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COLOSTOMY;
ROLE OF MECHANICAL BOWEL PREPARATION BEFORE COLOSTOMY REVERSAL; A RANDOMIZED CONTROL TRIAL.

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ABSTRACT... Objectives: To see the outcome of colostomy reversal with and without mechanical bowel preparation. **Study Design:** Randomized controlled trial. **Setting:** Department of General Surgery, Nishtar Medical University/Hospital, Multan. **Period:** 1st July 2016 to 31st December 2017. **Materials & Methods:** A total of 302 patients with sigmoid colostomy of more than 1 month duration and undergoing colostomy closure, patients above 12 years of age of both genders were included. Patients with history of pelvic irradiation, peritonitis, CRF and CLD were excluded. Selected patients were placed randomly into two groups. Group A included cases in which mechanical bowel preparation was done 6 hours prior to operation while group B included patients in which no mechanical bowel preparation was done. Mean Hospital stay was noted in every patient of both groups from day of operation to day of discharge. Wound infection was noted on seventh post-operative day. **Results:** Mean age was 36.62 ± 7.23 years. Mean duration of disease was 3.05 ± 1.04 months. Mean hospital stay in group A (mechanical bowel preparation) was 5.29 ± 1.05 days and in group B (without mechanical bowel preparation) was 3.87 ± 1.17 days with p-value of 0.0001. Wound infection in group A (mechanical bowel preparation) was found in 19 (12.58%) and in group B (without mechanical bowel preparation) was found in 08 (5.30%) patients with p-value of 0.027. **Conclusion:** There were no significant benefits of mechanical bowel preparation before colorectal surgery and it should be reserved for selective cases only.

Key words: Colostomy Reversal, Mechanical Bowel Preparation, Wound Infection.

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INTRODUCTION

A colostomy is an opening made in the colon to divert feces and flatus after giving incision over the abdominal wall. Colostomy bag is applied over the stoma to collect the feces and flatus in to the bag. Stoma can be made temporary or permanent depending on the situation.[1] Once the requirement of colostomy is over come and stoma is mature, reversal of colostomy should be done in which two ends of the colon or colon and rectum are reconnected. This is a regularly performed procedure and aim of this seeks the continuity and function of the colon and rectum.[2]

The mortality due to the colorectal surgery is more than 20% in the early days of 20th century[2], common cause was septicemia. More advancement in surgical techniques and improvement in perioperative care have significantly decreased the mortality and morbidity of the patient. Infection is still the major cause of morbidity and mortality in colorectal surgery and its related complications.[3] Purpose of mechanical bowel preparation is to clean the fecal matter from the large bowel. Cleaning prior to colorectal surgery is recommended in many studies.[4]

Mechanical bowel preparation before surgery have more benefits due to decrease fecal matter as well as count of bacteria, which one is the cause of anastomotic dehiscence in unprepared patients Mechanical bowel preparation can remove hard, impacted fecal matter which decreases the pressure in the lumen of colon. Hard impacted

stool in the lumen of the colon may increase the growth of bacteria. Moreover clearance of hard stool reduces the ischemia and pressure on the anastomosis.[6] In laparoscopic surgery, an empty colon may be easier to manipulate as compare colon full of fecal contents. In recent years, the necessity and benefits of mechanical bowel preparation have been questioned and data to stop this practice is mounting.[6,7]

The study done by Serrurier K et al showed that a significantly higher rate of wound infection (14.4% vs. 5.8%), as well as mean duration of hospital stay (5.6 ± 1.0 vs. 4.4 ± 1.0 days) in the group who underwent a bowel preparation before colostomy closure.[8]

Aim of our study was to compare the outcome of colostomy reversal with and without mechanical bowel preparation. Local data was very limited available. That was the real stimulus for us to do this study and results will be helpful to recommend the suitable way to precede colostomy reversal.

MATERIAL AND METHODS

This randomized controlled trial was conducted at department of General Surgery, Nishtar Medical University/Hospital, Multan from 1st July, 2016 to 31st December, 2017. Using non-probability, consecutive sampling, 302 patients above the age of 12 years and with the diagnosis of colostomy were included in this study. Two groups were created, 151 cases in each group, with 5% level of significance, 80% power of study and taking wound infection in bowel preparation group as 14.4% versus no bowel preparation group as 5.8%.[8] Patients with history of pelvic irradiation, peritonitis, chronic renal failure and chronic liver disease were excluded.

After approval from the ethical review committee, informed written consent was taken from all the patients. They were offered to pick up a slip from total mixed up slips (half-slips contained letter 'A' and other half-slips contained letter 'B') and he/she was placed in that respective group. All patients were given injection Ceftriaxone 1gram intravenously pre-operatively. Group A included cases in which mechanical bowel preparation was done 6 hours prior to operation while group B included patients in which no mechanical bowel preparation was done. All procedures were performed by the same level of surgeons (with at least 3 years post-fellowship experience). All patients were followed regularly by the researcher for any complaint till patient was discharged from the ward. Mean Hospital stay was noted in every patient of both groups from day of operation to day of discharge. Wound infection was noted at seventh post-operative day. All data was recorded on a specially designed proforma.

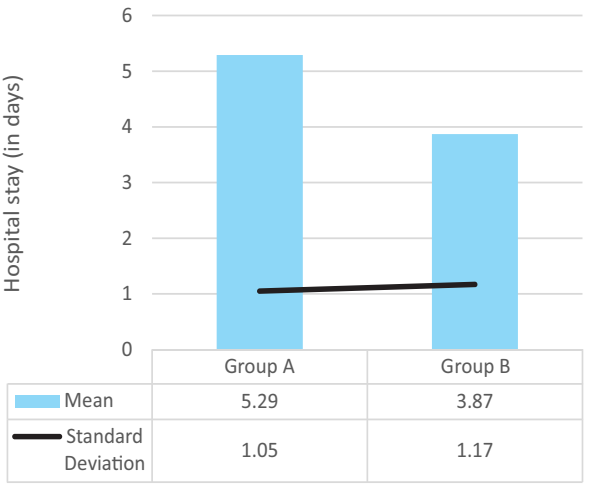
All the data was entered and analyzed by using SPSS version 20.0. The quantitative variables like age, duration of colostomy, height, weight, BMI and duration of hospital stay were presented as mean and standard deviation. The qualitative variables like gender, place of living (rural/urban), hypertension (yes/no), diabetes mellitus (yes/no) and BMI (normal/malnourish) were presented as frequency and percentage. Student t-test was used to compare the mean duration of hospital stay of both groups and chi square was used to compare the wound infection and p-value ≤ 0.05 was considered as significant.

RESULTS

Mean age of the patients in this study was 36.62 ± 7.23 years. The mean age of patients in group A was 36.83 ± 7.11 years and in group B was 36.50 ± 7.51 years. In group A, 65 (43.05%) patients were between 12-35 years and 86(56.95%) were above 35 years. In group B, 63(41.72%) were below 35 years and 88(58.28%) were above 35. Total 174 males and 128 females were present in this study with M: F ratio was 1.3 to 5:1. Mean duration of disease was 3.05 ± 1.04 months, it was 3.1±1.1 in group A and 2.99+0.91 in group B. Mean BMI was 26.81 ± 6.49 kg/m^2 and 35% patients were malnourished. In our study majority of patients, 196(64.9%) belong to Rural areas and 106(35.1%) belong to Urban areas. In group A 97(64.26%) patients belong to Rural and 54(35.76%) belong to Urban areas. In group B, 99(65.56%) belong to Rural and 52(34.44%) to Urban back ground. In our study 18.34% patients were diabetic and 15.6% were hypertensive. 13.8% were having both diabetes and hypertension.

Mean hospital stay in group A (mechanical bowel preparation) was 5.29 ± 1.05 days and in group B (without mechanical bowel preparation) was 3.87 ± 1.17 days with p-value of 0.0001 as shown in Figure-1. Wound infection in group A (mechanical bowel preparation) was found in 19 (12.58%) and in group B (without mechanical bowel preparation) was found in 08 (5.30%) patients with p-value of 0.027 as shown in Table-I.

Stratification of hospital stay and wound infection according to different confounding variables is shown in Table-II and Table-III respectively.



P-value = 0.0001 which is statistically significant
Figure-1. Mean hospital stay in both groups.

		Group A (n=151)		Group B (n=151)	
		No. of Patients	%age	No. of Patients	%age
Wound infection	Yes	19	12.58	08	5.30
	No	132	87.42	143	94.70

Table-I. Comparison of wound infection between both Groups (n=302). P value is 0.027 which is statistically significant.

Variables		Group A (n=151)		Group B (n=151)		P-value
		Hospital stay (days)		Hospital stay (days)		
		Mean	SD	Mean	SD	
Age	15-35 years	5.14	1.01	3.78	1.14	0.0001
	36-50 years	5.41	1.07	3.83	1.20	0.0001
Gender	Male	5.28	0.98	3.77	1.24	0.0001
	Female	5.31	1.14	3.86	1.07	0.0001
Duration of Colostomy	≤3 months	5.43	1.01	3.86	1.18	0.0001
	>3 months	5.13	1.08	3.66	1.15	0.0001
BMI	Malnourished	5.43	0.99	3.86	0.94	0.0001
	Normal	5.18	1.09	3.77	1.29	0.0001
Place of Living	Rural	5.22	0.86	3.88	1.20	0.0001
	Urban	5.33	1.14	3.77	1.16	0.0001
Diabetes Mellitus	Yes	5.21	1.00	3.74	1.25	0.0001
	No	5.34	1.08	3.85	1.12	0.0001
Hypertension	Yes	5.42	1.14	3.69	1.10	0.0001
	No	5.24	1.01	3.86	1.20	0.0001

Table-II. Comparison between hospital stay of both groups according to different variables.

Variables		Group A (n=151) Hospital stay (days)		Group B (n=151) Hospital stay (days)		P-value
		Yes	No	Yes	No	
Age	15-35 years	08	57	04	59	0.248
	36-50 years	11	77	04	84	0.059
Gender	Male	15	71	05	83	0.015
	Female	04	61	03	60	0.729
Duration of colostomy	≤3 months	10	71	06	104	0.089
	>3 months	09	61	02	39	0.175
BMI	Malnourished	11	56	03	55	0.047
	Normal	08	76	05	88	0.291
Place of living	Rural	11	43	02	50	0.010
	Urban	08	89	06	93	0.552
Diabetes mellitus	Yes	07	49	02	56	0.073
	No	12	83	06	87	0.150
Hypertension	Yes	05	40	01	48	0.072
	No	14	92	07	95	0.129

Table-III. Comparison between wound infections of both groups according to different variables.

DISCUSSION

Trends are changing about mechanical bowel preparation before routine elective colostomy reversal procedures.

In the past it was mandatory to do bowel preparation before elective colorectal surgery to reduce the post surgery complications.[9] There are many procedures for bowel preparation and it depends on surgeons choice which one he advise.[10,11] Results of many studies showed that preoperative bowel preparation cannot decrease the postoperative complications of surgery in adult population.[12-14] Many studies recommend that before surgery bowel preparation should not be done on routine bases in every patient it should be done only for selected cases.[15-17] The aim of our study is to compare the outcome of colostomy reversal with and without mechanical bowel preparation.

Age range in our study was from 12 to 65 years with mean age of 36.62 ± 7.23 years. The mean age of patients in group A was 36.83 ± 7.11 years and in group B was 36.50 ± 7.51 years. Majority of the patients 174 (57.62%) were above 35 years of age. Mean hospital stay in group A (mechanical bowel preparation) was 5.29 ± 1.05 days and in group B (without mechanical bowel preparation) was 3.87 ± 1.17 days with p-value of 0.0001. Wound infection in group A (mechanical bowel preparation) was found in 19 (12.58%) and in group B (without mechanical bowel preparation) was found in 08 (5.30%) patients with p-value of 0.027. In other study, the author noted a significantly higher percentage of wound infection (14.4% vs. 5.8%), as well as mean duration of hospital stay (5.6 ± 1.0 vs. 4.4 ± 1.0 days) in the group who underwent a bowel preparation before colostomy closure.[8]

In Another study done on 64 patients, results showed that duration of hospital stay was increased in those patients who underwent bowel preparation prior to surgery group (mean ± SD, 8.2 ± 5.1days) was compared with those patients in whom bowel was not prepared prior to surgery (mean ± SD, 8.0 ± 2.7days). Twelve patients (37.5%) of without bowel preparation group suffered from postoperative complications as compared with 15 patients (46.9%) underwent mechanical bowel preparation group.[7] Due to mechanical bowel preparation some changes happen in the bowel wall morphologically as well inflammatory changes also. Studies done on gut of rats showed that use of polyethylene glycol cause microscopic trauma in the multiple layers of gastrointestinal tract. One previous study results showed polyethylene glycol use before colonoscopy cause increase in Eosinophilic cell as well more oedema in the lamina propria.[18-20] It is not clear these changes have a direct relation

with mechanical bowel preparation related morbidity increase after abdominal surgery.[21] After mechanical bowel preparation, more imbalance develop in normal micro flora of bowel as reported by Watane be et al, study showed no difference in the total number of colonic bacteria count in those patients whom mechanical bowel preparation done and no mechanical bowel preparation. They saw significantly lower levels of normal gut flora beneficial for the gut such as probiotic bacteria and short-chain fatty acids also have main role in the healthier colon. This imbalance in bowel micro flora may lead to bacterial translocation.[22]

Mechanical preparation of bowel is more harm full if it is not done properly. Due to improper mechanical preparation of bowel, solid fecal matter converted in to liquid form and causing more spillage of fecal matter during surgery which is one of the common cause of postoperative wound infection and anastomotic leakage.[23] In 2007 Jung et al did two clinical trials and results showed no difference between both groups. Total number of patients were 1343, randomly mechanical preparation of bowel done in 686 and in 657 patients without mechanical bowel preparation.[24] One study conducted by contant et al. He divided the total 1354 patients into two groups with and without mechanical bowel preparation and he found no difference between the two groups.[25] Another study done by Slim et al updated all the previous meta-analysis consisting of 14 controlled trials in which he proved the best available evidence based role of mechanical bowel preparation in colorectal surgery in 2009.[26, 27]

CONCLUSION

Routine use of mechanical bowel preparation before colorectal surgery increases the hospital stay, cost and postoperative complications. We should not use preoperative mechanical bowel preparation in every case but it should be reserved for selective cases only.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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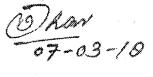
1	Ashar Ahmad Khan	Data collection, Study design, Interpretation, Principal investigator.	
2	Abdul Rashid Surahio	Conception, Study design and interpretation.	
3	Umair Maqsood	Conception and design of the study, Data collection.	