The Miss Rate for Colorectal Adenoma Determined by Quality-Adjusted, Back-to-Back Colonoscopies

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Background/Aims: Colonoscopy is considered to be the gold standard for detecting adenomatous polyps. Polyps are missed during colonoscopic examination at a rate that varies from 6% to 27%. The adenoma miss rate affects colonoscopic surveillance intervals and procedural quality. We aimed to assess the adenoma miss rate and the variables affecting the rate using same-day, quality-adjusted, back-to-back colonoscopies. Methods: This prospective study was performed at a single institution and included 149 patients. Two consecutive same-day colonoscopies were performed by two experienced endoscopists. The adenoma miss rates and variables affecting the missed adenomas, including polyp characteristics and procedure times, were evaluated. Results: The miss rates of polyps, adenomas, and advanced adenomas were 16.8%, 17%, and 5.4%, respectively. The smaller polyps and increased number of polyps detected during the first colonoscopy were more likely to be missed. A longer insertion time during the colonoscopy was correlated with an increased adenoma detection rate. Conclusions: There was a significant miss rate in the detection of colonic adenomas even in quality-adjusted, back-to-back colonoscopies. The adenoma miss rate can be reduced with a sufficient observation time during colonoscopic insertion. The development of specific technological methods to reduce the adenoma miss rate is necessary. (Gut Liver 2012;6:64-70)

Key Words: Colonoscopy; Adenoma; Miss rate; Quality

INTRODUCTION

Colonoscopy is the only procedure that allows removal of adenomatous polyps through the colon, substantially reducing colon cancer incidence.12 The sensitivity of colonoscopy for the detection of polyps is of clinical importance, as the risk of colorectal cancer has been shown to be reduced by the detection and removal of adenomatous polyps. Missing adenomas during colonoscopy might reduce preventive efficacy against colon cancer.3,4 The adenoma miss rate varies from 6% to 27% because of study heterogeneity.5-7 Recently, several studies involving special colonoscopic techniques including narrow band imaging (NBI), autofluorescence, and chromoendoscopy have been conducted to improve detection of polyps and flat lesions. So far, there were no impressive promising benefits of NBI, autofluorescence, and third-eye retroscope in improving polyp detection, as well as being relatively expensive.8-10 In addition, even though pan-chromoendoscopy increased the detection rate of small flat adenomas, it is considered too laborious and time-consuming to be used for routine colonoscopy.11 Quality indicators for colonoscopy include the adenoma detection rate, adenoma miss rate, cecal intubation rate, bowel preparation, and withdrawal time. Cecal intubation and good bowel preparation are minimal requirements for qualified colonoscopic examination.12 The reasons why polyps are missed are not clear, but it may be related to the size, shape, and number of polyps of an individual. The colonoscopic withdrawal time, quality of bowel preparation, and optimal observation techniques of colonoscopist are also important in reducing the adenoma miss rate.13 The most reliable method for assessing the adenoma miss rate is “tandem” or “back-to-back” colonoscopy, a method in which two same-day colonoscopies are performed on each patient.7 We investigated the polyp and adenoma miss rate with same day back-to-back colonoscopy under the circumstances of adequate withdrawal time, bowel preparation, and cecal intubation rate. We also analyzed the variables affecting the miss rate for
MATERIALS AND METHODS

1. Study population

Patients were selected by endoscopists and randomized using the last numeric digit of the patient registration number on the procedure day. Patients were not consecutively enrolled but included between May 2007 and December 2008. We enrolled the patients between the ages of 18 and 80 years who were scheduled for elective colonoscopy. Patients were excluded if they had undergone a previous surgical resection, had inflammatory bowel diseases, familial polyposis coli, or poor bowel preparation, were under anticoagulation therapy, or were in a poor general condition (American Society of Anesthesiologists grade 3 or 4) for two colonoscopies in the same day.

The study was approved by the Institutional Review Board of Hanyang University Guri Hospital, and informed consent was obtained from all patients.

2. Colonoscopic procedure

Before colonoscopy, all patients completed the demographic and medical history questionnaires. Subjects took a standardized preparation on the day prior to colonoscopy with a large volume (4 L) of polyethylene glycol. The examinations were performed by two experienced endoscopists who had each performed at least 3,000 colonoscopies and related procedures.

All endoscopic examinations were performed under conscious sedation in the left lateral decubitus position. Changing position and abdominal compression were performed if necessary. During each procedure, the quality of bowel preparation was rated by the endoscopists as excellent (colon empty and clean), good (minor amount of fluid in the gut, but easily removed by suction), moderate (fluid or semisolid residual stool, fully removable by suction or disposable), bad (fluid or semisolid residual stool, only partially removable with risk of incomplete mucosal visualization) or very bad preparation were excluded from the analysis. After endoscopists reached the ileocecal area, they took photos and recorded the insertion time. Withdrawal time excluding time needed for polyp removal was also measured. All endoscopists spent at least 6 minutes for observation during withdrawal.

The colonoscopes used were forward viewing colonoscope, CF-H260AI (Olympus Optical Co., Ltd., Tokyo, Japan) and an identical type of colonoscope was used during the second colonoscopic examination. We did not use chromoendoscopy or a NBI system.

3. Back-to-back colonoscopy

All patients underwent back-to-back colonoscopy examination, with a conventional colonoscopy followed immediately by the second endoscopy. In all patients, both the first and second colonoscopies were performed by the same examiner. In the first examination, colonoscope was inserted into the cecum, and polyps identified during insertion and withdrawal were counted and removed. Numerous tiny hyperplastic polyps in the rectum and sigmoid colon were not subjected to removal.

In the second examination, we recorded any remaining polyps not found on the initial examination and defined these as ‘missed polyp’. Again, all remaining polyps, except tiny hyperplastic polyps of the rectum and sigmoid colon, were removed.

All polyps detected by the first and second examination, along with the size, shape, location, and polypectomy method were noted. A pair of colonoscopy was included for analysis if both procedures were completed to the ileocecal area and the observation time during withdrawal was at least 6 minutes. The polyp shape was determined according to the Paris classification. We classified type I p polyp as pedunculated polyp, and both type Ia and Isp as sessile polyp, and both type IIa and IIb as flat polyp. Polyp size was determined by comparing with opened biopsy forceps pushed up against the polyp or, in some cases of pedunculated polyps by direct measurement after retrieval.

All the endoscopic lesions removed were reviewed by a gastrointestinal specialized pathologist. Those adenomas larger than 1 cm at endoscopy and/or with high grade dysplasia or a villous component >25% at histology were defined as an advanced adenoma.

4. Calculation of adenoma miss rate and statistical analysis

Miss rates were calculated for adenomas, adenomas ≥6 mm, advanced adenomas, and all polyps. A pooled miss rate for polyps was calculated as: total number of missed polyps/(total number of missed polyps+total number of polyps on initial examination). Miss rates were calculated overall and within strata of polyp size, location, and shape.

Statistical analysis was performed with SPSS for Windows software version 13.0 (SPSS Inc., Chicago, IL, USA). Demographic findings such as age, gender, body mass index, alcohol, smoking, chronic diseases as well as adequacy of colonic preparation were included for analysis. Polyp size, shape, location, and the number of polyps were included in a logistic regression analysis to identify the variables associated with missed polyps.

RESULTS

1. Clinical characteristics

A total of 165 patients was enrolled in the study, and 149 completed both colonoscopies. 16 patients were excluded. The reasons for exclusion were poor bowel preparation (n=15) and failure to complete a second examination to the cecum due to pain after a successful initial examination (n=1). The 149 pa-