

EDITORIAL

## 대장내시경 장정결제와 불량한 장정결에서 구제 요법

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### Bowel Preparation Formulations and Salvage Options for Inadequate Preparation

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**Article:** Formulation and Management of Poor Bowel Preparation: A Survey Study (Korean J Gastroenterol 2016;68:70-76)

Colorectal cancer is the third most frequently diagnosed cancer in Korea.<sup>1</sup> Colonoscopy is the most ideal and standard method preventing colorectal cancer by the detection and removal of adenomatous polyp. However, 6-8% of all colorectal cancer develop as interval cancer after the index colonoscopy and before the next recommended surveillance examination.<sup>2,3</sup> Factors related to colonoscopy have been confirmed in many studies as being associated with the risk of developing interval cancer.<sup>4,5</sup> Improving the clinical effectiveness of colonoscopy requires a programmatic approach that addresses quality issue. Adequate bowel preparation is a major determinant of colonoscopy quality. Inadequate bowel preparation can result in missed adenomatous polyp, longer procedural time, extra cost and time as the examination has to be re-scheduled or alternative investigations have to be organized.<sup>6,7</sup> The main recommendation of bowel cleansing from the U.S. multi-society task force on colorectal cancer are the following: split-dose bowel cleansing regimen for elective colonoscopy (or a same-day regimen in the case of after-noon colonoscopy); low-residue diet on the day before colonoscopy; preferred timing of the second dose of split-dose

preparation to be started 4-6 hours before colonoscopy and end at least 2 hours before colonoscopy.<sup>8</sup>

The qualities of an ideal bowel preparation formulation are confirmed safety, high efficacy, and high rates of patient compliance. Because safety is an essential prerequisite for bowel preparation, the rate of efficacy should be considered first and patient compliance successively for the choice of bowel preparation formulation. Current available bowel preparation formulations are polyethylene glycol (PEG) solution such as 4 L or 2 L plus ascorbate, oral sulfated solution, sodium picosulfate plus magnesium, and oral sodium phosphate. Many trials recently have focused on the efficacy of low volume preparation. In healthy nonconstipated individuals, PEG 4 L produces a bowel-cleansing quality that is not superior to a lower-volume PEG formulation.<sup>8</sup> Oral sulfate solution was approved for split-dose administration only.<sup>9</sup> Bowel preparation formulation should be determined by considering the patient's medical history, medication, and above all the adequacy and compliance of bowel preparation from previous colonoscopy.

Adequate bowel preparation is a main quality indicator of

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screening colonoscopy. To reduce inadequate preparation, awareness of risk factors associated with inadequate preparation and poor compliance would potentially be of benefit when selecting which patients need a more effective or active preparation regimen or more extensive education. Evidence of salvage options for patients with insufficient bowel preparation is still limited. But up to 25% of all colonoscopies are observed to have inadequate bowel preparation.<sup>7,10</sup> Rapid recognition of inadequate bowel preparation at the time of arrival to the endoscopic room might allow for salvage option before sedation. Fatima et al.<sup>11</sup> reported last effluent as brown liquid or solid had a 54% change of having fair or poor preparation. In this case, the salvage option with large-volume enema or additional oral preparation formulation could be considered. After starting the colonoscopy, preliminary assessment should be made in the rectosigmoid colon. If an inadequate preparation is deemed to interfere with the detection of polyps > 5 mm, the following salvage option can be considered: colonoscopic enema, further oral ingestion of preparation formulation with same-day or next day colonoscopy. Horiuchi et al.<sup>12</sup> reported 26 patients with poor or inadequate preparation assessed at the rectosigmoid region for the quality of preparation and received a colonoscopic enema. PEG solution was infused into the colon at the level of hepatic flexure via the working channel of colonoscope. Subsequent colonoscopy was achieved in 96% (25/26) of the patients without complication. In another study, colonoscopic enema with phosphate enema followed by a bisacodyl enema was instilled into the right colon.<sup>13</sup> They reported success in all cases. Though, further randomized study is required, colonoscopic enema is a conceivable salvage option for patients with inadequate preparation who receive sedative endoscopy.

There are currently no consensus for superiority between bowel preparation formulation and optimal salvage option for inadequate preparation. In the current issue of *Korean Journal of Gastroenterology* by Seong et al.<sup>14</sup> the first large-scale survey of physician's preference to bowel preparation formulation and salvage options for inadequate preparation is reported. This study has some limitations. First, the clinical application is difficult due to the characteristic of the study being a survey. Second, there is a lack of assessment for inter-observer variability for term and variables involved in the preparation. Third, there is potential selection bias in

relation to clinical experience. Nevertheless, this study provides physicians with information that is current preference for bowel preparation formulation and management of inadequate bowel preparation in Korea. As it is not an evidence-based, randomized study, further studies are warranted to compare various bowel preparation formulations and confirm optimal salvage options for inadequate preparation. Various investigations lead to improve bowel preparation quality and ultimately do a role for establishing Korean guideline for optimal bowel cleansing.

## REFERENCES

1. Jung KW, Won YJ, Kong HJ, et al. Cancer statistics in Korea: incidence, mortality, survival, and prevalence in 2012. *Cancer Res Treat* 2015;47:127-141.
2. Samadder NJ, Curtin K, Tuohy TM, et al. Characteristics of missed or interval colorectal cancer and patient survival: a population-based study. *Gastroenterology* 2014;146:950-960.
3. Singh H, Nugent Z, Demers AA, Bernstein CN. Rate and predictors of early/missed colorectal cancers after colonoscopy in Manitoba: a population-based study. *Am J Gastroenterol* 2010;105:2588-2596.
4. Nishihara R, Wu K, Lochhead P, et al. Long-term colorectal-cancer incidence and mortality after lower endoscopy. *N Engl J Med* 2013;369:1095-1105.
5. Arain MA, Sawhney M, Sheikh S, et al. CIMP status of interval colon cancers: another piece to the puzzle. *Am J Gastroenterol* 2010;105:1189-1195.
6. Rex DK, Imperiale TF, Latinovich DR, Bratcher LL. Impact of bowel preparation on efficiency and cost of colonoscopy. *Am J Gastroenterol* 2002;97:1696-1700.
7. Harewood GC, Sharma VK, de Garmo P. Impact of colonoscopy preparation quality on detection of suspected colonic neoplasia. *Gastrointest Endosc* 2003;58:76-79.
8. Johnson DA, Barkun AN, Cohen LB, et al. Optimizing adequacy of bowel cleansing for colonoscopy: recommendations from the US multi-society task force on colorectal cancer. *Gastroenterology* 2014;147:903-924.
9. Di Palma JA, Rodriguez R, McGowan J, Cleveland Mv. A randomized clinical study evaluating the safety and efficacy of a new, reduced-volume, oral sulfate colon-cleansing preparation for colonoscopy. *Am J Gastroenterol* 2009;104:2275-2284.
10. Froehlich F, Wietlisbach V, Gonvers JJ, Burnand B, Vader JP. Impact of colonic cleansing on quality and diagnostic yield of colonoscopy: the European Panel of Appropriateness of Gastrointestinal Endoscopy European multicenter study. *Gastrointest Endosc* 2005;61:378-384.
11. Fatima H, Johnson CS, Rex DK. Patients' description of rectal effluent and quality of bowel preparation at colonoscopy. *Gastrointest Endosc* 2010;71:1244-1252.e2.
12. Horiuchi A, Nakayama Y, Kajiyama M, et al. Colonoscopic enema

- as rescue for inadequate bowel preparation before colonoscopy: a prospective, observational study. *Colorectal Dis* 2012;14: e735-e739.
13. Sohn N, Weinstein MA. Management of the poorly prepared colonoscopy patient: colonoscopic colon enemas as a preparation for colonoscopy. *Dis Colon Rectum* 2008;51:462-466.
14. Seong JH, Yoo JS, Lee KJ, et al. Formulation and management of poor bowel preparation: a survey study. *Korean J Gastroenterol* 2016;68:70-76.