Original Article

Access this article online
Website: www.afrjpaedsurg.org
DOI: 10.4103/0189-6725.91670
Quick Response Code:

One-day bowel preparation in children with colostomy using normal saline

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ABSTRACT

Background: Colonic and colorectal surgery frequently requires bowel preparation. This is an evaluation of the use of normal saline for one-day bowel preparation in children with colostomy. **Patients and Methods:** A prospective study of 55 children with colostomy who had one-day bowel preparation for colonic and colorectal surgical procedures in a 3-year period. The information, along with clinical data was recorded on a structured proforma. Data were analysed using SPSS version 11.0. **Results:** There were 33 boys and 22 girls. The median age was 4 years (range, one month - 13 years). The primary diagnosis were as follows: Anorectal malformation, 24 (44%); Hirschsprung`s disease, 24 (44%); Faecal incontinence- post-abdominoperineal pull-through, 2 (4%); Penetrating rectal injury, 1 (2%); others, 4(8%). Intraoperative bowel luminal fluid cleanliness was assessed as clear in 36 (62%) and contaminated in 21 (38%). Overall, postoperatively, superficial surgical site infection occurred in 6 (10.9%) patients (2 had clean intraoperative colonic fluid, 5.9%. **Conclusion:** One-day bowel preparation using normal saline is effective and safe in children with colostomy.

Key words: Bowel preparation, effectiveness, normal saline, one-day, safety

INTRODUCTION

The traditional three-day or five-day bowel preparation initially employed when indicated for colonic surgeries might be strenuous for infants and children.[1] The amount and cost of fluid used for bowel preparation may also be a discouraging factor. This necessitated the search for a method of bowel preparation with a shorter duration that is safe and effective. The one-day bowel preparation was therefore introduced with the use of polyethylene glycol as a standard method.[1] Polyethylene is expensive and is not readily available in our setting.

The need for an alternative fluid for bowel preparation that is affordable, readily available, less expensive and safe became pertinent. Normal saline fulfilled the above properties and was therefore preferred.[2] This is a report of the result of use of normal saline for one-day bowel preparation in children with colostomy in a resource-limited setting.

PATIENTS AND METHODS

Setting

This study was carried out at the Ahmadu Bello University Teaching Hospital, Zaria, a tertiary institution in North-western Nigeria.

Patient selection

This was a prospective study of children with colostomy who had bowel preparation for various surgical procedures. Those without colostomy were excluded from the study, as it was considered difficult to adequately cleanse the bowel with this method in the absence of a colostomy.

Ethical clearance

Ethical approval for the study was obtained from the hospital's ethical committee.

Methodology

Most patients were admitted into hospital on the day before surgery. The parent or caregiver was counselled on the procedure. The proximal and distal stoma were intubated with a rectal tube and washed out with warm saline, one at a time. In patients with an anal opening, washout was also done through the anus. This was

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done in the evening (6 pm) the day before surgery and in the morning (6 am) of surgery. The washout was done, each time, until the returning effluent was clear. The total amount of normal saline used during each washout session was recorded. Any complication(s) noticed during or after each washout was recorded. The patients were allowed liquids only orally one day before surgery.

Clinical and laboratory parameters

The patients' weight, packed cell volume and serum electrolyte and urea values were ascertained before the evening and after the morning colonic washouts.

Perioperative antibiotics

Each patient received intravenous perioperative antibiotics (amoxicillin, gentamicin and metronidazole combination or cephalosporin and metronidazole combination). The antibiotics were given after induction of anaesthesia (but not more than 2 hours before incision). After surgery, antibiotics were continued for 48 hours intravenously, and then another 3 days orally (once intestinal function returned).

Intraoperative cleanliness and postoperative monitoring

Colonic cleanliness was assessed intraoperatively by examining the colonic contents for colour and constituents. Cleanliness was categorised as follows:

- Clear: Clear contents, without faecal particles
- Contaminated: Colonic contents containing faecal particles or faeces.

Any spillage of colonic contents into the operation field was noted.

Postoperatively, evidence of surgical site infection was noted and recorded.

Data management

These informations together with the demographic data of the patient, clinical presentation, diagnosis, intraoperative bowel cleanliness and postoperative complications were prospectively recorded in a structured proforma. Data from the proforma were analysed using SPSS version 11.0. Level of statistical significance was set at 0.05.

RESULTS

A total of 55 children were recruited for the study, including 33 boys and 22 girls. The median age was 4 years (range, 1 month to 13 years).

The primary indications for colorectal surgery were anorectal malformation, 24 (44%); Hirschsprung's disease, 24 (44%); Faecal incontinence- post-abdominoperineal pull-through, 2 (4%); colostomy for penetrating rectal injury, 1 (2%); others, 4 (8%). Forty children (72.7%) had sigmoid colostomy and 15 (27.3%) had transverse colostomy.

The amount of normal saline used to achieve a clear effluent was 500 to 1 500 ml (median, 1 000 ml) for the evening colonic washout and 500 to 2 000 ml (median, 1 000 ml) for the morning washout. There was no significant difference in the patients' weight, packed cell volume and electrolyte and urea values obtained before the evening washout and after the morning washout ($P>0.05$).

Complications encountered during washout included abdominal discomfort, 1 (2%), and mild stoma bleeding, 6 (11%). The stoma bleeding did not require any measure to control it.

Intraoperative colonic fluid cleanliness was considered to be clear in 34 (62%) and contaminated in 21 (38%). The specific colorectal surgical procedures performed were as follows: Colostomy closure, 23 (42%); posterior sagittal anorectoplasty, 12 (22%); transabdominal Soave's endorectal pull-through, 8 (16%); Swenson pull-through, 6 (11%); transanal endorectal pull-through, 3 (5%); posterior sagittal anorectovaginourethroplasty, 2 (4%) and abdominoperineal pull-through, 1 (2%). No patient's surgery was postponed due to presence of contaminated intraoperative fluid.

Overall, postoperatively, superficial surgical site infection occurred in 6 (10.9%) patients (2 had clean intraoperative colonic fluid, 5.9%; 4 had contaminated intraoperative colonic fluid, 19%). Pyrexia day one after surgery occurred in 2 (3.6%) patients (one each with clean intraoperative colonic fluid and contaminated intraoperative colonic fluid, respectively). One patient (1.8%) had anastomotic leakage (the patient had contaminated intraoperative colonic fluid), but this was not related to the cleanliness of the colon.

The hospital stay was 7 to 14 days (median, 8.5 days) for those with clean bowel and 7 to 15 days (median, 10 days) for those with contaminated bowel. Although the longer duration of hospital stay for patients with contaminated intraoperative colonic fluid was due to surgical site infection, the difference did not reach statistical significance ($P>0.05$).

DISCUSSION

The aim of bowel preparation in surgery is to reduce faecal as well as bacterial load. This is best achieved either mechanically or chemically or a combination of both. Various fluids, agents and antibiotics have been used for this purpose.

The use of normal saline in bowel preparation has been established in whole gut irrigation.[3] Normal saline is isotonic and physiologic when compared with body fluids. The risk of water intoxication or electrolyte derangement is therefore minimal when normal saline with added potassium was used for bowel preparation in children.[2] Normal saline is readily available and affordable, making it justifiable for use in one-day bowel preparation in children, as seen in the present report. We were able to clean the proximal colon satisfactorily by repeated saline washouts through the proximal stoma. This was usually done each time until the returning effluent was clear. However, a limitation of this method is the fact that cleansing could not extend beyond the caecum, so that small intestine could not be cleansed, as in whole gut irrigation.

The other fluids such as hypertonic saline, mannitol and polyethylene glycol may be used. Polyethylene glycol is the ideal fluid for the one-day bowel preparation.[4-7] These fluids are not often readily available in our setting and may be expensive. In particular, mannitol causes osmotic diuresis, dehydration and has the risk of eliciting an explosion with diathermy.[3,8-12]

The three-day or five-day bowel preparation is cumbersome, tedious and causes unwanted anxiety among parents and requires hospital admission several days before surgery.[1,6] The one-day bowel preparation with normal saline in children with colostomy requires that the child is admitted only on the evening before surgery and is well-accepted by parents. It did not produce any significant changes in body weight, packed cell volume or serum electrolytes.

The results were good; the preoperative and postoperative complications observed were considered not severe. Anastomotic leakage in one of the patients was not directly related to the method of bowel preparation.

In conclusion, one-day bowel preparation with normal saline in children with colostomy is safe and effective. This method may therefore be applicable to settings with limited resources.

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Cite this article as: Ameh EA, Lukong CS, Mshelbwala PM, Anumah MA, Gomna A. One-day bowel preparation in children with colostomy using normal saline. Afr J Paediatr Surg 2011;8:291-3.

Source of Support: This study was supported by funding from the University Board of Research, Ahmadu Bello University, Zaria, Nigeria. **Conflict of Interest:** None declared.