Hospital Practice

Oral bowel lavage preparation for colonoscopy

D.A. Burke, A.P. Manning, L. Murphy and A.T.R. Axon

Gastroenterology Unit, The General Infirmary, Leeds LS1 3EX, UK.

Summary: Colonoscopy is a commonly performed diagnostic and therapeutic procedure in most general hospitals, which requires effective bowel preparation to be worthwhile. We report the effect of replacing a diet, laxative and bowel washout preparation with oral bowel lavage using a balanced electrolyte formulation, in our unit.

The preparation was acceptable to patients, medical and nursing staff, generally preferred to previous preparations by those who had experienced them, allowed a more complete colonoscopy with an excellent quality of view, and was less expensive in nursing time.

We regard oral bowel lavage as currently the method of choice for bowel preparation prior to colonoscopy in the majority of patients.

Introduction

Colonoscopy is now accepted as a valuable diagnostic and therapeutic procedure in the management of colonic disease.¹ However, a clean colon is essential for adequate colonoscopic examination. Effective bowel preparation depends upon patient co-operation, nursing time and expertise, conventional preparations often being time consuming, inconvenient, and unpleasant for all concerned. In addition, osmotic purgatives, if fermentable within the colon, may be dangerous when used in conjunction with diathermy² and cathartics used for preparation may cause histological changes in mucosal biopsies.³ Oral bowel lavage (OBL) using a balanced electrolyte solution has been proposed as an alternative.^{4,5}

To assess the effectiveness and acceptability of this regime to patients, nursing, and medical staff,

OBL using the Golytely formulation⁴ (Table I) was instituted for a trial period.

Patients and methods

All outpatients referred for colonoscopy to the Gastroenterology Unit of the General Infirmary at Leeds were considered for OBL; only patients with a suspicion of stricture were excluded. After an overnight fast, and without any other dietary restriction, patients were asked to drink the OBL solution until the bowel effluent became clear. Patients, colonoscopists and nursing staff involved in colonoscopy were independently interviewed by questionnaire. Those patients who had undergone a previous colonoscopy were asked to score on a visual analogue scale (VAS) their overall impression of their previous bowel preparation as well as indicating the discomfort, palatability, inconvenience, or other problems associated with it. They then compared OBL with their previous experience using a VAS where 1 = much worse and 10 = much better.

All patients indicated on a VAS, scored from 1-10, their overall impression of the palatability, convenience, and comfort of OBL.

Table I Oral bowel lavage solution formula

Sodium chloride	1.46 g/litre
Sodium sulphate anhydrous	5.68 g/litre
Potassium chloride	0.74 g/litre
Sodium bicarbonate	1.69 g/litre
Polyethylene glycol 4000	57.00 g/litre
Distilled water	to one litre
(osmolality 283 mosmol)	

Correspondence: D.A. Burke, M.B., B.S., M.R.C.P.
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Nursing staff recorded the time taken for the bowel effluent to become clear, the volume of solution taken to achieve a clear effluent, any additional preparation required to achieve an acceptable effluent, and an overall score of the quality of preparation for each patient.

Colonoscopists recorded the proximal limit of colonoscopy and where examination was incomplete whether this was due to inadequate bowel preparation or to other reasons (such as patient discomfort, instrument failure, or operator failure). They scored (from 1–10) the quality of view achieved in each area of the colon and an overall impression of the quality of the preparation.

To compare the effectiveness of OBL with our previous bowel preparation of restricted diet, senna laxatives and enemas the reports of 306 consecutive colonoscopies performed in the preceding year were traced and analysed for quality of preparation, and extent of colonoscopy.

Results

One hundred and three consecutive outpatients (male=53, females 50; mean age 56, range 14–77) were entered for OBL. Ninety six patients, 92 nursing staff, and 100 colonoscopists' questionnaires were returned for analysis. A median of 2.5 litres of solution were necessary to clear the bowel, (range 1–6 litres) and a median of 2.6 hours (range 1–5.2 hours) was required to achieve a clear effluent. Two patients received an additional rectal washout as they were unable to drink an adequate volume of preparation because of its taste. One patient was unable to complete the preparation as he vomited shortly after drinking the solution resulting in an endoscopically proven small Mallory–Weiss tear. In 4 of 103 cases (3.9%) total colonoscopy was not possible in the OBL group because of inadequate preparation as compared with 26 of 306 (8.5%) in the previous year using the old preparation. However, there were 83 of 306 (18.6%) reports in all of inadequate preparation for colonoscopies performed in the previous year. Taking a colonoscopist's score of <6 to be indicative of an inadequate preparation for the OBL group only 4 of 100 patients (4%) did not achieve an adequate preparation which is significantly less than previously. ($P<0.001$; Chi-squared test).

Fifty-one patients (27 males, 24 females) had undergone preparation for a previous colonoscopy; 3 had received Picolax, the remainder had received Senokot, X-prep, restrictive diet, oxyphenisatin enemas and rectal washouts. In this group scores for overall impression were significantly higher for OBL (median score=8) compared with a median

score of 3.5 for our traditional preparation ($P<0.002$; Mann–Whitney U test). X-prep and rectal washouts were the most unfavourable aspects, because of taste, discomfort and inconvenience.

For all patients receiving OBL the median scores for overall impression were 8, convenience 8, taste 5, comfort 8. The most common criticism of OBL was unpalatability, but the majority of patients found this preparation to be convenient, neither unpleasant nor uncomfortable.

The median scores given by colonoscopists for the quality of view achieved were 9 or greater for each area of the colon and overall. Scores correlated with the assessments of the adequacy of preparation graded 1 to 10, made by nursing staff prior to colonoscopy based on the appearance of the effluent ($P<0.001$). More fluid was usually present in the colon when compared to our traditional preparation, but this was invariably clear, easily aspirated and consequently did not impair the view. No problems were encountered with mucosal biopsy or polypectomy.

Discussion

Combinations of purgatives and enemas have generally been used as bowel preparation prior to surgery, radiology, and endoscopy. For these to be effective not only does it require compliance on behalf of the patient who must undergo dietary restriction, but also a great deal of nursing time and expertise to ensure a clean colon. Nursing time is at a premium not only in busy outpatient and endoscopy units, but also on wards for the preparation of inpatients and dedication necessary to achieve adequate cleansing of the bowel is often not possible. As a consequence some procedures will fail because of inadequate bowel preparation. In the retrospective analysis of purgative and senna preparation undertaken here a complete examination was not possible in 18.6% of colonoscopies due to inadequate bowel preparation. This compares with only 4% for OBL.

Colonoscopy is understandably viewed by many patients as an unpleasant procedure and dietary restriction, purgation with its accompanied discomfort and unpredictability together with the embarrassment of undergoing enemas and rectal washout adds to their dislike of the procedure. In the present study the 50% of the patients who had had a previous colonoscopy recorded significantly higher acceptability scores for OBL than for their previous experience of bowel preparation.

OBL has the advantage that it can be carried out on the day of the examination and does not require

stringent dietary restriction or compliance with preparation from the patient at home. There have been reports of incontinence from patients undergoing purgative preparation at home, and elderly patients express anxiety about their journey to hospital after having taken purgatives.

OBL is easy to perform in either outpatient departments or on the ward. It requires little nursing time as compared with the traditional preparation; For OBL all that is required is to encourage the patients to drink the solution and to assess the effluent at intervals, whereas the traditional method requires up to 2 hours of nursing involvement per patient. The OBL solution has a slightly bitter taste and unpalatability was the commonest criticism. Chilling the solution makes it more palatable. The preparation used (Table I), is made up by a local hospital pharmacy department, and costs approximately £1.15 per litre to manufacture; the median cost for this preparation per patient is £2.88. This compares very favourably with traditional prep-

arations but in addition there is a saving in nursing time, an improvement in the quality of view achieved during colonoscopy and a reduction in the number of preparation failures resulting in fewer repeat examinations. One of the limiting factors in the numbers of colonoscopies that we were able to perform in the past was the availability of adequate numbers of nursing staff to prepare patients. We have now been able to increase the number of patients per list since the introduction of OBL. It has the further advantage of allowing colonoscopy to be performed at short notice as there is no need for dietary restrictions prior to the day of examination.

OBL offers a reliable method of bowel preparation for colonoscopy which would be simple to undertake in all endoscopy departments, including those with limited nursing facilities. Improvement in the taste of this preparation may further enhance its acceptability.

References

1. Williams, C.B. Colonoscopy. *Curr Opin Gastroenterol* 1986, **2**: 40-43.
2. Bigard, M.A., Gaucher, P. & Lassaile, C. Fatal colonic explosion during colonoscopic polypectomy. *Gastroenterology* 1979, **77**: 1307-1310.
3. Pockros, P.J. & Foroozan, P. Golytely lavage versus a standard colonoscopy preparation. Effect on normal colonic mucosal histology. *Gastroenterology* 1985, **88**: 545-548.
4. Davis, G.R., Santa Ana, C.A., Morawski, S.G., & Fordtran, J.S. Development of a lavage solution associated with minimal water and electrolyte absorption or secretion. *Gastroenterology* 1980, **78**: 991-995.
5. Michael, K.A., Di Piro, J.T., Barden, T.A. & Tedesco, F.J. Whole-bowel irrigation for mechanical colon cleansing. *Clin Pharm* 1985, **4**: 414-423.