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MECHANICAL BOWEL PREPARATION VERSUS NO BOWEL PREPARATION BEFORE COLORECTAL SURGERY : A COMPARATIVE STUDY

General Surgery

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ABSTRACT

Background: Earlier mortality from colorectal surgery exceeded 20% mainly due to sepsis , modern surgical techniques and improved perioperative care have reduced the mortality rate significantly. Mechanical Bowel Preparation (MBP) is aimed at cleansing the large bowel of faecal content thereby reducing the morbidity and mortality related to colorectal surgery . We carried out a comparative study to investigate the outcome of colorectal surgery with and without MBP , to avoid the unpleasant side effect of MBP and also to design a protocol for preparation of a patient for colorectal surgery.

Material and Method: This was a prospective study conducted over a period of 24 months from August 2015 to July 2017 in the Department of General Surgery , Indira Gandhi Institute Of Medical Sciences, Sheikhpura , Patna . A total of 70 patients were included in this study ; among those, 34 patients were operated with MBP and 36 without it ; admitted in in-patient department undergoing resection of left colon and rectum for benign and malignant conditions in both emergency and elective situations.

Results: Anastomotic leakage , Intra-abdominal collection was detected clinically and radiologically in 4 and 5 patients in each group respectively. P > 0.5 in both situation indicates statistically no difference between results of the two groups.
Wound infection were detected in 10 (29.41%) patients with MBP group and 11 (30.5%) patients without MBP.

Conclusion: The present result suggests that the omission of MBP does not impair healing of colonic anastomosis , neither increases the risk of leakage.

KEYWORDS

Mechanical Bowel Preparation , Colorectal Surgery , Anastomotic Leakage

INTRODUCTION:

In the first half of 20th century, mortality from colorectal surgery often exceeded 20%,[1] mainly due to sepsis. Modern surgical techniques and improved perioperative care have significantly lowered the mortality rate. Infectious complications, however still are a major cause of morbidity and mortality in colorectal surgery. Mechanical bowel preparation (MBP) is aimed at cleansing the large bowel of faecal content. Bowel preparation by orthograde cleansing prior to colorectal surgery is still commonly recommended in several practical guidelines.[2] The main intention of such practice is to reduce post operative complication in addition to easing the intraoperative handling of the bowel. Emptying of colon of its content seems to be a logical step prior to surgical intervention , thus pre operative cleansing was established as a dogma in the early 70s.[3] Traditionally, bowel cleansing was achieved using enemas in combination with oral laxatives. More recently oral cathartic agents to induce diarrhoea and cleanse the bowel from solid faeces 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 colorectal surgery.[4] There is however paucity of data showing that MBP by itself, separately from other operative and perioperative measures actively reduces the rate of infectious complications .

MATERIALAND METHOD:

This prospective study comprising of 70 patients was conducted over a period of 24 months from August 2015 to July 2017 in the Department of General Surgery, Indira Gandhi Institute Of Medical Sciences, Sheikhpura, Patna admitted in in-patient department (emergency as well as elective) who underwent resection and primary anastomosis of left colon and upper rectum.

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 colostomy
10. Patient undergoing APR
11. Hepatic, Renal, Cadiopulmonary 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 colorectal surgery. 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.[5] 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 day-care cases. All patients 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. Outcome of surgery was studied clinically, radiologically and by hematological parameters. Complications with reference to anastomotic dehiscence, intra-abdominal 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 ultrasonographic 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 anastomotic dehiscence.

RESULTS AND ANALYSIS :

In this prospective study , 35 (50%) patients were between 40 - 60 years age ,25 (35.71%)were> 60 years and 10 (14.28%) were between 20 - 40 years (Table 1). Here 30% cases were benign and 70% malignant (Table 2 & Table 3). 64.28% of patients undergoing surgery were male and 35.71% were female (Table 2). Majority of patients (50 out of 70) had undergone elective operative intervention. Patients undergoing emergency surgery had mostly benign conditions (16 out of 21) and there was no scope for mechanical bowel preparation in

those patients (Table 4). Out of 70 patients , 34 received MBP and 36 underwent surgery without MBP (Table 5) which means both the groups are quite comparable. Anastomotic leak was observed in 4 patients in each group and 5 patients in each group suffered from intra abdominal collection (Table 6). This clearly indicates, complications are quite similar between two group. Wound infection were also almost same between two group (Table 6).

Table 1: Age distribution of patients undergoing operative intervention

Age	No. of cases	Percentage
<20 years	0	0
20-40 years	10	14.28%
40-60 years	35	50%
>60 years	25	35.71%

Table 2 : Sex distribution of patients undergoing operative intervention

Types	Male	Female	Total
Benign	15	6	21(30%)
Malignant	30	19	49(70%)
Total	45(64.28%)	25(35.71%)	

Table 3 : Pathological condition which required operative intervention

Types	Pathology	No.	Percentage
Benign	Sigmoid volvulus	11	15.71%
	Benign polyp	3	4.28%
	Neurofibroma in sigmoid	1	1.43%
	Penetrating trauma	3	4.28%
	Rectal prolapse	3	4.28%
Malignant	Left colon carcinoma	10	14.28%
	Carcinoma sigmoid colon	17	24.28%
	Rectal carcinoma	21	30.00%
	Renal cell carcinoma involving left colon	1	1.43%

Table 4 :Type of surgery patients required (emergency/elective)

Types	Emergency	Elective
Benign	16	5
Malignant	4	45
Total	20	50

Table 5 : Operation with and without mechanical bowel preparation

Types	With MBP	Without MBP
Benign	4	16
Malignant	30	20
Total	34	36

Table 6 : Surgical complication after colorectal surgery with and without mechanical bowel preparation

Complication	With MBP (%)	Without MBP (%)	Total (%)
Anastomotic leak	4 (11.76 %)	4 (11.11%)	8 (11.42 %)
Intra abdominal collection	5 (14.70%)	5 (13.88%)	10 (14.28%)
Wound infection	10 (29.41%)	11 (30.55%)	21 (30%)

P >0.5 (statistically non-significant). MBP: Mechanical bowel preparation

DISCUSSION:

In our study, total 70 cases were included of which 21 (30%) were with benign and 49 (70%) with malignant conditions. 35 (50%) patients were between 40 - 60 years age group, 25 (35.71%) patients were > 60 years and 10 (14.28%) patients were between 20 - 40 years age group. 45 (64.28%) patients undergoing surgery were male and 25 (35.71%) were female. Majority of patients (50 out of 70) had undergone elective operative intervention. Patients undergoing emergency surgery had mostly benign conditions (16 out of 20) and there was no scope for MBP in these patients. The study is designed to test the hypothesis that patients without MBP before colorectal surgery do not have a higher risk of anastomotic leakage than those with MBP. There are conflicting results in the non-randomized studies with some showing an increased rate of infection and others reporting no difference in infection rates between the groups.

The reported leakage rate varied greatly from 0% - 30% but averages to 5% [6-14] and rate of surgical wound infection has been 11% in patients undergoing colorectal operation with antibiotic prophylaxis. [15-17] In 2003, Zmora *et al*. [16] compared orthograde MBP (with Polyethylene Glycol) versus no MBP. All patients received intravenous antibiotic prophylaxis before and after surgery. No information on anastomotic technique is given. This study enrolled a total of 380 patients with 78% (296 patients) suffering from neoplastic condition. There was statistically insignificant decrease in anastomotic leak, abdominal collection and wound infection rates in the no MBP group ($P > 0.05$). In 1994, Burke *et al*.[17] compared orthograde MBP (with Sodium Picosulphate) versus no MBP in patients undergoing elective colorectal surgery. All patients received intravenous antibiotic prophylaxis (Ceftriaxone and Metronidazole) before and after surgery . The anastomotic technique was either manual or mechanical. 17 patients were excluded because bowel continuity was not restored after surgery or a colostomy was performed. This study enrolled a total of 186 patients with 79% (133 patients) suffering from neoplastic condition. No statistical difference in anastomotic leak and wound infection rates were seen between the two groups. Hughes *et al* .[18-19] reported on a small randomized trial in 1972. The 46 patients with MBP fared no better than those 51 who did not. In 1987, Irving and Scrimgeour [20-21] wrote a similar article on 72 consecutive elective and emergency colectomies with primary anastomosis where all MBP was omitted and the patient was only covered by a single pre operative dose of Cefuroxime and Metronidazole. No anastomotic dehiscence was clinically apparent and wound infection was noted in 8.3% of patients. In 1998, Platell and Hall [22] gave an excellent review of the literature and performed a meta-analysis of three trials in patients undergoing elective colorectal operation. It revealed a markedly greater incidence of wound infection in patients who received MBP (10.8% vs 7.4%).

In our study, 34 patients were operated with MBP with oral Polyethylene Glycol preparation as per manufacturer's instruction along with Phosphate enema and 36 patients without MBP. All patients received intravenous Ceftriaxone and Metronidazole – 1 hour prior to surgery and continued for 36 hour post operatively. The anastomotic technique was manual by a single layer interrupted sero submucosal suture as advised by Matheson and Irving. Among the post operative complication, anastomotic leakage was detected clinically and radiologically in 4 patients in each group (11.76% with MBP and 11.11% without MBP) and intra abdominal collection was detected radiologically in 5 patients in each group (14.70% with MBP and 13.88% without MBP). *P* value was more than 0.5 in both situations, indicating statistically no difference between results of two groups. Wound infection was detected in 10 (29.41%) patients with MBP and 11 (30.55%) patients without MBP. No statistically significant result was seen in post operative incidence of persistent fever after 2nd post operative day, post operative change of blood picture indicating infection and post operative hospital stay. Pre operative electrolyte imbalance was more commonly noticed in older age group who presented with intestinal obstruction but statistically no difference was found between the two groups.

CONCLUSION:

Utilization of pre operative MBP in colorectal surgery has been evaluated in many clinical and experimental studies. Faecal loading and spillage have been reported as contributory factor for anastomotic leakage. Therefore, MBP can prevent faecal content from coming in contact with the small gaps between the sutures on the anastomotic line and thereby prevent faecal soiling of the peritoneal cavity. Based on these assumptions, most colorectal surgeons believe MBP is necessary for safe colorectal surgery. The present result suggests that the omission of MBP does not impair healing of colonic anastomosis , neither increases the risk of leakage. Due to the small sample size in this study, there remains a chance of statistical error. There is a need for more prospective clinical studies with larger sample size to evaluate the role of MBP in outcomes of colorectal surgery.

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