Advances in Digestive Medicine (2015) 2, 12–17

Available online at www.sciencedirect.com

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journal homepage: www.aidm-online.com

ORIGINAL ARTICLE

Different schedules of bowel preparation with sodium phosphate lead to different bowel cleansing effects and adenoma detection rates at colonoscopy

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Received 1 October 2013; accepted 18 March 2014
Available online 1 December 2014

KEYWORDS
Adenoma detection rate;
Bowel cleansing quality;
Bowel preparation;
Colonoscopy

Summary *Background:* Adequate bowel preparation is an important quality indicator of colonoscopy. This study validated whether the bowel cleansing quality and adenoma detection rate (ADR) could be different between two bowel preparation schedules in individuals receiving health examinations.
Methods: We enrolled individuals who had received a colonoscopy as part of the regimen for their health checkup program with split-dose phosphosoda for bowel preparation. Prior to December 31, 2012, the second dose of phosphosoda was administered at 10:00 PM before the day of the colonoscopy and the individuals were defined as the 10-PM group. After January 1, 2013, the schedule was changed to 4:00 AM the same day as the colonoscopy and was defined as the 4-AM group. The bowel cleansing quality was assessed using the Aronchick scale.
Results: A total of 431 individuals were included, 259 in the 10-PM group and 172 in the 4-AM group. The 4-AM group individuals had a higher rate of excellent or good bowel cleansing quality as compared with the 10-PM group (77.3% vs. 22%, respectively; $p < 0.001$). The ADR was also higher in the 4-AM group than in the 10-PM group (36% vs. 25.5%, respectively; $p = 0.019$).

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http://dx.doi.org/10.1016/j.aidm.2014.03.005

Conclusion: Modifying the time schedule of bowel preparation could improve bowel cleansing quality and increase the colonic ADR in a health management center.

Introduction

Screening and surveillance colonoscopy can reduce the disease burden and also decreases the mortality rate of colorectal cancer [1—4]. However, up to 9% of colorectal cancers are interval cancers and > 70% of interval cancers are attributed to missed lesions [5]. Thus, examining how to better achieve a high quality colonoscopy should be considered very important [6,7].

Proper bowel preparation is important in order to provide a high quality colonoscopy and improve the adenoma detection rate (ADR). A split-dose regimen is commonly applied for the preprocedure bowel preparation [8,9]. Recent studies emphasize that the time of the second dose of administration of cleansing agent being within < 6 hours prior to colonoscopy may improve the bowel preparation quality, especially for the right-side colon [10—12].

Because colorectal cancer screening accounts for 50% of incidence and 53% of mortality reduction, screening colonoscopy is now an important examination involved in the health checkup programs for many in the general population [4]. We thus validated whether the bowel cleansing quality and ADR could be improved by modifying the time schedules of bowel preparation in individuals receiving screening or surveillance colonoscopy as part of their health examination.

Participants and methods

We conducted this study at the health management center of the National Cheng Kung University Hospital, Tainan, Taiwan. The participants were enrolled between July 2012 and June 2013. During July 2012 to December 2012, the enrolled individuals received 45 mL of sodium phosphate twice (Fleet; C.B. Fleet Company Inc., Lynchburg, VA, USA) as part of their bowel preparation program at noon and at 10:00 PM on the day before their colonoscopy (10-PM group). Between January 1, 2013 and June 30, 2013 the Fleet timing schedule was changed, and the individuals received Fleet at 6:00 PM in the evening on the day before their colonoscopy and at 4:00 AM on the morning of the colonoscopy (4-AM group). Accordingly, this was an interventional study with a nonconcurrent control group (4-AM as intervention group and 10-PM as control group). The primary endpoint was the bowel cleansing quality and the secondary endpoint was the ADR, as compared between both groups.

All the participants who received colonoscopy as part of their health checkup program with split-dose sodium phosphate for bowel preparation were enrolled. The patients were excluded from the analysis if any of the following criteria were present: (1) the colonoscopy was not completed; (2) they did not follow the bowel preparation schedule; (3) they had a history of previous intestinal surgery; (4) the patients did not receive further polypectomy in our hospital to provide the histological result.

All the participants provided signed informed consents and completed a patient report form, which recorded the actual administration time of the second dose. The colonoscopies were scheduled between 9:00 AM and noon. Before their examination, participants received detailed information with regard to diet and the standard split-dose bowel preparation regimen with Fleet (1 bottle taken 2 times).

All colonoscopies were performed by experienced endoscopists. Most participants received premedication of antispasmodic agents and were sedated with intravenous propofol infusion if there were no contraindications. The smaller colonic neoplasms were removed by biopsy forceps or cold snare polypectomy during the examination. If the neoplasms were too large, a second colonoscopy was scheduled to remove those by cauterized polypectomy. All removed specimens were then sent for histological analysis.

The bowel cleansing quality was analyzed by a validated Aronchick scale [13]. It provided a qualitative global assessment based on the percentage of mucosal surface seen and the amount of liquid/solid stool present: excellent (> 95% of surface seen); good (> 90% of surface seen); fair (some semisolid stool that could be suctioned or washed away but > 90% of surface seen); and poor (< 90% of surface seen).

The location of the colorectal lesion was recorded as an anatomical location or as the distance from the anal verge. A proximal lesion was defined as a lesion located above the splenic flexure or > 40 cm above the anal verge. A distal lesion was defined as a lesion located between the descending colon and the rectum or < 40 cm above the anal verge. The definition of advanced colorectal neoplasm was polyp size > 1 cm, villous component, high-grade dysplasia, or adenocarcinoma. Furthermore, the possible confounding factors of bowel cleansing quality and colorectal neoplasm were also recorded for statistical analysis, such as body mass index (BMI), diabetes mellitus, dyslipidemia, smoking, alcohol, colon polyp history, and so on.

Statistical analysis

We used SPSS software version 15.0 (SPSS Inc., Chicago, IL, USA) for statistical analysis. The Chi-square test and the Student *t* test were used for measurement of the statistical difference between the two study groups. A two-tailed $p < 0.05$ was taken to be significant. In order to attain