Narrow-band imaging for the detection of polyps in patients with serrated polyposis syndrome: a multicenter, randomized, back-to-back trial

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Background: Serrated polyposis syndrome (SPS) is characterized by the presence of multiple serrated polyps spread throughout the colon. Patients with SPS are considered to be at risk of colorectal cancer and are advised to undergo endoscopic surveillance. Narrow-band imaging (NBI) may improve the detection of polyps during these surveillance colonoscopies.

Objective: To compare polyp miss rates between NBI and high-resolution white-light endoscopy (HR-WLE).

Design: Multicenter, randomized, crossover study.

Setting: Four tertiary referral institutions.

Patients: A total of 52 patients with SPS undergoing surveillance colonoscopy.

Intervention: All patients underwent back-to-back colonoscopies with HR-WLE and NBI in a randomized order.

Main Outcome Measurements: Polyp miss rates of HR-WLE and NBI.

Results: In the HR-WLE group, 116 polyps were detected during the first inspection. A second inspection with NBI added 47 polyps, resulting in an overall polyp miss rate of 29% with HR-WLE (95% confidence interval, 22-36). In the NBI group, a total of 128 polyps were detected during the first inspection. Subsequent inspection with HR-WLE added 32 polyps, resulting in an overall polyp miss rate of NBI of 20% (95% confidence interval, 15-27). Comparison of the overall polyp miss rates of HR-WLE and NBI showed no significant difference ($P = .065$).

Limitations: Small sample size; second inspection was performed by the same endoscopist.

Conclusions: The results of our study suggest that NBI does not reduce polyp miss rates in patients with SPS compared with HR-WLE. Further multinational studies with larger numbers of patients are warranted to verify these results. (Clinical trial registration number: NTR2497.) (Gastrointest Endosc 2015;81:531-8.)

Abbreviations: CI, confidence interval; CRC, colorectal cancer; HR-WLE, high-resolution white light endoscopy; NBI, narrow-band imaging; OR, odds ratio; SPS, serrated polyposis syndrome; WHO, World Health Organization.

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Serrated polyposis syndrome (SPS), formerly known as hyperplastic polyposis syndrome, is characterized by the appearance of multiple serrated polyps spread throughout the entire colon. Besides multiple serrated polyps, adenomas are also frequently observed. The syndrome has been defined by the World Health Organization (WHO) as at least 5 histologically confirmed serrated polyps proximal to the sigmoid with at least 2 being 10 mm in diameter or larger (WHO criterion 1), any number of serrated polyps occurring proximal to the sigmoid colon in an individual who has a first-degree relative with SPS (WHO criterion 2), or more than 20 serrated polyps spread throughout the colon (WHO criterion 3).[1]

Patients with SPS are considered to be at increased risk of colorectal cancer (CRC).[2-5] Studies have shown that cancers detected in patients with SPS are generated by both the serrated neoplasia pathway and the traditional adenoma-carcinoma sequence.[6] This implies that in these patients, all types of polyps should be considered clinically relevant as they may act as precursor lesions for CRC. In an effort to prevent CRC, patients are advised to undergo regular endoscopic surveillance with removal of these polyps.[7-9] However, data suggest that in some patients with SPS, even if they undergo endoscopic surveillance, CRC still develops.[2,4] These so-called interval cancers may originate from lesions that are not detected with conventional colonoscopy techniques.

Narrow-band imaging (NBI) is a technique that has been developed to enhance the detection of GI lesions.[10] By using light of a shorter wavelength, the mucosal pit pattern and microvasculature of lesions are highlighted, which may improve visualization. Previous studies have shown that NBI was helpful for the detection of hyperplastic polyps.[11,12] Furthermore, in a recent pilot study in patients with SPS, we demonstrated that NBI significantly reduced polyp miss rates compared with high-resolution white-light endoscopy (HR-WLE).[13] However, this pilot study was performed by a single endoscopist at a single academic center. To confirm our results, we conducted this randomized, multicenter study performed by multiple endoscopists. The primary aim was to compare polyp miss rates of HR-WLE and NBI in patients with SPS.

METHODS

Patients

Between January 2011 and March 2013, consecutive patients with SPS scheduled for colonoscopy in 4 medical centers in the Netherlands were invited to participate. Patients meeting criterion 1 or 3 of the WHO criteria for SPS, defined as 5 or more serrated polyps proximal to the sigmoid colon, of which 2 are greater than 10 mm in diameter (WHO criterion 1) or 20 or more serrated polyps spread throughout the colon (criterion 3) were eligible to enroll.[1] Patients were excluded in cases of inflammatory bowel disease, a total colectomy, age younger than 18 years, and inadequate bowel preparation (Boston Bowel Preparation Scale [BBPS] score <6).[14] At the end of the study, patients were excluded from data analysis if an endoscopist performed fewer than 4 study procedures. The institutional review board of all hospitals approved the study protocol, and written informed consent was obtained from all patients before inclusion. The study was registered at www.trialregister.nl, trial number NTR2497.

Study design

This study had a randomized, crossover design (Fig. 1). Patients underwent modified back-to-back colonoscopies with HR-WLE and NBI performed by the same endoscopist. Patients were randomly allocated to 1 of the 2 arms: (1) HR-WLE group: first inspection with HR-WLE followed by a second inspection with NBI; (2) NBI group: first inspection with NBI followed by a second inspection with HR-WLE. Polyps detected during the first examination were removed immediately. Consequently, polyps detected during the second examination were classified as missed polyps. All polyps 3 mm or larger were removed. Polyps smaller than 3 mm were not removed and not counted in the miss rate. The order in which both techniques were used was determined by block randomization (block sizes of 4) with stratification by endoscopist. Randomization was performed by opening a sealed opaque envelope once the cecum, or the neoterminal ileum in cases of right hemicolectomy, was reached and bowel preparation was assessed as adequate.

The colon was divided into 5 segments (cecum, ascending, transverse, descending, and rectosigmoid). During withdrawal, the 5 segments were sequentially inspected with the first imaging technique, followed by a re-examination with the second imaging technique. In cases in which no other landmarks (eg, liver shining through the colonic wall) were available, random biopsy specimens were taken to mark the end of the first examination. For all polyps, size (measured with open biopsy forceps), location, morphology (Paris classification[15]), and polypectomy technique was noted on a case record form by a research fellow or nurse. Withdrawal time during both examinations was recorded by a stopwatch. The time needed for polypectomies was subtracted. The proximal colon was defined as proximal to the sigmoid (cecum, ascending, transverse, and descending colon). A maximal study time of 1.5 hours was set for withdrawal; otherwise, the procedure could become too inconvenient for the patient. After passing this time limit, the study procedure was terminated. Polyps removed after stopping the study protocol were not used for data analysis.

Endoscopic equipment

All procedures were performed with CF-H180 AL endoscopes with NBI (Olympus, Tokyo, Japan) in combination