Communication from the Standards of Practice Committee

GUIDELINE

Bowel preparation before colonoscopy

This is one of a series of documents discussing the use of GI endoscopy in common clinical situations. The Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy prepared this document that updates a previously issued consensus statement and a technology status evaluation report on this topic.[1,2] *In preparing this guideline, a search of the medical literature was performed by using PubMed between January 1975 and March 2014 by using the search terms "colonoscopy," "bowel preparation," "intestines," and "preparation." Additional references were obtained from the bibliographies of the identified articles and from recommendations of expert consultants. When limited or no data exist from well-designed prospective trials, emphasis is given to results from large series and reports from recognized experts. Recommendations for appropriate use of endoscopy are based on a critical review of the available data and expert consensus at the time that the documents are drafted. Further controlled clinical studies may be needed to clarify aspects of recommendations contained in this document. This document may be revised as necessary to account for changes in technology, new data, or other aspects of clinical practice. The recommendations were based on reviewed studies and were graded on the strength of the supporting evidence (Table 1).*[3] *The strength of individual recommendations is based both on the aggregate evidence quality and an assessment of the anticipated benefits and harms. Weaker recommendations are indicated by phrases such as "we suggest," whereas stronger recommendations are typically stated as "we recommend."*

This guideline is intended to be an educational device to provide information that may assist endoscopists in providing care to patients. It is not a rule and should not be construed as establishing a legal standard of care or as encouraging, advocating, requiring, or discouraging any particular treatment. Clinical decisions in any particular case involve a complex analysis of the patient's condition and available courses of action. Therefore, clinical considerations may lead an endoscopist to take a course of action that varies from these recommendations and suggestions.

0016-5107/$36.00
http://dx.doi.org/10.1016/j.gie.2014.09.048

Colonoscopy is the current standard method for imaging the mucosa of the entire colon. Large-scale reviews have shown rates of incomplete colonoscopy, defined as the inability to achieve cecal intubation and mucosal visualization effectively,[4,5] between 10% and 20%,[4] well over targets recommended by the U.S. Multi-Society Task Force on Colorectal Cancer.[6] The diagnostic accuracy and therapeutic safety of colonoscopy depends, in part, on the quality of the colonic cleansing or preparation.[7] Inadequate bowel preparation can result in failed detection of prevalent neoplastic lesions and has been linked to an increased risk of procedural adverse events.[1,8] Sidhu et al[9] performed an audit of all colonoscopies performed between April 2005 and 2010 at the Royal Liverpool University. Of the 8910 colonoscopies performed, 693 were incomplete (7.8%; 58% women; mean age, 61 years), and inadequate bowel preparation was the most common reason for incomplete colonoscopy, accounting for nearly 25% of failed colonoscopies in their series.

Numerous investigations designed to identify predictors of inadequate colonoscopy bowel preparation[6-8] have found that inadequate preparation is more common in patients with the following characteristics: previous inadequate bowel preparation, non-English speaking, Medicaid insurance, single and/or inpatient status, polypharmacy (especially with constipating medications such as opiates), obesity, advanced age, male sex, and comorbidities such as diabetes mellitus, stroke, dementia, and Parkinson's disease.[1,10,11] Poor adherence to preparation instructions, erroneous timing of bowel purgative administration, and longer appointment wait times for colonoscopy have also been associated with poor bowel preparation.[10,11] Thus, it is important for clinicians to understand the numerous modifiable physician- and patient-related factors that can lead to colonoscopy failure to reduce its incidence and provide patients with improved outcomes.

The ideal preparation for colonoscopy should reliably empty the colon of all fecal material in a rapid fashion with no gross or histologic alteration of the colonic mucosa. The preparation should not cause patient discomfort or shifts in fluids or electrolytes. The preparation should be safe, convenient, tolerable, and inexpensive.[12] Unfortunately, none of the currently available preparations have all of these characteristics. This document updates a previous consensus document and a technology status evaluation report on bowel preparation[1,2] and reviews the available evidence regarding bowel preparation before colonoscopy.

TABLE 1. GRADE system for rating the quality of evidence for guidelines

Quality of evidence	Definition	Symbol
High quality	Further research is very unlikely to change our confidence in the estimate of effect	⊕⊕⊕⊕
Moderate quality	Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate	⊕⊕⊕◯
Low quality	Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate	⊕⊕◯◯
Very low quality	Any estimate of effect is very uncertain	⊕◯◯◯

Adapted from Guyatt et al.[3]

GENERAL CONSIDERATIONS

It is important that patients are educated and engaged in the colonoscopy prepararion process,[13] and it has been shown that effective education significantly improves the quality of bowel preparation.[14] Patient counseling along with written instructions that are simple and easy to follow and in their native language should be provided to patients,[15] and patient education may improve with the use of visual aids.[16] Recently, educational booklets were shown to improve bowel preparation and quality indicators such as cecal intubation rates.[17,18] Smartphone applications have even been developed to guide patients through the preparation process.[19] Patients can also be directed to resources such as the ASGE Website entitled "Understanding Bowel Preparation" (http://www.asge.org/patients/patients.aspx?id=10094) that explain the steps involved and importance of optimizing bowel preparation for colonoscopy.

Bowel preparation regimens typically incorporate dietary modifications along with oral cathartics.[20] Most commonly, a clear liquid diet is advised for the day before colonoscopy. Red liquids can be mistaken for blood in the colon or can obscure mucosal details and should be avoided. Clear liquids can be taken up to 2 hours before the procedure.[21] However, it is not clear whether a clear liquid diet the day before colonoscopy offers advantages over a low-fiber diet in terms of preparation quality.[22-25] A low-residue diet that avoids foods containing seeds and other indigestible substances is often recommended for several days before the procedure and has been shown to be at least as effective as a clear liquid diet[20,26] and associated with increased patient satisfaction.[23]

Although the individual components of bowel preparations vary widely, the combination of dietary restriction and cathartics has proven to be safe and effective for colonic cleansing for colonoscopy.[27] In a study of hospitalized patients undergoing colonoscopy, a clear liquid diet before administration of the bowel preparation was the only dietary modification that improved the quality of preparation.[28] Adequate hydration is an important adjunct to any bowel preparation before colonoscopy.[29] Additional medication modifications may be required in special populations such as diabetic patients, who must maintain glycemic control, and patients taking anticoagulation agents.[30]

TIMING OF PREPARATION

Giving part (usually half) of the bowel preparation dose on the same day as the colonoscopy (termed split-dose) results in a higher-quality colonoscopy examination compared with ingestion of the entire preparation on the day or evening before colonoscopy.[31-39] A higher-quality bowel preparation due to this split-dose has been demonstrated to increase the adenoma detection rate.[40] In addition to a higher-quality bowel preparation, split-dosing also improves patient tolerance, as demonstrated by an increased willingness to repeat the procedure using the same preparation in the future.[37] Typically, the standard dose of a bowel preparation is split between the day before and the morning of the procedure. The timing of the second dose must allow sufficient time for the patient to complete the second dose, have the desired response, and for the patient to travel to the center where the colonoscopy will be performed. The second dose should be administered between 3 to 8 hours before the planned start of the colonoscopy procedure.[41,42] A prospective trial found no difference in residual gastric fluid in patients using split-dose bowel preparation and bowel preparation given the evening before colonoscopy.[43] Patients must have completed the preparation at least 2 hours before sedation is given to avoid potential aspiration as recommended in the American Society of Anesthesiologists (ASA) guidelines.[21] However, institutional policies may vary from this ASA recommendation. In patients with early morning appointments, this second morning dose may be