

Bowel preparation for colorectal surgery: with and without mannitol

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Abstract

Introduction: In our country due to some limitations, mannitol is widely used for bowel preparation. Bowel preparation with mannitol has several side effects.

Aim: To compare complication of mechanical bowel preparation with and without mannitol.

Material and methods: This case control study was carried out in Imam Khomeini and Abuzar children's hospitals. Sixty cases of patients who underwent colorectal surgery were included in this study. Pull-through, colostomy closure, and anorectoplasty were the surgical procedures. Subjects were randomly placed in the case or control group. Infection, electrolyte disturbances, fever, and leukocytosis were recorded. Multivariate analysis was done using PRISM. Odds ratio was calculate with CI = 95%.

Results: Fourteen boys and 16 girls were included in group I. Ten boys and 20 girls were included in group II. Twenty colostomies, 6 pull-throughs, and 4 anorectoplasties were performed in group I. Twenty-one colostomies, 5 pull-throughs, and 4 anorectoplasties were done in group II. Mean age of the patients was 2.63 ± 1.9 and 2.66 ± 1.68 for group I and group II respectively ($p = 0.262$). Following bowel preparation with mannitol, 14 patients had mild fever with mean body temperature of 38.1°C . Three subjects had postsurgical fever within 48 h of surgery. In group II, postoperative fever was found in 2 subjects.

Conclusions: Hypernatremia, hypokalemia, and leukocytosis were more common in patients who underwent bowel preparation with mannitol.

Introduction

Mannitol was recommended for bowel preparation in previously published literature [1]. Bowel preparation with mannitol has several side effects such as fluid and electrolyte disturbances, dehydration, nausea, vomiting, fever, and abdominal cramp [2]. Bowel preparation using mannitol may be associated with abdominal infection [3]. Today, polyethylene glycol as a standard method for bowel preparation is widely used in countries with high economic status. But in countries with low economic states, polyethylene is expensive and may not be available [4]. In our country due to some limitations, mannitol is widely used for bowel preparation.

Aim

The aim of this study was to compare bowel preparation with mannitol and without mannitol regarding wound infection and electrolyte disturbances.

Material and methods

This case control study was carried out in Imam Khomeini hospital. Sixty cases were included in this study. Indications for colorectal surgery were pull-through, colostomy closure, and anorectoplasty. All subjects in case and control groups underwent enema for preparation. Oral antibiotics were prescribed for cases and controls in 3 doses preoperatively. A systemic antibiotic was prescribed for all subjects 30 min preoperatively. Subjects were randomly placed in the case or control group. Surgeons were blind to the type of preparation. Emergency cases, patients with proximal colostomy, and patients who received antibiotics for intra-abdominal infection were excluded from our study. Normal saline enema (10 cc/kg) was used for both groups. Mannitol 10% (10 cc/kg) with Ringer serum was prescribed orally for the case group. Infection, electrolyte disturbances, fever, and leukocytosis were recorded.

Table I. Comparison between two groups

Parameter	Group I (mannitol)	Group II (without mannitol)	Value of p
Mean age [year]	2.63 ±1.9	2.66 ±1.68	0.262
Na	141.13 ±4.41	139.73 ±2.55	0.002
K	3.7 ±0.32	4.39 ±0.45	0.0006
WBC	9146.6 ±2434.4	7523.3 ±1098.8	< 0.001
Defecation	4.30 ±1.02	3.10 ±0.99	0.601
Bowel sound	2.43 ±1.00	2.03 ±0.92	0.288
Wound infection	1	2	
Hospital stay	8.5	9.2	

Wound infection was determined when there was erythema that needed antibiotic treatment, and a wound with an indication for exploration for drainage. White blood cells > 10,000 was considered as leukocytosis. Anastomotic leakage was determined using radiologic investigation or drainage of fecal material. Patients were examined daily until discharge and then 1 week after that. Multivariate analysis was done using PRISM. Odds ratio was calculated with CI = 95%.

Results

Fourteen boys and 16 girls were included in group I. Ten boys and 20 girls were included in group II. Mean age of case and control groups had no significant difference ($p = 0.262$). Twenty colostomies, 6 pull-throughs, and 4 anorectoplasties were performed in group I. Twenty-one colostomies, 5 pull-throughs, and 4 anorectoplasties were done in group II. Following bowel preparation with mannitol, 14 patients had mild fever (mean 38.1°C). Three subjects had postsurgical fever within 48 h of surgery. In group II, postoperative fever was found in 2 subjects. The level of sodium was significantly higher in group I. The level of potassium was significantly lower in group I. White blood cells count was significantly higher in group I (Table I).

Discussion

Leukocyte count was significantly higher in patients with mannitol preparation. Sodium concentration was significantly higher among patients who underwent bowel preparation with mannitol. The level of potassium was significantly lower in patients who underwent bowel preparation with mannitol. Mannitol causes osmotic diuresis, dehydration, and has the risk of eliciting explosion with diathermy [5, 6].

In our study wound infection showed no significant difference between the two groups. This may be due to limitation in sample size. In another study, wound infection was significantly higher in patients who un-

derwent bowel preparation with mannitol [7]. In the study by Zmora *et al.*, there were no significant differences between the prep and non-prep group regarding complications except for diarrhea [8]. In the study by Scabini *et al.*, who compared polyethylene glycol with a group without mechanical bowel preparation, the authors concluded that colon and rectal surgery may be safely performed without mechanical bowel preparation [9]. This finding supported our finding, because polyethylene glycol is safer than mannitol bowel preparation.

In the study by Balogh *et al.*, the rate of septic complication was higher in colon preparation using the conventional method than preparation with mannitol [10]. In our study, the rate of infection was similar in both groups. However, sample size in our study was smaller than in the Balogh *et al.* study [10].

Most studies have shown that colorectal surgery without mechanical bowel preparation has fewer side effects, even with newer agents [7, 11]. In contrast, in a recent study on 190 patients who underwent colorectal surgery due to diverticulitis, there were no significant differences between groups in septic complication and mortality [12].

Conclusions

Rectal bowel preparation without mannitol is safe and is associated with less complications than bowel preparation with mannitol. In our setting, normal saline enema without mannitol may be an appropriate regimen and is recommended.

Limitation: Low sample size is the main limitation of our study.

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