

Bowel Preparation for Flexible Sigmoidoscopy: Which Method Yields the Best Results?

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BACKGROUND. Bowel preparation is a significant aspect of the flexible sigmoidoscopy procedure. Clear visibility of the bowel mucosa is critical for a thorough examination. The combination of a light breakfast in the morning and the application of 2 phosphate enemas a few hours before the examination is a safe and commonly used method of preparing a patient for a flexible sigmoidoscopy procedure. However, there is a paucity of objective data on the efficacy of this method of bowel preparation. It has been practiced on the basis of intuition and clinical experience.

METHODS. In this prospective single-blinded randomized study, 429 consecutive patients were assigned to receive 1 of 4 different bowel preparations before elective 60-cm flexible sigmoidoscopy. After completion of the procedure, the examiner gave a subjective rating of the quality of the preparation. The rating was determined on the basis of the percentage of bowel mucosa that was visible.

RESULTS. Statistical analysis of results suggests no significant difference in frequency of favorable ratings between the 4 bowel preparations.

CONCLUSIONS. This study substantiates the practice of having a light breakfast and 2 phosphate enemas as a method of bowel preparation for a flexible sigmoidoscopy procedure. Additional preparatory measures such as dietary restrictions and ingestion of phospho-soda oral saline laxative did not significantly enhance the quality of the examination.

KEY WORDS. Sigmoidoscopy; enema; colon; intestinal mucosa. (*J Fam Pract* 1999; 48:272-274)

Colorectal cancer is the third most commonly diagnosed form of cancer in the United States; projections indicated that more than 130,000 new cases were likely to be diagnosed in 1998.¹ It ranks third among both men and women as the cause of cancer-related mortality, and it is predicted to have caused more than 55,000 deaths in 1998.¹ Flexible sigmoidoscopy is a routinely used, well-tolerated procedure for evaluating the lower colon and rectum of patients with a wide range of gastrointestinal complaints, and is an accepted method of screening for colorectal cancer.^{2,4} The American Cancer Society recommends screening flexible sigmoidoscopy for all adults every 3 to 5 years, beginning at age 50 years.⁵ The United States Preventive Services Task Force recommends screening flexible sigmoidoscopy for all persons aged 50 years or older at unspecified time intervals.⁶

The relevance of flexible sigmoidoscopy to the discipline of family medicine is clear. The feasibility of flexible sigmoidoscopy has been demonstrated in both the primary care physician's office⁷ and in a clinical setting

with multiple health care providers.⁸ There is evidence that the procedure can be effectively taught to family physicians.⁹

Bowel preparation is an integral factor in performing a flexible sigmoidoscopy. Clear visualization of the mucosa is critical for a successful examination. Significant colonic pathology can be obscured by even small amounts of stool.

Directing the patient to eat a light breakfast and self-administer 2 phosphate enemas before the procedure is a simple, safe, and commonly used method of preparing the patient for the flexible sigmoidoscopy procedure.¹⁰ There is a paucity of objective data on the efficacy of this method for bowel preparation, and it is used on the basis of intuition and clinical experience. Previously published investigations of different bowel preparations have yielded contradictory results.

The purpose of this prospective single-blinded randomized study was to determine whether there is an objective difference in visual quality between 4 groups of patients who were given different bowel preparation regimens. The null hypothesis is that no significant relationship exists between the method of preparation and the objective effectiveness achieved.

METHODS

The subjects of this study were patients receiving health care from family practice residents and faculty at the Florida Hospital Family Health Center in Orlando, Florida. A total of 429 patients participated in the study,

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TABLE 1

The 4 Bowel Preparation Regimens

Group	Dietary Modification	Oral Preparation	No. of Fleet Enemas
A	Light breakfast	None	2
B	Clear liquid dinner; NPO after midnight	None	2
C	Clear liquid dinner; NPO after midnight	1.5 oz phospho-soda	2
D	Clear liquid dinner; NPO after midnight	1.5 oz phospho-soda	1

NPO denotes nothing by mouth.

which went from June 1992 to August 1995. Flexible sigmoidoscopy was ordered to investigate problems commonly seen in an outpatient primary care setting, such as diarrhea and positive occult blood testing, and for preventative screening of asymptomatic patients.

At the time the sigmoidoscopy was scheduled patients were randomized into groups A, B, C, and D by random sequential order. One member of the Health Center staff was given the responsibility of scheduling the procedures.

Four different bowel preparations were selected after a review of the current literature and consideration of commonly used bowel preparation methods for flexible sigmoidoscopy, colonoscopy, and radiographic imaging studies. Patients in group A were instructed to have a light breakfast and to administer 1 Fleet phosphate enema (C.B. Fleet Company, Lynchburg, Virginia) 2 hours before the procedure, followed by another enema 1 hour later. They were instructed not to use any other laxatives. Patients in group B were told to have a clear liquid meal on the evening before the day of the procedure and were instructed not to eat or drink anything after midnight. They were instructed to administer 1 Fleet enema 2 hours before the examination, followed by another enema 1 hour later. Patients in group C were told to have a clear liquid meal on the evening before the day of examination. Later that evening, they were to drink 1.5 oz Fleet phospho-soda oral saline laxative in half a glass of water followed immediately by 8 oz of water. They were instructed not to eat or drink anything after midnight. On the day of the examination, they administered 1 Fleet enema 2 hours before the procedure followed by another enema 1 hour later. Patients in group D were given the identical instructions as patients in group C, with the exception that they were to administer only 1 Fleet enema 1 hour before the examination (Table 1).

All enemas were self-administered by the patient. Those who failed to follow all the preparation instructions were excluded from the study. Patients who did not keep their procedure appointment and those who canceled were rescheduled and given the same bowel preparation instructions.

The sigmoidoscopy was performed by 1 of 4 designated residency faculty or by residents with the faculty member in the room observing the entire procedure on a video monitor. The examiners were blinded to the preparation that the patient had used. All patients were examined with an Olympus 60-cm flexible sigmoidoscope (Olympus Corporation of America, Lake Success, New York, model OSF-2, serial number 2618536). The 4 faculty members were instructed to use a standard rating scale designed specifically for this study. The rating scale was devised after a literature review and with the consensus of all 4 reviewers. The rating scale was as fol-

lows: good (no stool seen until 40 cm), fair (rare stool with <10% of mucosa obscured), poor (small amount of stool with 10% to 20% of mucosa obscured), and awful (moderate to large amounts of stool, <30% of mucosa observed, procedure terminated).

Immediately following the completion of the procedure, the examiner's rating of the preparation and the depth of insertion were recorded. Statistical analysis of the data was performed using the Statistical Package for the Social Sciences, version 7.5 (SPSS Inc, Chicago, Illinois). To verify effective randomization, the size of the groups, and patients' age and sex were analyzed. The goodness-of-fit test was employed to determine if there were significant differences in the number of subjects across the groups. The chi-square test was used to investigate for any significant relationship between the preparation types and patient's age, patient's sex, and the endoscopist's rating. For all tests, alpha was set at the 0.05 level of confidence.

RESULTS

Although patients were randomly assigned to the 4 groups, group mortality due to failure to follow instructions or failure to keep the appointment resulted in unequal group sizes. The sample size of this study provided a statistical power of 0.80 with an effect size of 20%.

Subjects across the 4 groups were not significantly different in terms of the number of subjects, age, and sex. Analysis of group frequencies yielded a chi-square test result of 3.3 ($P = .344$). This indicated that there was no significant difference in the distribution of frequencies across the 4 groups. Analysis of variance testing of age did not reveal any significant difference between groups. Likewise, there was no significant difference in sex distribution among the 4 groups.

Chi-square analysis between preparation types and rating categories yielded an obtained value of 11.1 ($P = .27$),

TABLE 2

Cross-tabulation Between Examiners' Subjective Rating of the Preparation, by Preparation Group

Rating	Group A n (%)	Group B n (%)	Group C n (%)	Group D n (%)	Total
Good	72 (59.5)	69 (69.7)	86 (77.5)	68 (69.4)	295
Fair	24 (19.8)	16 (16.2)	14 (12.6)	18 (18.4)	72
Poor	22 (18.2)	11 (11.1)	10 (9.0)	11 (11.2)	54
Awful	3 (2.5)	3 (3.0)	1 (0.9)	1 (1.0)	8
Total	121	99	111	98	429

Note: $\chi^2 = 11.1$; $P = .27$.

which is greater than the alpha. Therefore, there was insufficient evidence to reject the null hypothesis (Table 2).

The "poor" and "awful" categories were collapsed for further analysis. The obtained chi-square value was 9.9 ($P = .129$), which is greater than the alpha.

DISCUSSION

The results of this study suggest that bowel preparation effectiveness with 2 Fleet phosphate enemas is not enhanced by adding oral phospho-soda or by instructing the patient to fast. The addition of these preparatory measures did not improve the probability that a good preparation would be obtained.

Previously published studies have yielded contradictory results. Osgard and colleagues¹¹ concluded that the addition of an oral preparation to a 2-enema regimen significantly improved the quality of endoscopic examination. Similarly, Sharma and coworkers¹² directly compared oral magnesium citrate plus 2 oral ducosate sodium tablets taken the evening before the examination with 2 phosphate enemas given on the day of sigmoidoscopy and found the oral preparation to be superior. In contrast, Drew and colleagues¹³ compared oral magnesium citrate given the evening before the examination with a single phosphate enema and concluded that the enema preparation was superior. In a study comparing the efficacy of 1 enema with that of 2 enemas, Preston and coworkers¹⁴ concluded that 1 phosphate enema was as effective as 2 enemas.

Patient tolerance of the bowel preparation phase of the examination is also an important consideration. Intuitively, more complex preparation regimens are at higher risk for patient error and noncompliance. It would have been interesting to investigate patient acceptance of the different preparation methods through a postprocedure survey. Such data could also have been used to account for the unequal numbers of subjects who remained in the study until completion of sigmoidoscopy. Since all of the preparations studied yielded statistically similar results, patient acceptance could be

a valid criterion for selecting a preparation method.

It is also interesting to note that the most complex of the 4 regimens (group C) received the highest proportion of "good" ratings followed in descending order by groups B, D, and A. It can also be noted that the complexity of the bowel preparation regimen decreases in that same respective order.

CONCLUSIONS

This study suggests that for flexible sigmoidoscopy, bowel preparation with a light breakfast and 2 phosphate enemas is sufficient. Visual quality of the examination is not significantly enhanced with the addition of oral phospho-soda or a clear liquid diet and restricted oral intake.

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