

Preparing the bowel for colonoscopy

Kabir Abubakar, Norma Goggin, Siobhan Gormally, Marie Durnin, Brendan Drumm

Abstract

Bowel preparation methods for total colonoscopy in children generally involve whole gut irrigation with electrolyte lavage solutions, which in most children will require hospitalisation for nasogastric tube administration. The aim of the study was to determine the efficacy of oral bisacodyl combined with a single phosphate enema as a bowel preparation regimen in children. In an open prospective trial, 30 children (aged 18 months-15 years) were given oral bisacodyl on each morning of the two days before colonoscopy. The children were maintained on a normal diet. A phosphate enema was administered on the morning of the procedure. The adequacy of bowel preparation was graded as grade I if no faecal material was encountered, grade II if small amounts of faecal material were present in scattered locations, and grade III if there was poor preparation with faecal material precluding satisfactory visualisation of the bowel mucosa. Eight children (26.6%) had minor abdominal cramps when taking bisacodyl, but all had a previous history of similar pain. Five children (16.6%), all under 5 years of age, cried during the administration of phosphate enema. Bowel preparation was considered excellent (grade I) in 26 (86.6%) and good (grade II) in four (13.3%). In all patients adequate visualisation of the bowel mucosa was obtained. Oral bisacodyl combined with a single phosphate enema provides an ideal method of preparing the bowel for total colonoscopy. This preparation allows colonoscopy to be carried out as a day case procedure in children while maintaining them on a normal diet.

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Colonoscopy is an important procedure in the diagnosis and in some cases treatment of large bowel disease. It offers the advantage of allowing direct visualisation of the mucosa combined with the ability to obtain tissue for histological assessment. Adequate visualisation of the bowel mucosa is necessary to improve the safety and diagnostic yield of colonoscopy.

Traditional bowel preparation methods involve whole gut irrigation with large volumes of electrolyte lavage solution (ELS), a solution based on polyethylene glycol and electrolytes, and light diet for 48 hours before examination.¹⁻¹² Though this is relatively well tolerated by adult patients, administration of ELS usually requires admission of the child into

hospital. In many children administration using a nasogastric tube is necessary because of the large volumes involved.¹² The solutions are unpalatable, and commonly cause nausea and vomiting.¹² Abdominal fullness and cramps occur and can be very distressing.¹⁰⁻¹² Hypothermia can occur if the fluid is not warmed to 37°C and administration of large volumes of ELS is difficult in children who have fluid balance problems. Bowel explosion has occurred during electrocautery from ignition of flammable gases produced from stool or fermentation of carbohydrate in bowel preparations containing mannitol.

The ideal method of bowel preparation in the child should involve as little discomfort as possible, a minimum length of time in hospital, and few dietary restrictions. The purpose of this study was to determine the efficacy of such a regimen.

Patients and methods

Thirty four children underwent colonoscopy between July 1993 and February 1994. Four patients were excluded because they did not receive the two day regimen of bisacodyl (Dulcolax). The remaining 30 patients ranging in age from 18 months to 15 years (mean (SD) age 8.9 (4.2) years) were entered into the study; the male to female ratio was 1.5:1.

Colonoscopy was carried out using Olympus paediatric endoscopes GIF-XQ 200 for children less than 3 years and PCF-20 for children more than 3 years of age. All procedures were performed in the morning under general anaesthesia after an overnight fast.

All children underwent a bowel preparation regimen before colonoscopy. Children 5 years and over were given bisacodyl tablets, 10 mg in the morning for two days before the day of the procedure. A Fletcher's phosphate enema (128 ml) was given on the morning of colonoscopy at least one hour before the procedure. Children less than 5 years old were given bisacodyl 5 mg each morning for two days and 64 ml of Fletcher's phosphate enema. All children were turned on their abdomen after administration of the phosphate enema to help prevent seepage of the material prematurely. The children were maintained on an unrestricted diet at all times up until the overnight fast before general anaesthesia.

Before sedation, patients were interviewed with their parents. A questionnaire relating to the presence of symptoms experienced after oral bisacodyl and phosphate enema was completed by one of the authors (KA). Parameters assessed included the presence of abdominal pain, vomiting, or faecal soiling after bisacodyl. The number of stools passed when taking bisacodyl compared with the usual number of

Department of
Paediatrics, University
College Dublin, Our
Lady's Hospital for
Sick Children,
Crumlin, Dublin 12,
Ireland
K Abubakar
N Goggin
S Gormally
M Durnin
B Drumm

Correspondence to:
Professor Drumm.

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stools passed per day was assessed. Pain or crying after phosphate enema administration was also documented. The attending nurse noted the nature of faecal material passed after phosphate enema.

All colonoscopies were performed by two clinicians (BD and SG) and the bowel was examined in all cases as far as the ascending colon or caecum. At colonoscopy, the adequacy of bowel preparation was graded as grade I, excellent preparation, if no faecal material was encountered; grade II, good preparation, if small amounts of faecal material were present in scattered locations but this could be removed by suctioning through the endoscope and adequate visualisation of bowel mucosa was obtained; and grade III, poor preparation, if faecal material precluded satisfactory visualisation of bowel mucosa.

This study was approved by the ethics committee at Our Lady's Hospital for Sick Children, Dublin, Ireland.

Results

INDICATIONS FOR COLONOSCOPY

In 27 children (90%) the indication for colonoscopy was bleeding from the rectum with or without associated diarrhoea. Two children (6.7%) had Peutz-Jeghers syndrome and one baby (3.3%) had anaemia and occult gastrointestinal bleeding. Twenty seven (90%) of our patients were prepared as day cases. The three inpatients were admitted for general assessment.

RESPONSE TO BISACODYL

The frequency of bowel motions doubled while taking bisacodyl with a mean of 4.9 (range 3-13) bowel motions per day compared with a mean 2.6 (range 1-8) bowel motions per day before treatment. The increased frequency of bowel motions was more significant on the second day of bisacodyl treatment.

SIDE EFFECTS

Eight children (26.6%) complained of abdominal pain or cramps after bisacodyl. These were children in whom abdominal pain was present before preparation for colonoscopy. The pain was described by all as similar to that which they experienced before the preparation. There was no exacerbation of pain even in those children with inflammatory bowel disease. One child (3.3%) had a single episode of faecal soiling on the second day of treatment with bisacodyl. Five children (16.6%) experienced discomfort or cried during phosphate enema administration; these were all less than 5 years old.

ADEQUACY OF BOWEL PREPARATION

At colonoscopy the colon was entirely clear in 26 children (86.6%). Some stool was present in four children (13.3%) but this could be removed via the colonoscope and adequate visualisation of bowel mucosa was achieved. Bowel preparation was therefore excellent

Table 1 Response to bisacodyl and enema

	Grade I (n=26)	Grade II (n=4)
Mean increase in number of bowel motions with bisacodyl	2	3.5
Stools after enema (n=14)	13	1
Clear fluid after enema (n=16)	13	3

(grade I) or good (grade II) in all cases. A very mild hyperaemia of the rectal mucosa only was observed in five children who had normal rectal biopsies. This may have been induced by the phosphate enema.

We documented the response to bisacodyl and to the phosphate enema in each child and compared this with the adequacy of the bowel preparation (table 1). The mean increase in the number of bowel motions during bisacodyl treatment was not greater among those with an excellent preparation (table 1). Among the 26 children with a grade I preparation equal numbers passed stools or clear fluid after the phosphate enema. The passage of stools at this time does not therefore indicate an unsatisfactory preparation.

The adequacy of the bowel preparation in relation to the histological diagnosis is shown in table 2. Twelve children had ulcerative colitis or Crohn's colitis and preparation was judged as grade I in nine (75%). Bowel histology was normal in 14 patients. Thirteen (94%) of these had grade I bowel preparation; all four patients who had polyps had a grade I preparation.

The time interval between phosphate enema administration and the start of colonoscopy was noted in 24 out of 30 patients. In 21 of these patients in whom the bowel preparation was judged as grade I, the mean interval between enema administration and colonoscopy was 1.76 hours (1-3 hours). Three (12.5%) children who had grade II preparation had a mean interval of 1.5 hours (1-2.5 hours).

Discussion

Bowel cleansing using ELS has become a standard preparation providing effective colon cleansing in adult patients.¹⁻⁷ A small number of studies in children have reported colonic cleansing using ELS but total cleansing of the colon is not consistently obtained.⁸⁻¹² The use of large volumes of ELS over a short period of time, in many instances via a nasogastric tube, makes hospital admission necessary on the night before colonoscopy especially in young children.¹² Vomiting of the lavage solution occurs commonly and requires the coadministration of prokinetic agents.¹²

The combination of oral bisacodyl and a single phosphate enema provides an ideal and safe means of preparing the bowel for total colonoscopy in paediatric patients. Our study

Table 2 Histological diagnosis and adequacy of preparation; values are number (%)

Histological diagnosis	Grade I	Grade II
Colitis (n=12)	9 (75)	3 (25)
Normal (n=14)	13 (94)	1 (7.7)
Polyps (n=4)	4 (100)	0

shows that this bowel preparation resulted in total cleansing of the colon in most patients. The method was well tolerated and safe. It has to be stressed that turning the child into the prone position after administration of the enema was an important feature of this method.

The incidence of side effects was much less than that reported with the use of ELS.¹² Retention of the phosphate enema was not encountered in any case, with bowel evacuation occurring within 15 minutes of administration. Hyperphosphataemia, hypocalcaemia, and rectal necrosis have been reported after repeated administration of phosphate enemas but not after administration of a single enema.¹³⁻¹⁷ The passage of stool rather than clear fluid after the enema does not imply inadequate bowel cleansing.

Before the institution of intestinal lavage, bowel preparation generally consisted of fluid diets combined with purgatives. A standard method as described by Rossi included a clear liquid diet for 48 hours before the procedure.¹⁸ Magnesium citrate was given on the morning of the day before the examination and senna (X-Prep) in the afternoon. A poor bowel preparation was described as 'unusual' with this regimen. A major advantage of the method reported here is the absence of any requirement for dietary restrictions in the days before colonoscopy. We believe that this makes the preparation much more acceptable to parents especially when the children concerned are very young. It was not possible to carry out a study to compare this method with intestinal lavage or purgatives because our nursing staff insisted that it would be unfair to the children in view of our excellent prior experience with this method.

This colonic preparation allows for the carrying out of colonoscopies as a day procedure on a consistent basis. The savings in cost compared with other methods of preparation are therefore significant. It is also likely that this method could be used very effectively for preparing the bowel for surgery in view of the success rate in achieving colonic cleansing. At present bowel preparation before surgery includes clear fluid and a purgative regimen as described above but also usually involves the administration of multiple enemas to the

child.¹⁸ We believe that paediatric surgeons should study the method reported here as it would be much less distressing to children and require fewer days in hospital.

We conclude that the combination of bisacodyl and phosphate enema provides an ideal method of preparing the bowel for total colonoscopy in the paediatric patient on an outpatient basis without the need to use large volumes of ELS or dietary restriction.

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