

Short report: comparison of two orally administered bowel preparations for colonoscopy—polyethylene glycol and sodium picosulphate

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SUMMARY

Fifty-nine consecutive patients admitted for colonoscopy were randomized to receive polyethylene glycol or sodium picosulphate. Patients expressed their opinion in a questionnaire and the endoscopists, blinded to the preparation, assessed the cleanliness of different segments of the colon.

There was no statistically significant difference in the taste-acceptability of the preparations, frequency of nausea, abdominal pain, peri-anal soreness or sleep disturbance between the two groups. Polyethylene glycol caused vomiting in 13% of patients while this was absent in those who received sodium picosulphate ($P < 0.05$).

The average number of stools passed was 12.4 in the polyethylene glycol and 8.6 in the sodium picosulphate groups; mean difference 3.8 (95% C.I. 0.7–6.9) with $P < 0.02$. The overall cleanliness of the colon was better in the polyethylene glycol group ($P = 0.002$) as judged by the blinded colonoscopist. There was less delay ($P = 0.06$) and more

completed colonoscopies ($P = 0.01$) in this group. Polyethylene glycol was a better preparation in all segments of the colon except the rectum.

We conclude that polyethylene glycol is the choice of the colonoscopist and should be given to all patients; sodium picosulphate would be a good alternative if patients are intolerant. If a limited colonoscopy or flexible sigmoidoscopy is intended, sodium picosulphate may be preferred because of its acceptable efficacy and slightly advantageous side-effect profile.

INTRODUCTION

Although there are several preparations available for bowel cleansing before colonoscopy there is no single ideal method. Good bowel preparation without compromising patient comfort is an essential preliminary to adequate visualization of colonic mucosa and performance of safe colonoscopy.

There is a trend towards the use of bowel lavage¹⁻⁴ and away from the traditional diet restriction for several days combined with enema. Lavage has been performed through a gastric tube but this has no advantage over the oral route.⁵ There is no survey of the type of preparation for colonoscopy in this country, but it is generally known that most gastrointestinal units currently use sodium picosulphate. Despite having several favourable reports,⁶⁻¹⁰ the use of polyethylene glycol remains confined to a limited number of units.⁶ This is probably because most trials compared polyethylene glycol to more traditional methods of preparation which include the use of enemas.⁷⁻¹⁰

We have compared sodium picosulphate with polyethylene glycol for patient tolerability and efficacy of bowel preparation for colonoscopy.

PATIENTS AND METHOD

A randomized single-blind trial was conducted on 59 consecutive patients admitted for colonoscopy to the Gastrointestinal Unit of Hull Royal Infirmary. Thirty patients received GoLytely (polyethylene glycol 236 g, sodium bicarbonate 7 g, sodium sulphate 23 g, sodium chloride 6 g, potassium chloride 3 g in 4 litres of water (Seward Medical Ltd, London, UK)) and 29 patients received Picolax (sodium picosulphate 20 mg, magnesium oxide 7 g, citric acid 24 g (Ferring Pharmaceutical Ltd, Middlesex, UK)). The preparations were given the day before colonoscopy following the manufacturers' instructions. Patients were allowed to have a normal diet until the afternoon before the examination when this was restricted to clear soups, clear juices, coffee and tea without milk. Patients were not allowed anything orally for 3 h before the examination, to reduce the chance of aspiration as sedation was given routinely.

Patients were given a questionnaire regarding the palatability of the material, the presence or absence of nausea, vomiting, abdominal pain, sleep disturbance and

Table 1. Patient's tolerability of bowel preparation

	PEG	SPS	Probability
Taste			
Acceptable	15	21	0.070 Not significant
Tolerable	14	8	
Intolerable	1	0	
Nausea			
None	18	23	0.063 Not significant
Mild	7	6	
Severe	5	0	
Vomiting			
None	26	29	0.044 Significant
Mild	3	0	
Severe	1	0	
Abdominal pain			
None	16	22	0.068 Not significant
Mild	11	6	
Severe	3	1	
Sleep disturbances			
Nil	8	11	0.427 Not significant
Mild	20	16	
Severe	2	2	
Peri-anal soreness			
Nil	9	13	0.099 Not significant
Mild	14	14	
Severe	7	2	
Number of motions (Mean)	12.4	8.6	< 0.02
Number of patients	30	29	

PEG: polyethylene glycol.

SPS: sodium picosulphate.

peri-anal soreness (Table 1). The time between taking the preparation and the onset of diarrhoea was noted and the number of stools passed was recorded.

Two experienced colonoscopists, who were unaware of the type of preparation given to the patient, performed the examinations. Adequacy of bowel preparation was assessed by the presence or absence of solid faeces, yellow liquid, clear liquid or an empty lumen in the caecum, ascending, transverse, descending, sigmoid colon and rectum (Table 2). The volume of liquid-stool aspirated was measured. Preparation was considered poor if there were solid faeces or yellow liquid obscuring colonic views in 4 of 6 segments of the large bowel, along with delay in the procedure or an incomplete study due to inadequate preparation. Preparation was considered equivocal if there were solid faeces or yellow liquid in 3 of the 6 segments but no delay in the procedure (Table 3).

Table 2. Colonoscopist's assessment of bowel preparation

	PEG	SPS	Probability
Caecum			
No fluids	20	8	
Clear fluids	1	2	0.001
Yellow fluids	4	10	Significant
Solid faeces	0	4	
Ascending colon			
No fluids	20	7	
Clear fluids	1	3	< 0.001
Yellow fluids	4	8	Significant
Solid faeces	0	7	
Transverse colon			
No fluids	18	8	
Clear fluids	3	4	0.007
Yellow fluids	7	13	Significant
Solid faeces	0	2	
Descending colon			
No fluids	15	12	
Clear fluids	11	4	0.040
Yellow fluids	2	10	Significant
Solid faeces	0	3	
Sigmoid colon			
No fluids	19	10	
Clear fluids	5	5	0.022
Yellow fluids	5	10	Significant
Solid faeces	1	3	
Rectum			
No fluids	23	18	
Clear fluids	3	4	0.228
Yellow fluids	3	6	Not significant
Solid faeces	1	1	

PEG: polyethylene glycol.

SPS: sodium picosulphate.

In the polyethylene glycol group there were 14 males and 16 females, age range 28–78 years, mean 52 years. In the sodium picosulphate group there were 20 males and 9 females, age range 18–88 years, mean 52 years.

STATISTICAL METHODS

The preparation was allocated to patients according to a randomization arranged in blocks of six in order to achieve near uniform allocation to the two treatment groups.

Table 3. Colonoscopist's assessment of colonoscopy

	PEG	SPS	Probability
Assessment of overall bowel preparation			
Good	25	14	0.002
Equivocal	4	3	
Poor	1	12	Significant
Delay			
Yes	1	9	0.006
No	29	20	Significant
Completion			
Yes	29	21	0.011
No	1	8	Significant
Volume aspirated	24 ml	51 ml	

PEG: polyethylene glycol.

SPS: sodium picosulphate.

Mantel-Haenzel test with standardized midrank scores was used to compare the ordinal responses between the two groups.

Wilcoxon two-sample and Kruskal-Wallis tests were used to compare the number of motions in the two groups with 95% confidence intervals calculated.

RESULTS

There was no statistically significant difference in the taste of the preparations, frequency of nausea, abdominal pain, or peri-anal soreness between the two groups, though polyethylene glycol had a trend ($P = 0.05-0.10$) to be less well tolerated. Polyethylene glycol caused vomiting in 13% of patients while this was absent in those who received sodium picosulphate ($P < 0.05$).

The average number of stools passed in the polyethylene glycol group was 12.39 (95% C.I. 9.68-15.10) and in the sodium picosulphate group 8.62 (95% C.I. 6.93-10.30); there is a mean difference of 3.78 (95% C.I. 0.65-6.90) with $P < 0.02$. No trend or statistical significance was observed between the two groups in sleep disturbance.

The time between taking the preparation and the onset of diarrhoea was from 30 min to 7 h, (mean 2 h 3 min), in the polyethylene glycol group, and in the sodium picosulphate group it was 1 h 20 min to 10 h, (mean 3 h 26 min). The average volume of liquid faeces aspirated in the sodium picosulphate group was 51 ml and in the polyethylene glycol group 24 ml.

The overall cleanliness of the colon was thought to be better in the polyethylene glycol group ($P = 0.002$) as judged by the colonoscopist. There was less delay ($P = 0.06$), with more completed colonoscopies ($P = 0.01$), in this group.

When each part of the colon was analysed separately, polyethylene glycol was a better preparation in all segments except the rectum (Table 2).

DISCUSSION

An earlier report had shown the efficacy of polyethylene glycol, but compared it with other preparations retrospectively.⁶ Other studies compared polyethylene glycol against methods of preparation which include rectal enemas.⁷⁻¹⁰ This is in contrast to our design which compared two oral preparations. Polyethylene glycol was superior to conventional methods in three studies,⁸⁻¹⁰ but was only equally effective in another study.⁷

Our results reveal that both preparations are satisfactory, but polyethylene glycol offers a clear advantage for the colonoscopist, particularly in the proximal parts of the colon, and allows quicker and more complete examination.

Although there was no statistical difference between the two preparations in the side effect profile, it appeared that a trend was in favour of sodium picosulphate. A clear difference emerged for vomiting which affected 13% of those taking polyethylene glycol, while those who received sodium picosulphate escaped free. In earlier studies patients preferred a preparation which did not involve the traditional method of severe dietary restriction and evacuating enemas.⁷⁻⁹

We conclude that polyethylene glycol is the colonoscopist's choice as it provides a cleaner colon and allows shorter and more complete examination. Since it offers a more satisfactory examination, despite being more costly,* polyethylene glycol should be given to all patients who need a complete colonoscopy. If patients are not tolerant of this preparation then sodium picosulphate would be a good alternative, particularly if repeated examination will be required. If the intention is to perform limited colonoscopy or flexible sigmoidoscopy, sodium picosulphate may be preferred because of its acceptable efficacy, low cost and slightly advantageous side effect profile.

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* Cost of bowel preparation in January 1992

Sodium picosulphate (Picolax)	£0.59
Polyethylene glycol (GoLytely or Kleen-Prep)	£4.50-8.60

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