



OUTCOME OF MANNITOL AS AN AGENT FOR MECHANICAL BOWEL PREPARATION IN ELECTIVE COLORECTAL SURGERY IN TERMS OF WOUND INFECTION

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Abstract: Background: Minimizing the risk of peritoneal contamination and wound infection as well as the risk of anastomotic dehiscence during preparation of the bowel is commonly performed and mannitol is one of the agent that has been used globally due to its effectiveness in bowel cleaning, low complication rates and cost effectiveness as well. **OBJECTIVE:**To compare the peri-operative and wound infection with or without mannitol for mechanical bowel preparation and elective full rectum surgery in terms of wound infection. **MATERIALS AND METHODS:**This was a randomized controlled trial that was being performed at the Department of General Surgery at Lady Reading Hospital, Peshawar from October 20 to April 19, 2021. In total 164 groups were being randomly assigned by block randomization to two groups. In group A, Mannitol 10% was mixed with juice and was being prescribed orally in normal saline and in the group B, only normal saline was being given. That was considered as a control group. Wound infection was recorded after one week of surgery. **RESULTS:**The average age of the participant was 43.3 with a range of 18 to 60 years. The group A showed comparatively less wound infection with 9.8% as compared to group B. And the wound infection was higher in group B with a statistically insignificant P value of 0.402. **CONCLUSION:**So in summary, the rectal bowel preparation without mannitol is safe and associated with lesser complications as compared to those given with mannitol.

Keywords: Mannitol, Surgery, Infection

INTRODUCTION

The mechanical bowel preparation is commonly done and it has an aim of reduction of the peritoneal contamination and wound infection. The current debate has been largely fueled by the previous data from US registries which suggest that oral antibiotic can be used when bowel preparation is done.² However, the recent quality has also shown that a single use of mechanical bowel preparation is lacking.³

So recent advances in our comprehension of biological mechanism (underlying the anastomotic leak have led to the examination of the bowel preparation in elective colorectal surgery. A lot of meta-analysis has been done in mechanical bowel preparation in elective colorectal surgery that shows mixed results and conflicting values with most studies demonstrating no difference in infective complications between patients receiving mechanical bowel preparation or control treatment although the control treatment has varied significantly in most of the patients. Similarly, in gynecological or urological surgeries where the studies have shown no benefits in visualization or bowel handling or complication rates in the patients treated with the bowel preparation and those having no bowel preparation.⁴

Meta-analysis have been published on MBP in elective colorectal surgery showing mixed results, with most studies demonstrating no difference in infective complications between patients receiving MBP or control treatment, although control treatment varied significantly between the use of a rectal enema or absolutely no preparation.⁵

Mannitol is being widely used as a diuretic globally but in this case, this is used for bowel cleaning and reduction of complication rates. As a result of above non-conclusive data of mannitol several studies have shown that the effectiveness practice varies therefore it was a dire need to compare the evidence of post-effective wound infection with or without mannitol for mechanical bowel preparation in elective colorectal surgery. ⁶

METHODS

A randomized control trial was being done at the Department of General Surgery Lady Reading Hospital Peshawar. The study was being done six months after the approval of synopsis The sample size was 164 was calculated with 95% confidence level and alpha value of 5% with power of 80.

The number of cases to be included in the sample size was 164 with equal division of 82 in each group (with the prevalence of wound infection by 36.1%. The patients were being collected after carefully reviewing the inclusion criteria which were age of 18 to 60 years and both males and females. The patients who had a previous history of hepatic or cardiovascular abnormalities, alcoholism, diabetes and bleeding disorders and localized skin infection were being excluded. Proper ethical considerations were being followed with informed consent being taken from the patient after studying the pros and cons of the studies. The baseline demographic variables such as age, and gender were being added in the questionnaire.

Subjects were being assigned by block randomization into two groups with each group containing 82 patients. The preoperative fasting of 6 hours was mandatory and was being ensured before operation in all the cases. All the patients received pre-medication of diazepam orally at night before surgery as pre-anesthetic checkup. In group A, Mannitol 10%(10cc/kg) mixed with juice were prescribed orally along with normal saline enema(10cc/Kg). In group B, only normal saline enema(10cc/kg) was used. Outcomes of surgery were studied clinically, radiologically and by hematological parameters. Complications with reference to wound infection were recorded as per operational definition after one week of surgery. The data analysis was being done by SPSS version 22 and the frequency and percentage was used for qualitative analysis (and mean and standard deviation for quantitative values.

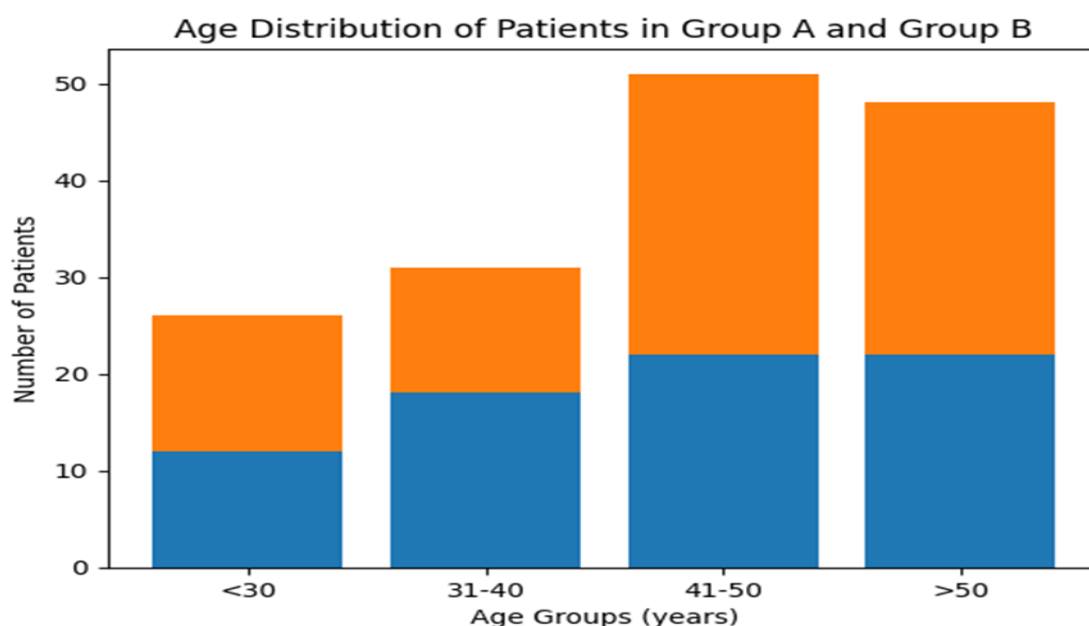
With the p-value of less than 0.05 taken as significant with the chi-square test was being applied to compare the wound infection in both the groups.

RESULTS:

AGE WISE DISTRIBUTION IN BOTH THE GROUPS

		Groups		Total	p-value
		A	B		
Age(in years)	<=30.00	12	14	26	0.531
		14.6%	17.1%	15.9%	
	31.00-40.00	18	13	31	
		22.0%	15.9%	18.9%	
	41.00-50.00	22	29	51	
		26.8%	35.4%	31.1%	
	51.00+	30	26	56	
		36.6%	31.7%	34.1%	
Total		82	82	164	
		100.0%	100.0%	100.0%	
Mean(in years)+SD		43.57+10.19	43+9.93	43.3+10	

The mean age of the patient was 43.3. Average age was 43.3 years+ 10SD with range of 18-60 years. Group A contained 12(14.6%) patients in less than 30 years, 18(22%) patients 31-40 years, 22(26.8%) patients 41-50 years and 22(26.8%) patients have the ages of more than 50 years. While group B contained 14(17.1%) patients in less than 30 years, 13(15.9%) in 31-40 years, 29(35.4%) patients 41-50 years and 26(31.7%) patients with age more than 50 years. 58.5% were males and 41.5% were females in group A, while group B contained 56.1% males and 43.9% females. Sex distribution was insignificant with the p-value of 0.437. In group A combined, the wound infection was compared in both groups. Group A showed 9.8% wound infection while group B was 90.2% free of any wound infection. While in group B, the wound infection was recorded in 12.2% while, the 87.0% showed no infection. The wound infection was higher in group without mannitol, but statistically it was insignificant. The age-wide distribution in both groups showed that the wound infection was lower in younger age group and enhanced with increase of age.



DISCUSSION

The ideal mechanical bowel preparation is a safe and cost-effective way to administer and have minimal side effects. However, it should be done in careful hands and the goal of the mean bowel preparation before the elective surgery is to clear the large bowel of gases and reduce the number of bacteria in the lumen of the bowel to minimize the risk of anastomotic complications as well. 7

In early 1970s, it was being revealed that the anaerobic growth in the intraluminal wall of the colon and rectum was largely increased. In 1972 and 73, it showed the addition of effective antibiotic therapy against anaerobic bacteria had shown protection against facultative organism.

And oral neomycin was successful in suppressing the interluminal bacteria. In a dose given at 1 gram, the pharmacokinetic study showed that the neomycin is not largely absorbed and remains bacteriologically active within the lumen of the bowel. Both interluminal serum antibiotics are thought to contribute to reduction of postoperative infection.8

Studies also regarding mechanical bowel obstruction prior to elective surgery showed no significant difference in surgical site infection, the length of the stay in the hospital and therefore the risk of leak and anastomosis. The results of a study showed that bowel anastomosis can be applied safely without mechanical bowel preparation. However, the multiple disciplinary studies are being needed to support the changes in the application.9

Many trials comparing MBP vs. no MBP were identified and showed no statistically significant difference in the SSI rate between performing a preoperative MBP vs. not doing so. One study showed a decrease of SSI when MBP was performed prior to the operation. Polyethylene glycol and/or sodium phosphate were the predominant agents of choice for MBP, although the protocols differed between the studies in terms of dosage and/or timing of the application. In 2 studies, patients undergoing rectal surgery were additionally given a single enema in both the intervention and the control group.10

A meta-analysis of the showed that preoperative MBP has neither benefit nor harm in reducing the SSI rate when compared to not carrying out a MBP at all (OR: 1.31; 95% CI: 1.00–1.72). In addition, a separate meta-analysis based on these studies showed no difference in the occurrence of anastomotic leakage with or without MBP (OR: 1.03; 95% CI: 0.73–1.44).2 In our study wound infection showed no significant difference between the two groups. This may be due to limitation in sample size.

CONCLUSION

This study proved that instead of giving benefit ,

disadvantage is achieved elective colorectal surgery. Careful assessment of condition of patients and their potential consequences before, during, and after MBP will be of a utility to clinicians in terms of quality of care and patients follow-up. Study results will be provided in developing evidence - base practice in preoperative period and patients' outcomes.

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