



A PROSPECTIVE COMPARATIVE STUDY BETWEEN MECHANICAL BOWEL PREPARATION AND NO PREPARATION BEFORE BOWEL SURGERIES

General Surgery

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ABSTRACT

To analyze the effect of mechanical bowel preparation versus no mechanical bowel preparation on outcome in patients undergoing elective bowel surgeries. A total of 50 patients were selected for study. Which were divided in two groups. Post-operative anastomotic leakage, wound infection, sepsis, intra-abdominal collection, hospital length of stay compared. Study showed that no additional advantage is gained by preoperative bowel preparation

KEYWORDS

mechanical bowel preparation, Post-operative anastomotic leakage, wound infection, sepsis, intra-abdominal collection, hospital length of stay.

BACKGROUND:

Reducing anastomotic leakage rate and the incidence of surgical site infection remains a constant challenge to surgeons. It was previously believed that mechanical cleansing of the large bowel could reduce these complications as most were caused by endogenous colonic bacteria. Mechanical bowel preparation (MBP) by administration of oral laxatives has been practiced since the 1970s. Yet, as for today, the issue of whether MBP is beneficial in colon surgeries remains debatable. Modern surgical techniques and improved perioperative care have significantly lowered the mortality rate. Mechanical bowel preparation (MBP) is aimed at cleansing the bowel of fecal content. Traditionally, bowel cleansing was achieved using enemas in combination with oral laxatives. 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 and are used by most surgeons in preparation for bowel surgery. Studies showed that the liquid bowel content caused more spillage than solid stool and increased post-operative infective complications. A meta-analysis which included seven randomized controlled trials of 1297 patients and concluded that MBP would not reduce septic complications and could even be harmful with respect to the incidence of anastomotic leak.

MATERIAL AND METHOD:

1) Patient selection:

This prospective study comprising of 50 patients was conducted over a period of 12 months from March 2019 to February 2020 in the Department of General Surgery, GCS Medical College and Research Centre Ahmadabad, Gujarat. Admitted in in-patient department (emergency as well as elective) who underwent resection and primary anastomosis of small bowel, colon and upper rectum. Cases of mid and low rectal cancer were excluded from this study, as there was a potential need of diversion stoma. Significant p value for study is concluded at less or equal to 0.05.

Exclusion criteria: 1. Patient refusal for surgery 2. Any known allergy or contraindication to Polyethylene Glycol 3. Alcoholism 4. Diabetes 5. Long term drug therapy 6. Bleeding diathesis 7. Local site skin infections 8. Advanced malignancy 9. Patient with proximal stoma 10. Patient undergoing APR 11. Hepatic, Renal, Cardiopulmonary abnormality. The total sample population was divided in two (2) groups - Patients receiving bowel preparation (with MBP) and Patients without bowel preparation (without MBP) and the outcome of this study was compared between the two groups and also with accepted standards of bowel surgery.

2) Patient preparation:

Oral Polyethylene Glycol preparation as per manufacturer's

instruction along with Phosphate enema were given to all patients of the first group (MBP group). All patients received intravenous Ceftriaxone and Metronidazole – 1 hour prior to surgery and continued for 36 hours post operatively. In pre-operative assessment, the patients were enquired about history of drug allergy, previous operation or prolonged drug treatment. General examination, systemic examination and assessment of the airway was done. Pre-operative fasting of minimum 6 hrs. Was ensured before surgery in all elective cases. All patients undergoing elective surgery received premedication of Tab. Diazepam (10 mg orally) the night before surgery as PAC direction. Patients also received Tab. Ranitidine (150 mg orally) the previous night and in the morning of operation with sips of water

3) Anastomosis:

All anastomosis were performed, using hand sewn (Connell and Lambert) technique with end to end, side to side, end to side anastomosis.

4) Determination of outcomes:

Outcome of surgery was studied clinically, radiologically and by hematological parameters. Complications with reference to anastomotic dehiscence, intraabdominal septic complication, wound infection, hospital stay (specifically post-operative hospital stay) in days and fluid & electrolyte imbalance were recorded. Postoperatively, total blood investigation and wound swab culture was done after 48 hr., on 5th day and thereafter if necessary. Routine ultra-sonographic examination was done on 5th day and thereafter if necessary. Contrast enhanced computed tomography scan of abdomen and contrast radiographic examination was done in suspected

RESULTS:

1) Patient characteristics and surgical outcome:

The study included 50 patients (26 patients in the No-MBP group and 24 patients in the MBP group). Patients' demographics, pathological characteristics and operation characteristics were shown in about 50% of patients between 30-60 years. About 58% of patients in both groups had ASA (American Society of Anesthesiologists) class 2. Location of pathology and operative characteristics included small and large bowels. Out of which 56% were having benign conditions.

1)PATIENT DEMOGRAPHY:				
		MBP	NO MBP	TOTAL
AGE	<30	1	4	5
	30-60	13	1	25
	>60	10	10	20
	TOTAL	24	26	50
SEX	MALE	14	8	22
	FEMALE	10	18	28

	Total	24	26	50
ASA	Grade-1	6	4	10
	Grade-2	13	16	29
	Grade-3	5	6	11
	Total	24	26	50

2) PATHOLOGICAL CHARACTERISTICS :

TYPE	MBP	NON MBP	
	BENIGN	14	14
	MALIGNANT	10	12
	TOTAL	28	26
LOCATION	JEJUNAL	2	1
	ILEAUM	7	8
	CEACUM & ASCENDING COLON	5	4
	TRANSVERS COLON	1	5
	SIGMOID COLON	6	3
	UPPER SECTION	3	5
	TOTAL	24	26

3) OPERATION CHARACTERISTICS :

	MBP	NO MBP
JEJUNOJEJUNAL ANASTOMOSIS	2	1
ILEOILEAL ANASTOMOSIS	5	8
RIGHT HEMICOLECTOMY	4	6
LEFT HEMICOLECTOMY	3	3
SIGMOID COLECTOMY	6	4
ANORECTAL RESECTION	4	4
TOTAL :	24	26

2) Operative outcome:

Postoperative recovery, the mean hospital stay for the No-MBP group and the MBP group was 6.8 days and 5.6 days respectively. The anastomotic leakage rates in the No-MBP group and the MBP were equal. One patient (one from each group) had anastomotic leakage and underwent reoperation with de-functioning stoma fashioned. Two patients from the No-MBP group and one patient in the MBP group had intra-abdominal collection, which required re-operation. Six patients in the No-MBP group and five patients in the MBP group required reoperations. The reasons for reoperation in the No-MBP group were intestinal obstruction for two patients, intra-abdominal collection for two patients, postoperative hemorrhage and anastomotic leakage in two patients. In the MBP group, five patients re-operated for acute cholecystitis, anastomotic leakage, ruptured liver metastasis and superior mesenteric vein thrombosis. The wound infection rate was 12% and 16% in the No-MBP group and the MBP group respectively. The 30-day mortality was equal 6% in each group.

OPERATIVE OUTCOME

	NO MBP	MBP	P
AVERAGE LENGTH OF HOSPITAL STAY	7	6	0.81
ANASTOMOTIC LEAKAGE	1(2%)	1(2%)	0.95
INTRA ABDOMINAL COLLECTION	2(4%)	1(2%)	0.6
HAEMORRHAGE	3(6%)	1(2%)	0.33
WOUND INFECTION	6(12%)	8(16%)	0.41
PARALYTIC ILEUS	8(16%)	8(16%)	0.84
URINARY TRACT INFECTION	2(4%)	4(8%)	0.33
REOPERATION	6(12%)	5(10%)	0.84
INTESTINAL OBSTRUCTION	4(8%)	1(2%)	0.18
30 DAY MORTALITY	3(6%)	3(6%)	0.9

3. Subgroup analysis:

A subgroup analysis was performed according to the type of anastomosis Performed: ileocolic, colocolic and colorectal

anastomoses. There were no differences in terms of superficial surgical site infection, deep organ space infection, postoperative paralytic ileus and reoperation rate in the various subgroups. Overall complication rate was comparable.

SUBGROUP ANALYSIS ON BASIS OF TYPES OF ANASTOMOSIS PERFORMED

	ILEO-COLIC ANASTOMOSIS			COLOCOLIC ANASTOMOSIS			COLORECTAL ANASTOMOSIS		
	NO MBP	MBP	P	NO MBP	MBP	P	NO MBP	MBP	P
SUPERFICIAL SSI	2(4%)	2(4%)	0.93	1(2%)	1(2%)	0.95	1(2%)	2(4%)	0.5
DEEP ORGAN SPACE INFILTRATION	2(4%)	1(2%)	0.6	0	0		2(4%)	1(2%)	0.6
PARALYTIC ILEUS	3(6%)	2(4%)	0.7	0	2(2%)		2(4%)	0	
REOPERATION	3(6%)	3(6%)	0.91	0	0		2(4%)	1(2%)	0.6

	JEJUNO-JEJUNAL ANASTOMOSIS			ILEO-ILEAL ANASTOMOSIS		
	NO MBP	MBP	P	NO MBP	MBP	P
SUPERFICIAL SSI	1(2%)	1(2%)	0.95	1(2%)	1(2%)	0.95
DEEP ORGAN SPACE INFILTRATION	0	0		2(4%)	1(2%)	0.6
PARALYTIC ILEUS	1(2%)	1(2%)	0.95	2(4%)	2(4%)	0.93
REOPERATION	0	0		1(2%)	1(2%)	0.95

DISCUSSION:

Despite numerous studies on the subject, the benefit of MBP remains to be a question. Many prior studies, which negate the benefit of MBP, were done in the era of open surgery. The widely adopted Enhanced Recovery after Surgery (ERAS) guidelines recommended MBP should not be routinely use for colonic surgery. However, this was yet again challenged by a recent large scale retrospective study, in which the use of MBP was associated with lower anastomotic leakage rate, surgical site infection rate and incidence of paralytic ileus. This is further complicated by the use of oral antibiotics in addition to MBP. The use of MBP, which is an essential decision that general surgeons could not escape from, seems to be an ever-changing dogma. The results of this study echoes with some of the study conducted on patients undergoing laparoscopic colonic resections. Zamora et al. Compared the outcomes of 68 laparoscopic colectomies with MBP to 132 laparoscopic colectomies without MBP in a retrospective review and observed similar complication rate. The anastomotic leakage rate was 4% and 3% and wound infection rate was 12% and 17% respectively. The group without MBP has higher conversion rate, which was caused by difficulty in tumor localization. Bertani et al. published a randomized control trial comparing the use of MBP plus glycerin enema and glycerin enema alone in patients undergoing laparoscopic colonic resections. There was no significant difference in terms of surgical site infection and anastomotic leakage rate observed between the two groups. Apart from incidence of infectious complications, whether the use of MPB would affect the efficiency of colectomy was also of interest. Would MPB result in less impacted bowel and hence better handling? The use of MBP might improve the operative space by cleansing the bowel content. A randomized control trial showed better surgical view in patients with MBP undergoing bowel operations. However in the presence of an obstructing tumor, this might in turn causes decrease in operative space as proximal bowel distends. The operating time and conversion rate served as surrogates

for operative difficulty in this study. Omission of MBP did not positively or adversely affect these two parameters. With the evidence in the literature, the use of MBP is largely up to individual surgeon's preference, and it is widely preferred according to surveys. Many consider MBP rather harmless but some study suggested otherwise. A meta-analysis which included 5000 patients showed significantly more cardiac events in patients who had MBP (4.0% VS 2.5% respectively; $p = 0.04$). Indeed more evidence is welcomed to support the use of MBP or its omission. The present study was limited by its small sample size and retrospective nature. It demonstrated that with the change of policy and omitting mechanical bowel preparation, the outcome of bowel surgeries was not inferior to those who had bowel preparation prior to the study period. However, failure to detect a difference due to small sample size could not be ruled out.

CONCLUSION:

The omission of mechanical bowel preparation does not increase surgical morbidities in patients undergoing bowel surgeries. It also has no effect on operating time and conversion rate.

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