconstruction intervals. These parameters were also used by Vining and Gelfand in their preliminary report on virtual colonoscopy. After reducing the radiation dose to 70 mA, the CT examination also had a calculated effective radiation dose comparable with barium enema examinations at our institution.

In vivo, this two-dimensional helical CT technique was coupled with specially designed postprocessing software and termed CTC. The key issue of this pilot study concerned the ability of CTC to detect polyps $≥1$ cm because these polyps and those with villous-type histology are associated with a higher risk of future malignant changes. Our results indicate that CTC allows excellent detection of these polyps with 5 of 5 polyps $≥1$ cm reported by both observers. Our detection of polyps between 0.5 and 0.9 cm was encouraging, with only 2 of 7 polyps missed by both observers. In addition, 1 rectal polyp measuring 0.9 cm was missed due to inadequate luminal distention at that level, an acquisition problem that can likely be avoided with additional experience. The 0.5-cm cecal polyp was missed either due to the small size of the polyp or secondary to fluid in the right colon.

The detection of small polyps $<0.5$ cm was less successful (11%–28%) using this technique. This is not necessarily of great clinical importance because colon can-

Figure 3. Patient example: barium enema, colonoscopy, CTC of the identical polyp (1.0 cm). (A) Pedunculated colon polyp seen during single-contrast barium enema. (B) Pedunculated colon polyp seen during colonoscopy. (C) Pedunculated colon polyp by CTC: vertical orthogonal and cross section.
Cancer is not significantly increased in patients with small polyps when compared with the general population and the risk of cancer in a polyp this size is remote (<0.1%). The identification of polyps <0.5 cm using CTC is challenging because the normal characteristics of haustral folds are variable and may resemble diminutive polyps in certain views. Further experience viewing these folds with this technique should allow improved differentiation between normal and abnormal colon.

CTC offers many potential advantages over currently available colorectal cancer screening tests such as anatomic assessment of the entire colorectum, the capacity to detect small polyps, and excellent patient tolerance. Sigmoidoscopy views only the distal colorectum, a serious limitation considering the shifting incidence towards proximal cancers. Widely used fecal occult blood tests fail to detect the large majority of polyps and, unlike structural screening, their repeated application does not reduce colorectal cancer incidence. Colonoscopy has multiple disadvantages, including patient sedation, patient discomfort, risk of perforation, and inability to reach the cecum in 5%–10% of cases. Although feasibility of the CTC technique for colorectal polyp detection was shown in this small patient group, a more accurate assessment of this method will ultimately depend on carefully performed, prospective, blinded comparisons against colonoscopy and barium enema.

In the 6 patients with barium enema examinations performed at our institution, 4 polyps ≥1.0 cm were reported that were not seen by colonoscopy or CTC. Because colonoscopy was considered the gold standard in this study, these 4 polyps were considered as false-positives by the barium enema examinations. CTC may offer a potentially more accurate and complete colon examination than a barium enema because of the improved sigmoid examination and visualization of the rectum, perhaps replacing the need for two examinations (proctoscopy or sigmoidoscopy plus the fluoroscopic barium enema) with one examination (CTC) requiring <10 minutes. The double-contrast barium enema does visualize the rectum routinely but was not assessed in this study. The minimal cramping noted by some patients in this study could be reduced with colonic insufflation using CO₂ instead of room air.

The total time required for an entire CTC study is approximately 1 hour, which can eventually be minimized in future studies. The patient examination requires 10 minutes, which compares favorably with both colonoscopy (30 minutes plus 1 hour recovery) and is comparable with barium enema (14 minutes plus film review). The patient examination time may be reduced pending faster CT scanner capabilities and optimized scanning parameters. Image reconstructions currently require 20 minutes, and image transfer, midline identification, and image evaluation each require 10 minutes. Time requirements for image postprocessing will likely also decrease with improvements in helical CT technology, increased computer power, and programming modifications to allow real-time display. The projected cost of this procedure may be reduced because it requires half the time (and potentially half the cost) of a standard noncontrast abdominal CT. Conceivably, the examination would be of comparable cost to barium enema and significantly less than colonoscopy, but the actual charges have yet to be determined. Furthermore, the minimal examination time could facilitate compliance with neoplastic screening.

Two technical problems during prescan preparation and image acquisition were encountered during this study: inadequate luminal distention and breath-hold artifacts. Distention problems may be solved by minimizing patient movement following colon insufflation. This may be accomplished by not removing the enema tip, imaging in the decubitus position or insufflating in a supine position, and scanning immediately following colon insufflation. In addition, image acquisition from a caudal to cephalic position may ensure optimal rectosigmoid distention. In this study, all patients were imaged from a cephalic to caudal position because this is traditional in CT image acquisition.

Our second technical problem concerned breath-hold misregistration between the three or four 20-second breath-holds. No patients were able to perfectly reproduce a breath-hold position, causing either overlap or deletion of small segments of the colon, which interfered with complete colon examination in 2 cases. This problem could be improved in multiple ways: (1) increasing the pitch to allow imaging in one breath-hold, (2) allowing shallow breaths during one acquisition, (3) acquiring data in overlapping sections, (4) improving breath-hold reproducibility by more concentrated patient teaching, (5) using respiratory-gating software, or (6) scanning with electron-beam CT to allow a single breath-hold image acquisition.

Retained fecal material was not found to be a significant problem. This may be explained by the small number of patients studied or the likelihood that our patient population carefully complied with the preparation instructions. Further investigation of the ideal preparation for this examination will be needed.

In conclusion, based on our experience in 10 patients, we believe that CTC of an air-filled colon with reformat-
ted cross-sectional and orthogonal views is a feasible method for detection of polyps $\geq 0.5$ cm. CTC could potentially have wide applications as a colorectal cancer screening test, as a postpolypectomy surveillance examination, or as a diagnostic test in patients with nonspecific abdominal complaints. Larger studies of CTC with blinded comparison to colonoscopy and barium enema examinations will be needed to determine the sensitivity and specificity of this new technique.

References


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