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Editorial

How Effective are Low-Volume Solutions for Oral Colonoscopy Bowel Preparation?

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Adequate bowel cleansing is very important for successful colonoscopy. Insufficient mucosal visualization during colonoscopy can result in missed lesions, difficult progression, prolonged procedure duration, incomplete procedures, an increased risk of procedural complications, and an increased requirement of the amount of sedatives and analgesics. Therefore, the quality of bowel preparation needs to be assessed.[1] The adequacy of bowel preparation is commonly assessed by the Aronchick Scale, the Boston Bowel Preparation Scale, the Harefield Cleansing Scale, and the Ottawa Scale. The Aronchick scale and the Boston Bowel Preparation Scale are the most commonly used bowel preparation scales.

Adequate bowel cleansing varies widely in different studies. Most of the studies showed adequate bowel cleansing to the tune of 85%–90%. Although guidelines for adequate bowel preparation are available in the literature, data regarding the comparison of various colonoscopic preparation regimens are still variable.[1] The adequacy of bowel cleansing mainly depends on the type of cleansing agents, volume of preparation, mode of administration (single dose versus split dose), use of adjunct agents, and timing of colonoscopy.

Polyethylene glycol-electrolyte solution (PEG-ELS)-based solutions are most commonly used preparation agent because of an excellent safety profile. Studies showed improved polyp detection rate, quality of the bowel cleansing, and colonoscopy completion rates with PEG-ELS split-dose regimen (2L on the day before procedure + 2L on the day of the procedure) compared to PEG-ELS single-dose regimen regardless of dosage. A meta-analysis showed that 4L split-dose PEG-ELS is better than other bowel preparation methods for colonoscopy with comparable compliance, favorable overall experience, willingness to repeat the same preparation, and adverse events.[2] A split-dose regimen of 4L PEG-ELS is endorsed by the American College of Gastroenterology as an optimal choice for colonoscopy. However, approximately 5%–15% of the patients are poorly tolerating PEG-ELS, mostly due to large-volume PEG-ELS ingestion. Large-volume PEG-ELS can cause abdominal fullness, bloating, cramping, nausea, vomiting, and insomnia. Aspiration pneumonia, colitis, pancreatitis, and Mallory–Weiss tears are other rare complications of large-volume regimen.

Volume-related adverse effects can be minimized with the use of low-volume preparations, 2L split preparation regimen, or combination regimens (low-volume PEG-ELS with an adjunct). 2L split-dose PEG-ELS preparation, sulfate-based preparations, sodium phosphate, and specially formulated preparations such as Clensia, NER1006, and Prepopik are currently available low-volume bowel cleansing regimens for colonoscopy. The authors have shown comparable efficacy and lesser adverse effects of 2L split-dose PEG-ELS preparation compared to 2L single-dose PEG-ELS preparation. However, the data regarding the 2L split regimen is limited, and most of these studies were specifically performed on patients attending morning outpatient colonoscopy. Recently, the US Food and Drug Administration (FDA) approved the 1L PEG-based oral solution, to offer split dosing on the same day as the colonoscopy procedure. In a recent study, a new low-volume PEG with citrate and simethicone solution (Clensia) was equivalent to the reference low-volume PEG with ascorbic acid in terms of bowel cleansing, safety, and acceptance.[3] In another study, 1L PEG NER1006, a low-volume preparation, demonstrated superior colon cleansing efficacy compared to standard 2L PEG with ascorbate, with comparable safety and tolerability.[4]

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The safety profile of sodium phosphate is poor in patients with renal dysfunction. Studies have shown that sodium sulfate is a safe and effective bowel cleansing agent for colonoscopy.[5] The efficacy of oral sulfate solution (OSS) in cleansing the colon ranges from 82% to 98%.[5-7] Studies have shown better efficacy and comparable adverse effects of split-dose OSS regimen compared to split-dose PEG solution regardless of dose. Colonoscopy preparation using split-dose low-volume OSS appears to be cost-effective compared to PEG-ELS with a cost saving of $16.01 per patient per year for the OSS cohort.[8]

Low-volume preparations with an adjunct, such as stimulant laxatives, prokinetics, citrates, or sodium ascorbate, have been used in various studies. Studies showed similar efficacy of a regimen of stimulant laxative at bedtime with 2L PEG-ELS in the morning and a 4L PEG-ELS split-dose regimen.[9,10] In a meta-analysis of six randomized controlled trials, low-volume PEG (2L) with bisacodyl demonstrates similar rates of adequate bowel cleansing and less nausea, vomiting, and bloating compared to 4L split-dose PEG-ELS.[9] In addition, the use of 2L PEG-ELS plus bisacodyl can save approximately $6 per procedure.[10] The average daily per capita income in South Asia is approximately $5. Recently, the US FDA has approved Prepopik, a powder mixture of sodium picosulfate, magnesium oxide, and citric acid, for colonoscopy preparation.

The choice of preparation also depends on the preparation-to-colonoscopy interval (PC interval). A long PC interval (>6 h) causes inferior bowel cleansing due to the deposition of thick secretion in the mucosal surface of the right colon. The study showed that an interval of 3–5 h produces better cleansing compared to longer interval. For morning procedures, a split-dose prior-evening and same-morning PEG-ELS regimen causes better bowel cleansing compared to single-dose morning regimen. The study showed equivalent cleansing efficacy and polyp detection rate of split-dose morning-only PEG-ELS and split-dose prior-evening and same-morning PEG-ELS for afternoon colonoscopy. The same-day morning preparation and afternoon colonoscopy is more convenient to patients as it does not cause sleep disturbance.

The quality of bowel preparation is very important for screening colonoscopy performed for early detection of adenoma. Due to the low prevalence of colorectal cancer, screening colonoscopy is not recommended in South Asian countries. Usual indications for colonoscopy in South Asia are gastrointestinal bleeding, abdominal pain and altered bowel habit caused by infective colitis, inflammatory bowel disease, ileocecal tuberculosis, hemorrhoids, and malignancies.[10] South Asian populations have lower body mass index, different diet habits, and shorter colonic transit time compared to Western countries. Studies from India had shown that adequate preparation for late-morning/afternoon colonoscopy can be achieved with the use of low-volume PEG-ELS with or without stimulant laxatives.[10,11]

Low-volume cleansing agents with or without an adjunct are gaining mainstream acceptance for bowel preparation due to reduced volume and acceptable safety profile. In the current issue, Bowel Cleansing agents in Clinical Practice: 'A Cross-Sectional study on Safety, Efficacy, and Predictor of Good Bowel Preparation' by Joshi *et al*.,[12] the authors showed better efficacy and comparable safety profile of low-volume OSS compared to PEG-ELS regimen for bowel preparation for colonoscopy in Indian population. Although this study had a few limitations, low-volume regimens appear to be safe, effective, and easy to use for colonoscopy preparation. Data are still limited, and further studies are necessary in order to recommend low-volume solutions as the preferred bowel cleansing regimens for colonoscopy.

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