A simple method to improve adenoma detection rate during colonoscopy: Altering patient position

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BACKGROUND: Colonoscopy is currently considered to be the gold standard method for detecting and removing adenomatous polyps. However, tandem colonoscopy studies reveal a pooled polyp miss rate of 22%. A prospective randomized trial was conducted to assess whether alteration of patient position during colonoscopy withdrawal increases the adenoma detection rate (ADR).

OBJECTIVE: A simple and effective method to improve the detection of adenomas during colonoscopy is currently considered to be the gold standard method for detecting and removing precancerous adenomatous polyps. However, tandem colonoscopy studies reveal a pooled polyp miss rate of 22%. The study group included 120 patients who presented for screening colonoscopy (6-11).

METHOD: The study group included 120 patients who presented for elective colonoscopic examination. After reaching the cecum, patients were randomly assigned in a 1:1 ratio to examination in either the left lateral position or other positions (left lateral position for the cecum, ascending colon and hepatic flexure; supine for transverse colon; and supine and right lateral position for splenic flexure, descending and sigmoid colon) first. Examination of the colon was performed segment by segment. The size, morphology and location of all polyps were recorded. Polyps were removed immediately after examination of a colon segment when all positions were completed. ADR and polyp detection rates (PDR) were calculated.

RESULTS: A total of 102 patients completed the study. Examination in the left lateral position revealed 66 polyps in 31 patients (PDR 30.3%) and 42 adenomas in 24 patients (ADR 23.5%). PDR increased to 43.1% (81 polyps in 44 patients) and the ADR to 33.3% (53 adenomas in 34 patients) after the colon was examined in the additional positions (P<0.001 and P=0.002, respectively). The increase in the number of adenomas detected was statistically significant in the transverse and sigmoid colon. The addition of position changes led to a 9.8% increase in the ADR in the transverse colon, splenic flexure, and descending and sigmoid colon. The frequency of surveillance interval was shortened in nine (8.8%) patients after examination of the colon in dynamic positions.

CONCLUSION: Alteration of patient position during colonoscopy withdrawal is a simple and effective method to improve ADR.

Key Words: Adenoma detection rate; Adenomatous polyp; Colon; Colonoscopy

Colorectal cancer (CRC) is one of the most common malignancies in Western countries including the United States. Colonoscopy is currently considered to be the gold standard method for detecting and removing precancerous adenomatous polyps. However, tandem colonoscopy studies reveal a pooled miss rate of 22% for polyps and 26% for adenomas <5 mm in size (1). Various devices and methods have been used to improve the detection of adenomas during colonoscopy. Devices include high-definition white-light colonoscopy, cap-fitted colonoscopy, wide-angle colonoscopes and third-eye retrosopes (2-5). Methods include inspection of the colon during withdrawal for a longer duration (26 min), increasing the adequacy of the bowel preparation with the use of split-dose preparations, use of antispasmodics and advanced endoscopic techniques such as chromoendoscopy and electronic mucosal enhancement, and participation of an additional observer during the screening colonoscopy (6-11).

Radiologists’ experience with barium enema suggest that altering patient position in a manner that the area of interest is brought to its highest point causes gas to rise and replaces the fluid in that area, which in turn leads to adequate distention and better examination. Therefore, the hepatic flexure, transverse colon and the splenic flexure, and descending and sigmoid colon are best examined with the patient in the left lateral, supine and right lateral positions, respectively. In
the present study, we conducted a randomized prospective trial to investigate whether these position changes defined for barium enema examination increase polyp and adenoma detection rates (PDR and ADR, respectively) during colonoscope withdrawal.

METHODS

Patients

The study group included 120 consecutive adult patients (40 to 80 years of age) who were admitted to Gastroenterology clinics of Türkiye Yüksek İhtisas Hospital (Ankara, Turkey) for elective outpatient colonoscopic examination. Patients with colitis, polyps syndromes, history of colon operation, musculoskeletal problems, technical difficulty in reaching the cecum (time to intubate cecum >20 min or inability to reach cecum) or refusal to participate in the study were excluded. All patients gave written informed consent to participate in the study, which was approved by the local ethics committee.

Colonoscopy examination

All patients received a standard bowel preparation of 4 L of polyethylene glycol electrolyte lavage solution the night before colonoscopy. Colonoscopies were performed by a single experienced endoscopist. None of the patients received intravenous sedation or antispasmodics during colonoscopy as standard of care at the hospital. Colonoscopy was performed using Olympus Evis Lucera CF-Q260DL colonoscopes and an Olympus high-definition LCD monitor OEV191H (Olympus Medical System Corp, Japan). Room air was used to insufflate the bowel as the standard of care at the hospital.

During colonoscopy, fluid and debris were suctioned as much as possible during intubation. Bowel preparation quality was graded according to the Boston bowel preparation scale (12). Patients with a segment score ≤1 were excluded from the study. Cecal intubation was confirmed by visualization of the ileocecal valve, the triradiate fold and the appendiceal orifice. After reaching the cecum, patients with acceptable bowel preparation were randomized according to a predetermined sequence in a 1:1 ratio to examination in either the left lateral position or other positions first. The duration of examination was 2 min for each position, which was timed using a stopwatch. This led to a total withdrawal time of 14 min from the cecum to sigmoid colon-rectum junction excluding the time spent for position changes and therapeutic procedures. The size (estimated by comparing with open biopsy forceps), morphology (classified according to Paris classification) and location of all polyps were recorded after each position. Polyps were removed immediately after examination of that segment when all positions were completed. Polyps <5 mm in size were removed by cold biopsy. Larger polyps were snared with electrocautery. ADR and PDR were defined as the proportion of cases with ≥1 lesions detected. The histopathological diagnosis of polyps was assessed by experienced pathologists.

Statistical methods

Statistical analyses were performed using SPSS version 17.0 (IBM Corporation, USA) for Windows (Microsoft Corporation, USA). Values for continuous variables are presented as mean ± SD while categorical variables are provided as percentages. Comparisons of continuous variables were made using the Student’s t test or Mann Whitney U-test, depending on normality of distribution. Categorical variables were compared using the Pearson’s or Fisher’s exact \( \chi^2 \) tests. The Wilcoxon signed-rank test and paired-samples test was used depending on the normality of distribution comparing two related samples to assess whether their population mean ranks differed; \( P<0.05 \) was considered to be statistically significant.

RESULTS

A total of 120 patients were enrolled in the present study. Of these, 18 (15%) patients were excluded because of poor bowel preparation in six (5.0%), colitis in three (2.5%), prolonged cecum intubation time in two (1.7%), refusal to participate in one (0.8%), musculoskeletal problems in two (1.7%), inability to reach the cecum in one (0.8%) and history of colon cancer in three (2.5%) (Figure 1). Demographic and clinical characteristics of the remaining 102 patients who participated in the study are presented in Table 1.

Examination in the left lateral position revealed 66 polyps in 31 patients (PDR 30.3%). The PDR increased to 43.1% (81 polyps in 44 patients) with additional examinations (\( P<0.001 \)) (Table 2). The median size of the 15 polyps detected during additional position changes (3 mm) were smaller than those detected during examination in the left lateral position (4 mm) (\( P=0.8 \)). Ten were <5 mm, three
were between 5 mm and 10 mm, and two were >10 mm in size. Paris classification was IIa in 10, IIb in three, and I's in two. The increase in the number of polyps was statistically significant in the transverse and sigmoid colon (P=0.01 and P=0.04, respectively).

Examination in the left lateral position revealed 42 adenomas in 11 female and 13 male patients. The ADR was 23.5% (21.5% for women and 25.4% for men). The ADR increased to 33.3% (53 adenomas in 34 patients) with the addition of position changes (P=0.002) (Table 3). Seven of the additionally diagnosed 11 adenomas were <5 mm, three were between 5 mm and 10 mm and one was 14 mm in size. Paris classification was IIa in 8, IIb in two, and I's in one. None of the additionally diagnosed polyps had high-grade dysplasia or villous histology. The increase in the number of adenomas was statistically significant in the transverse and sigmoid colon (P=0.05 and P=0.04, respectively).

The addition of position changes led to a 12.8% increase in the number of adenomas detected in the left lateral position (P=0.002) (Table 3). The increase in the number of adenomas was statistically significant in the transverse and sigmoid colon (P=0.05 and P=0.04, respectively). The frequency of surveillance interval determined according to the addition of position changes (PC) was between 5 mm and 10 mm, and two were >10 mm in size. Paris classification was IIa in 10, IIb in three, and I's in two. The increase in the number of polyps was statistically significant in the transverse and sigmoid colon (P=0.01 and P=0.04, respectively).

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In the present study, ADR in the left lateral position was 25.4% for men and 21.5% for women. These values were close to the acceptable ADR threshold levels defined by societies. This may be due to the enrollment of younger patients (40 to 50 years of age) in the study. Accordingly, the ADR in men and women ≥50 years of age were higher (30.8% and 27.3%, respectively) and consistent with values reported in guidelines. Dynamic position changes led to a 9.8% increase in the ADR. This finding is consistent with a recent study reporting an increase in ADR from 23% in the left lateral position to 34% after addition of position changes (16). The median size of the additionally diagnosed adenomas were 3 mm and none exhibited high-grade dysplasia or villous histology. Although the benefit of removing these small adenomas in the short term may be limited, dynamic position changes led to a more accurate risk stratification for surveillance. The frequency of surveillance interval determined according to NCCN Colorectal Cancer Screening guidelines was shortened in nine (8.8%) patients.

It is well known that ADR is strongly associated with longer colonoscopy withdrawal times. Studies have recommended that colonoscopy withdrawal should last at least 6 min (6). From this point of view, the increase in the ADR after dynamic position changes may be partly due to the significant increase in the colonoscopy withdrawal time due to position changes. On the other hand, ADRs in the cecum, ascending colon and hepatic flexure after examination in the left lateral position twice were almost identical, which suggests that prolonged withdrawal time is not the only factor contributing to increased ADR.

The increase in the number of adenomas detected after position changes were statistically significant in the transverse and sigmoid colon. The splenic flexure, descending and sigmoid colon were examined both in the supine and right lateral positions. The number of additional adenomas detected in the supine position (four adenomas) was equal to the number detected in the right lateral position. Although these position changes could be easily achieved in most of the unsedated or consciously sedated patients within a few seconds, it could be difficult to move a deeply sedated patient to the right lateral position. Therefore moving the patient only to the supine position after examination of the hepatic flexure may be preferred and equally effective in deeply sedated patients. Examination of the entire colon in a specific position at once rather than examining segment by segment may be preferred in deeply sedated patients to prevent frequent position changes.

The present study had some limitations, the first of which was that it was a single-centre analysis; therefore, results should be confirmed in a larger, multicentre study. Although there is sufficient evidence that position changes increase ADR, additional studies investigating the benefit of only the supine position in the left colon may be useful. Another limitation was that the endoscopist was not blinded, which may have led to meticulous examination for additional polyp detection. Furthermore, examination of the colon segment by segment may have increased the awareness of the endoscopist to the polyps present in that segment in the first examination and led to easier detection of polyps at the dynamic position changes; however, randomization prevented the advantage of dynamic position changes. On the other hand, segmentary examination is more reflective of daily practice and decreases the time and effort needed for second intubation of the cecum. Antispasmodic medications and carbon dioxide insufflation were not used in any of the patients. Therefore, the results are widely generalizable.

CONCLUSION
Position changes during colonoscopy withdrawal led to a significant increase in the ADR in the transverse colon, splenic flexure, and descending and sigmoid colon. It is a simple and effective method to increase ADR. Endoscopists should integrate dynamic position changes into their routine clinical practice.

DISCLOSURES: The authors have no financial disclosures or conflicts of interest to declare.