

## Research Article

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# Evaluation of primary anastomosis in prepared/unprepared colo-rectal surgeries, and correlation with physiological and operative severity score for the enumeration of mortality and morbidity scoring

Jitin Bajaj\*, Dileep S. Thakur, Deepti B. Sharma, Dhananjaya Sharma

Department of Surgery, NSCB Medical College, Jabalpur, Madhya Pradesh, India

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**\*Correspondence:**

Dr. Jitin Bajaj,

E-mail: [bajaj.jitin@gmail.com](mailto:bajaj.jitin@gmail.com)

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## ABSTRACT

**Background:** Mechanical bowel preparation (MBP) is a common practice for colo-rectal surgeries. Our aim was to study whether preoperative MBP has a positive impact on the outcome of colo-rectal anastomosis, and their correlation with co-morbid conditions (calculated by POSSUM score).

**Methods:** This was a prospective study. Patients for colo-rectal anastomosis were randomized into group A (MBP group), and group B (NMBP group). Record was made of demography, diagnosis, POSSUM score, and complications in the form of wound infection, anastomotic leak, intra-abdominal abscesses, reoperation and mortality. According to the POSSUM score, patients were divided into two groups, and complications were correlated according to it.

**Results:** Neither of the primary outcome (leak, abdominal abscess, or wound infection), and secondary outcomes (reoperation and mortality) showed any difference. Similar were the results for physiological and operative severity score for the enumeration of mortality and morbidity (POSSUM) scoring.

**Conclusions:** Mechanical bowel preparation and POSSUM predicted morbidity has no effect over integrity of the anastomosis, wound infection and abdominal abscesses in colo-rectal surgeries.

**Keywords:** MBP, Colo-rectal surgeries, POSSUM Score

## INTRODUCTION

Mechanical bowel preparation (MBP) seems to be lucrative as, firstly, it leads to easy handling of the bowel during surgery, and secondly, which is presumptuous, can reduce the anastomotic leak rates and decreased wound contamination. Oral or mechanical bowel preparation agents include mannitol, sodium phosphate, sodium picosulphate or polyethylene glycol.<sup>1</sup> Importantly, bowel preparation is not harmless; it is exhausting to the patient, associated with electrolyte imbalance, dehydration, and thus may lead to anaesthesia complications.<sup>2,3</sup> Besides these, there is contraindication in cases of obstruction,

perforation, toxic megacolon, renal insufficiency and cardiac failure due to varied reasons.<sup>4,5</sup>

Our aim was to study whether preoperative MBP has a positive impact on the outcome of colo-rectal anastomosis, and their correlation with co-morbid conditions (calculated by POSSUM score).

## METHODS

This was a prospective study, done in institute in five-year duration from July 2010 to October 2015, after taking ethical committee permission, and written and

informed consent from the patients. Total sixty-one cases for colo-rectal anastomosis were included, and randomized into two groups, on alternate base, into group A (MBP group) of having surgeries with preoperative bowel preparation, and group B (NMBP group) without preoperative bowel preparation. We recorded their age, sex, diagnosis, POSSUM score, surgery done, complications in the form of wound infection, anastomotic leak, intra-abdominal abscesses, reoperation and mortality. According to the POSSUM score, patients were divided into two groups: Low  $< 50$  (P1) and High  $> 50$  (P2) for ease of calculation; complications were correlated according to it. Experienced surgeons performed all the procedures.

Inclusion criteria were patients of carcinoma rectum, sigmoid volvulus, sigmoid perforation, and transverse colon perforation that underwent primary anastomosis. Exclusion criteria were hemodynamic instability, and patients having ASA of more than III.

#### Bowel preparation procedure

Patients in group A were given PEGLEC (polyethylene glycol preparation) a day prior to surgery. It comes in the packed powder form. The pack was dissolved in two litres of plain water and patient was asked to drink it slowly. IV Ringer Lactate was started simultaneously. Each time, there occurred good purgation, which lasted for 6-8 hours. For this time, vitals were monitored and signs of dehydration were looked for. PEGLEC (commercial name) (137.15 g) contained Polyethylene glycol (118 g), Sodium chloride (2.93 g), Potassium chloride (1.484 g), Sodium bicarbonate (3.37 g), and Anhydrous sodium sulphate (11.36 g).

#### Operative procedures

We did anastomosis in double layer, and with non-absorbable suture. Procedures were following.

#### Sigmoid resection and colorectal anastomosis for sigmoid volvulus

The Volvulus was de-rotated and bowel was mechanically decompressed. After that whole of the sigmoid was resected and end-to-end colorectal anastomosis was performed.

#### Colonic anastomosis

The affected segment was resected and end-to-end colonic anastomosis was performed.

#### Anterior resection

After mobilizing the descending colon and involved rectum, whole of the sigmoid colon and involved rectum was resected, and end-to-end colorectal anastomosis was performed.

## RESULTS

**Table 1: Cases performed according to category.**

Procedure done	MBP (n=30)	NMBP (n=31)
Anterior resection	16	0
Descending colon RA	0	3
Hartman's reversal	3	0
Sigmoid RA	3	4
Sigmoid resection and Colorectal anastomosis	6	23
Transverse colon RA	2	1

It was a prospective single centre study done in the authors' institute after taking ethical committee permission and written and informed consent from the patients. Total sixty-one cases were included under this study. Cases were divided into MBP group (n=30) and NMBP group (n=31) on a one: one basis. All patients were included as intention to treat and there were no exclusions. Mean age of the patients was forty-five years, and ranged from sixteen to sixty-five years; median and mode were also forty-five years. Males were thirty-six, and females were twenty-five in the study. Sigmoid volvulus (n=22) was the most common diagnosis. Cases performed were as in Table 1.

Primary outcome of the surgeries were leak (n=3), abdominal abscess (n=4), and wound infection (n=18). There was no statistically difference between the two groups, as shown in Table 2.

**Table 2: Primary outcomes.**

	Group		p value
	MBP=30	NMBP=31	
Leak	1 (3.3%)	2 (6.4%)	1.00
Abdominal abscess	1 (3.3%)	3 (9.6%)	0.61
Wound infection	7 (23.3%)	11 (35.4%)	0.40

**Table 3: Comparison of leak rates, wound infection, and abdominal abscess with POSSUM scoring.**

	Leak		Abdominal abscess		Wound infection	
	Yes	No	Yes	No	Yes	No
P1 $< 50\%$	1 (2.5%)	38	2 (5.1%)	37	11 (28%)	28
P2 $> 50\%$	2 (9%)	20	2 (9%)	20	7 (31%)	15
P value	0.293 (NS)		0.615 (NS)		0.778 (NS)	

NS- Not Significant.

Secondary outcomes were reoperation and mortality. Neither of the group had these occurrences.

Comparison was done between POSSUM predicted morbidity and the primary outcomes, as shown in Table

3. P value showed no significant difference between leak, abdominal abscess, or wound infection with the POSSUM scoring.

**Table 4: Comparison of different studies for MBP and NMBP groups.**

Study	Leak			Abdominal abscess			Wound infection		
	MBP	NMBP	Result	MBP	NMBP	Result	MBP	NMBP	Result
Contant CM <sup>13</sup>	4.8%	5.4%	P= 0.69 Not significant	0.3%	2.4%	P= 0.001 Significant			
Van't Sant HP <sup>14</sup>	7.6%	6.6%	P= Not significant						
Our study	3.3%	6.4%	P=1.00 Not significant	3.3%	9.6%	P=0.61 Not significant	23.3%	35.4%	P=0.40 Not significant

## DISCUSSION

Bowel preparation, before surgery, has been a routine practice since long time.<sup>6</sup> Despite of much debate and criticism for use of mechanical bowel preparation, consensus has still not formed whether to completely abolish its use. There are still very few Indian studies and paucity of data over this topic; a majority of colorectal surgeons still are biased and use of MBP is still prevalent in most of the institutes. We conducted this study in our institution to assess whether primary anastomosis, of left sided colon, is feasible without using mechanical bowel preparation; and to see the effect of patient's co-morbid conditions on the outcome of surgery. This trial was conducted in a single institute, having same surgical practice, therefore practice bias was excluded.

The basics of anastomosis are the most important things for its healing i.e. healthy margins, appropriate suturing technique, and vitals maintenance. These were followed, and were probably the reason of not getting any difference between the MBP and NMBP group.

POSSUM scoring has 12 physiological parameters and 6 operative parameters. We tried to compare POSSUM morbidity scoring with our primary surgical outcomes. Harris et al observed that five of his eight patients who got leak in his series of 153 patients were having other comorbid conditions like diabetes mellitus, neoadjuvant radiation therapy, end-stage renal disease, prior anastomotic leak and tobacco use.<sup>7</sup> Our study, on the contrast, showed no significant difference in leak rates between the high and low POSSUM scoring groups. There were two leaks in patients having high POSSUM score compared to one patient in low POSSUM score (p value= 0.293). It may be because of less number of patients in both the groups; this was a limitation of our study.

Recent studies show a negative effect of preoperative bowel preparation. PEG has been showed to cause damage to colonic tissues, while sodium phosphate has been showed to cause aphous lesion in human colonic tissue.<sup>8-11</sup>

These adversaries occur directly by fluid shifting and inflammation leading to oxidative stress, and indirectly by depriving the colonic mucosa of short chain fatty acids, which are washed away with faeces. In comparison to these studies, we found no incidence of vomiting, headache or aphous lesion in any of the patient.

Finally, mechanical bowel preparation remains distressing to the patient. With an IV line in situ, he has to go frequently to the toilet. Despite of addition of flavoring agents nowadays, the product still tastes bad and nauseating.

Bowel preparation owes on the management part too. The nursing and hospital staff are burdened; the hospital costs increases too, taking into account the early admission of the patient.

Our results matched with most of the studies in respect to anastomotic leakage, abdominal abscess rates, and wound infection, as shown in table 4. Most authors recommend that colorectal surgery is safe without pre-operative MBP but there are situations in which consensus has not been formed, like if there is a small tumour or the possible need for intra-operative colonoscopy.

There are few Indian studies on this topic supporting our point.<sup>12</sup> Argument often comes that Indians are bulk producers of stool and avoiding MBP may not be safe, but our study showed that it is safe in Indian scenario.

Though MBP shows no objective advantage, it has a subjective advantage on the account of surgical practice.

Many surgeons may feel easy handling of the bowel and clean operative field after MBP.

Limitation of our study was less number of patients. We report no conflicts of interest among the authors. We acknowledge our patients for taking part in this study.

## CONCLUSION

Mechanical bowel preparation and POSSUM predicted morbidity has no effect over integrity of the anastomosis, wound infection and abdominal abscesses in colo-rectal surgeries.

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