Comparison Between Mechanical and Non Mechanical Bowel Preparation Prior To Elective Colorectal Surgery

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Abstract

Background: Bowel preparation prior to colonic surgery usually includes antibiotic therapy together with mechanical bowel preparation which may cause discomfort to the patients, prolonged hospitalization and water & electrolyte imbalance.

Objective: to assess whether elective colon and rectal surgery may be safely performed without preoperative mechanical bowel preparation.

Method: the study includes all patients who had elective large bowel resection at Medical City – Baghdad Teaching Hospital between Feb, 2007 to Jan, 2010. Emergency operations were not included. The patients were randomly assigned to the 2 study groups (with or without mechanical bowel preparation.

Results: A total of 165 patients participated in the study, 82 with mechanical bowel preparation and 83 without. The 2 groups were similar in age, sex and type of surgical procedure. 134 patients (81.2 %) underwent surgery owing to colorectal cancer & 31 patients (18.8 %) owing to benign disease. The hospitalization period was longer in the bowel-prepared group (mean ± SD, 8.2 ± 5.1 days) as compared with the non prepared group (mean ± SD, 8.0 ± 2.7 days). However, this difference was not statistically significant. The time until the 1st bowel movement was similar between the 2 groups : a mean ± SD of 4.2 ± 1.3 days in the non prepared group as compared with a men ± SD 4.3 ± 1.1 days in the prepared group (P = NS).

Conclusion: Our results suggest that no advantage is gained by preoperative mechanical bowel preparation in elective colorectal surgery.

Key words: Elective colorectal surgery, Mechanical and Non Mechanical Bowel preparations

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Introduction

The value of mechanical bowel preparation (MBP) for colorectal surgery is debatable. In the first half of the 20th century, mortality from colon and rectal surgery often exceeded 20%, mainly attributed to sepsis [(1)]. Modern surgical techniques and improved perioperative care have significantly lowered the mortality rate. Infectious complications, however, still are a major cause of morbidity in colorectal surgery, leading to increased cost, prolonged hospital stay, and occasional mortality [(2)].

Mechanical bowel preparation is aimed at cleaning the large bowel of fecal content, thereby reducing the rate of infectious complications following surgery.

Traditionally, bowel cleansing was achieved using enemas in combination with oral laxatives [(3)]. More recently, oral cathartic agents to induce diarrhea and cleanse the bowel from solid feces were developed. These new bowel preparation agents, such as polyethylene glycol and sodium phosphate, provide superior cleansing compared to the more traditional methods [(4-6)] and are used by most surgeons in preparation for colorectal surgery. [(7-9)] the practice of bowel cleansing before colorectal surgery has became a surgical dogma, and primary colonic anastomosis is considered unsafe in the face of an unprepared bowel. There is, however, a paucity of data showing that mechanical bowel preparation by itself, separately from other operative and perioperative measures, actually reduces the rate of infectious complications.

In urgent colon surgery for penetrating trauma, recent studies have shown that primary colonic anastomosis is safe even though mechanical bowel preparation is not performed before surgery. [(10-11)] these

data therefore may bring into question the utility of mechanical bowel preparation in elective colon and rectal surgery.

The aim of this study was to assess whether elective colon and rectal surgery may be safely performed without preoperative mechanical bowel preparation.

Methods

The study populations comprise adult patients admitted for elective colorectal surgery in the Medical City – Baghdad Teaching Hospital, between Feb 2007 to Jan 2010. All patients gave their informed consent. Patients were allocated to the 2 study groups , The 1st group received MBP (group1) & the 2nd group did not received MBP (group 2) . Patients in both groups were excluded if they had taken antibiotics for the last 10 days before surgery or if there was evidence of infection. Patients undergoing emergency operations were not included. Patients to group 2 were excluded if they had bowel preparation for colonoscopy within 6 days prior to surgery. All patients admitted one day before surgery and received low - residue diet. Parenetral hydration was given in the morning of surgery. For all patients, one hour before induction we used 500 mg of metronidazole intravenously & 1 gm of ceftriaxone. The same antibiotic was continued for 48 hours following the operation. One day before surgery all patients in group 1 received Coloclean (poly ethylene glycol) for MBP possible complications were registered daily after surgery , and patients re-examined at the outpatient clinic 1,3 and 6 weeks following surgery . Wound infection was indicated by the presence of pus or discharge resulting in a culture positive for bacteria . Abdominal or pelvic infection comprised discharge or abscess, which was defined as a typical finding on Ultrasonography or Computed Tomography, and a culture positive for bacteria from the puncture or drain. Wound rupture was defined as clinical evisceration. Anastomotic dehiscence was detected by radio- logical imaging using water soluble contrast. An investigation was under taken in the presence of fever, tenesmus, abdominal pain, or clinical signs of peritonitis. The operations were performed by a general surgeon or by a resident surgeon assisted by a consultant. A midline incision was used in all patients.

Results

Between Feb. 2007 & Jan. 2010, 165 consecutive patients underwent elective colorectal procedures for non obstructive large bowel pathologic features like Right & Left Hemicolectomy, Sigmoidectomy, Subtotal Colectomy,

Abdomino-perineal resection, Transverse Colectomy & Anterior resection & Low Anterior resection (table 1), 82

Patients (50 male, 32 female) underwent surgery with MBP, while 83 patients (51 male, 32 female) did not have MBP. (Table2) summarizing general parameters. There were male > female in both groups (no statistically difference between the two groups, p – .79). The patients in each group were similar in age. Preoperatively 14 patients (MBP, 9 & non MBP, 5) who had hemoglobin levels < 9.5 g/dL received preoperative blood transfusion. 31 patients (20 , MBP & 11, non MBP) received blood transfusion postoperative period (p = .005) . The average hospital stays for patients in both groups was similar. Pathological examination of the resected specimens revealed that 135 patients (81.8 %) had malignant disease, whereas 30 patients (18.2) had benign disease such as irritable bowel disease or diverticulosis (no statistical difference was found between the 2 groups. In most cases, the anastomosis performed by hand sewing technique & few of them by stapler technique. Time to 1st defecation was similar in both groups.

Postoperative complications are given in (table 3). The incidence of wound infection was higher in patients MBP: 8 (9.8 %) as compared with 5(6 %) in the non MBP group . The incidence of wound dehiscence, abdominal / pelvic collection, urinary tract infection, thrombophlebitis ileus, and anastomotic break down was not significantly different between the two

groups Anastomotic bleeding occurred in 2 patients (2.4 %) both in non MBP group. In one the bleeding stopped spontaneously, while the 2nd required re-laparotomy & suturing of the stapler line. Anastomotic breakdown occurred in 1 patient with MBP & 2 with non MBP. Following anterior resection & was diagnosed on the basis of clinical findings that included signs of peritonitis or septicemia, fecal discharge from the surgical wound, worsening abdominal pain , fever & diarrhea CT scan & U/S were used to confirm the anastomotic leak in all these 3 patients.

Pulmonary complication occurred more frequently in the MBP group: 8 patients (9.8 %) vs. 5 patients (6 %) in the non MBP group this difference was not statistically significant mortality occurred in 2 patients (2.4 %) from each group . One patient died of massive pulmonary patients died of cardio respiratory failure, & the 4th patients died of respiratory failure on the 4th day following relaparotomy owing to anastomotic failure. Various secondary surgical procedures were carried out in 4 patients with anastomotic leak & bleeding in both groups , These included peritoneal lavage , abdominal drainage, defunctioning colostomy in 3 patients & suturing of stapler line in one patients with anastomotic bleeding. All together no statistical difference in the frequency of complications was observed between the two groups. However when the complications were categorized into a binary variable (yes / no complication), there was a tendency for fewer complications in the non-MBP group (45.6 %) as compared with the MBP group (53.7%).

Table (1) Surgical Procedures

Type of operation	Mechanical Bowel Preparation (n = 82)	Non Mechanical Bowel Preparation (n = 83)	Total (n = 165) No. (%)
Hemicolectomy , Right	9	12	21(12.7%)
, Left	19	18	37(22.4%)
Sigmoidectomy	20	23	43(26.1%)
Subtotal colectomy	3	2	5(3.03%)
Abdomino-perineal Resection	9	8	17(10.3%)
Transverse Colectomy	1	1	2(7.2%)
Anterior Resection	15	10	2.5(15.2%)
Low Anterior Resection	6	9	15(9.1%)

Table (2) Summary of General Parameters

Parameters	MBP(n = 82)	Non MBP(n = 83)
Sex , M : F	50 : 32	51 : 32
Age , Y . Mean +_ SD	68.17 +_ 11.5	68.11 +_ 9.5
Preoperative Blood Transfusion	9	5
Postoperative Blood Transfusion	20	11
Malignant to Benign disease ratio	62 : 20	73 : 10
Surgeon : Attending to Resident ratio	30 : 52	27 : 56
Anastomosis : Hand Sew to Stapler ratio	60 : 22	65 : 18
First defecation , d , mean +_ SD	4.3 +_ 1.1	4.2 +_ 1.3
Hospital stay , d , mean +_ SD	8.2 +_ 5.1	8.0 +_ 2.7

Table (3) Mortality & Morbidity

Mortality & Morbidity*	MBP (n = 82)	Non MBP (n = 83)
Mortality	2 (2.4 %)	2 (2.4 %)
Wound Dehiscence	3 (3.7 %)	2 (2.4 %)
Wound Infection	8 (9.8 %)	5 (6 %)
Anastomosis Breakdown	1 (1.2%)	2 (2.4 %)
Anastomosis Bleeding	NA	2 (2.4 %)
Abdominal & Pelvic collection	1 (1.2 %)	1 (1.2 %)
UTI	5 (6.1 %)	3 (3.6 %)
Pulmonary complication	8 (9.8 %)	5 (6 %)
Thrombophlebitis	7 (8.5 %)	8 (9.6 %)
Ileus	8 (9.8 %)	6 (7.2 %)
Re-laparotomy	2 (2.4 %)	2 (2.4 %)

Abbreviation: NA, Not available. *, Data are presented in number (percentage), P – value were not significant.

Discussion

Most surgeons used MBP for elective colorectal surgery. However, the use of MBP in elective colorectal surgery is controversial issues. The aim of MBP is to rid the colon of solid stool, thus reducing the bacterial load & minimizing the risk of infection & anastomotic complications. It also enables the surgeon to perform intra-operative colonoscopy & facilitates palpation of the entire colon during surgery. The disadvantage of MBP are electrolyte imbalance , dehydration , abdominal pain , bloating , fatigue , & the risk of perforation with enemas especially in elderly population [12,13,14,15,16] . MBP has been justified by Smith et al (17) in their experimental model suggesting that the passage of large fecal load can disrupt the healing anastomosis as compared with those individuals with an empty colon . On the other hand, Schein et al (18), failed to find a difference in anastomotic healing between groups of animals with or without bowel preparation Various prospective randomized studies [19, 20, 21, 22, 23], comparing patients with or without MBP, failed to show the benefit of MBP in reducing the rate of complications. There is no doubt that prophylactic antibiotic therapy plays a very important role in colorectal surgery. Keighley et al (24) found that the combination of MBP & systemic antibiotics provided the most effective protection against wound infection. LeVeen et al (25) & Cohen et al (26) have also shown the advantage of prophylactic antibiotics for colorectal anastomotic healing in the presence of fecal loading. Some studies [27,28], shows that anastomotic dehiscence occurs mainly after low anterior resection: in our study also, the 3 cases of anastomotic leak occurred after this procedure. Our study failed to show any increase in the rate of anastomotic brake- down in patients with out MBP, only 2 patients (2.4 %) from this group had anastomotic brake-down. However , the rate of wound infection was higher in the group that received MBP , but this was not statistically significant when compared with those who did not receive it . Despite these results , we strongly emphasize the need for MBP in 2 instances : patients who need low or very low anterior resection or when surgery performed for polypoid lesion where palpatory & sometimes intra operative colonoscopy is necessary . On the other hand , we recommend extreme caution regarding the use of MBP in patients with a tumor almost occluding the lumen . MBP in these patients may cause large bowel obstruction necessitating emergency operations that frequently require stoma formation. .

Conclusions

This randomize prospective study suggest that MBP is unnecessary for safe elective colonic & colorectal surgery , although it recommended in selected cases where palpation of entire colon during surgery or intra- operative colonoscopy might be required .

References

1. Glenn F, McSherry CK. Carcinoma of the distal large bowel: 32-year review of 1,026 cases. Ann Surg. 1966; 163: 838–849.

2. Brachman PS, Dan BB, Haley RW, et al. Nosocomial surgical infections: incidence and cost. Surg Clin North Am. 1980; 60: 15–25.

3. Keighley MR. A clinical and physiological evaluation of bowel preparation for elective colorectal surgery. World J Surg. 1992; 6: 464–670.

4. Oliveira L, Wexner SD, Daniel N, et al. Mechanical bowel preparation for elective colorectal surgery. A prospective, randomized, surgeon-blinded trial comparing sodium phosphate and polyethylene glycol-based oral lavage solutions. Dis Colon Rectum. 1997; 40: 585–591.

5. Cohen SM, Wexner SD, Binderow SR, et al. Prospective, randomized, endoscopic-blinded trial comparing precolonoscopy bowel cleansing methods. Dis Colon Rectum. 1994; 37: 689–696

6. Yoshioka K, Connolly AB, Ogunbiyi OA, et al. Randomized trial of oral sodium phosphate compared with oral sodium picosulphate (Picolax) for elective colorectal surgery and colonoscopy. Dig Surg. 2000; 17: 66–70.

7. Beck DE, Fazio VW. Current preoperative bowel cleansing methods. Results of a survey. Dis Colon Rectum. 1990; 33: 12–15.

8. Solla JA, Rothenberger DA. Preoperative bowel preparation. A survey of colon and rectal surgeons. Dis Colon Rectum. 1990; 33: 154–159.

9. Nichols RL, Smith JW, Garcia RY, et al. Current practices of preoperative bowel preparation among North American colorectal surgeons. Clin Infect Dis. 1997; 24: 609–619.

10. Curran TJ, Borzotta AP. Complications of primary repair of colon injury: literature review of 2,964 cases. Am J Surg. 1999; 177: 42–47.

11. Conrad JK, Ferry KM, Foreman ML, et al. Changing management trends in penetrating colon trauma. Dis Colon Rectum. 2000; 43: 466–471.

12. Oleveira L, Waxner SD, Daniel N , et al . MBP for elective colorectal surgery : a prospective , randomized , surgeon – blind trial comparing sodium phosphate & polyethylene glycol - based oral lavage solutions Dis,Colon&Rectum.1997:40:585-591.

13. Lieberman DA, Ghormleg J, Flora K . Effect of oral sodium phosphate colon preparation on serum electrolytes in patients with normal serum creatinine . Gastro-intest Endosc. 1996:43:467-469 .

14. Dipalma JA, Brady CE111, Steward DL, et al . Comparison of colonic cleansing methods in preparation for colonoscopy .Gastroenterology . 2004:86:856-860

15. Van Geldere D, Fa-Si-Oen P, Noach LA, et al .Complications after colorectal surgery without MBP . J Am Coll Surg . 2002;194:40-47 .

16. Beck DE . Mechanical bowel cleansing for surgery . Perspect colon rectal surg. 1994;7:97-114 .

17. Smith SR, Connolly JC, Flimore OJ .The effect of fecal loading on colonic anastomotic healing . Br J Surg . 1983;70:49-50 .

18. Schein M, Assalia A, Edlar S, Wittmann DH. Is MBP necessary before primary colonic anastomosis ? an experimental study . Dis Colon Rectum . 1995;38:749-745 .

19. Burke P, Mealy K, Gilled P, Joyce W, Traynor O, Hyland J . Requirement for bowel preparation in colorectal surgery . Br J Surg . 1994;81:907-91

20. Miettinen RP, Laitinen ST, Makela JT, Paakkonen ME . Bowel preparation with oral polyethylene glycol electrolyte solution vs. no preparation in elective open colorectal surgery : Prospective randomized study . Dis Colon Rectum,2000;43:669-677.

21. Brownson P, Jenkins S, Nott D, et al . MBP before colorectal surgery : results of prospective randomized trial . Br J Surg .1992;79:461-462 .

22. Santos JC, Batista J, Sirimarco MT, Guimaraes AS, Levy CE .Prospective randomized trial of MBP in patients undergoing elective colorectal surgery . Br J Surg,1994;81:1673-1676 .

23. Zmora O, Mahajina A, Bar-Zakai B, et al .Colon & rectal surgery without MBP . Ann Surg . 2003;237:363-367 .

24. Keighley MR , Arabi Y , Alexander-Williams J , Young D , Burdon DW .Comparison between systemic & oral antimicrobial prophylaxes in colorectal surgery Lancet . 1979;1:894-897 .

25. LeVeen HH , Wapnick S , Falk J . et al . Effects of prophylactic antibiotics on colonic healing . Am J Surg .1976;131:47-53 .

26. Cohen SR, Cornell CN, Collins MH, Snell JE, Blank WA, Altman RP .Healing of ischemic colonic anastomosis in the rat : role of antibiotic preparation . Surgery . 1985:97:443-446 .

27. Fazio VW , Turnbull RP , Goldsmith MG . Ileorectal anastomosis : a safe surgical technique . Dis Colon Rectum . 1995;18:107-114 28- Mealy K, Burke P, Hyland J .Anterior resection without a defunctioning colostomy : question of safety . Br J Surg . 1992;79:305-307

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