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A PROSPECTIVE STUDY OF FACTORS INFLUENCING RETURN OF BOWEL ACTIVITY AFTER EXPLORATORY LAPAROTOMY

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ABSTRACT

Background: The intestines, comprising the small and large intestines, play a crucial role in nutrient absorption and overall body function. Pathological conditions affecting the bowels can disrupt the body's delicate balance. During abdominal surgery, normal abdominal functions are temporarily halted, and restoring them quickly is a primary goal. Postoperative ileus (POI), characterized by gastrointestinal motility inhibition, significantly impacts patients' recovery, causing discomfort, pain, and delayed hospital discharge. This prospective study aims to investigate the prevalence of POI and assess risk factors associated with its occurrence and progression. Understanding POI is vital for improving patient outcomes and promoting faster recovery after abdominal surgeries. **Methods:** This hospital-based prospective study included patients who underwent surgery at Rabindranath Tagore Medical College, Udaipur. Data was collected using a standardized proforma, including relevant clinical history, pre-operative and post-operative investigations. Statistical analysis involved descriptive statistics, t-tests, nonparametric tests, chi-square tests, and multivariate logistic regression analysis. **Results:** In this study males (59.03%) were predominant in numbers than females (40.96%). Bowel motility appeared earlier in females (91.17%) compared to males (89.79%). Factors significantly associated with POI in the univariate analysis were stoma ($p \leq 0.001$), blood transfusion $p=0.048$), peritoneal contamination ($p \leq 0.001$), higher preoperative haemoglobin ($p=0.009$), Duration of surgery ($p=0.005$), postoperative chloride ($p<0.001$).

Conclusion: In the present study appearance of bowel motility was found to be significantly earlier in patients with shorter duration of surgery, less intraperitoneal contamination, presence of stoma, not receiving intra- or post-operative blood transfusion, shorter duration of surgery, higher preoperative haemoglobin and higher postoperative chloride. This study recommends use of passage of flatus over auscultation of bowel sounds for purpose of starting oral intake in patients undergoing laparotomy as the latter can be positive even in regional return of bowel activity.

KEYWORDS: Intestines, Postoperative Ileus, Risk Factors, Bowel Function.

INTRODUCTION

The intestines, comprising the small and large intestines, form a vital part of the human digestive system. Accounting for approximately 90% of the digestive system's length and surface area, these organs play a crucial role in nutrient absorption, water balance, and the uptake of essential micro nutrients. As such, they significantly contribute to the growth and proper functioning of the human body. Any pathological conditions affecting the bowels can disrupt the delicate homeostasis of the body, emphasizing the importance of timely intervention and correction of bowel-related pathologies for ensuring a healthy and functional life for patients.[1]

During abdominal surgery, the normal functions of the abdomen are temporarily halted to facilitate the surgical procedure. However, the primary goal of the surgeon is to restore abdominal functions to their normal routine as quickly as possible. One of the important functions impaired during and after abdominal surgery is the passage of flatus, which serves as an indicator of bowel function.[2]

Laparotomy, a commonly performed surgical procedure in both emergency and elective settings, is associated with high mortality rates. It is known to cause gastrointestinal motility inhibition, leading to a clinical condition called postoperative ileus (POI). This condition significantly impacts the postoperative course of patients undergoing abdominal surgery, causing discomfort, pain, and delayed hospital discharge. Symptoms of POI include abdominal distension, nausea, vomiting, stomach cramps, and the absence of bowel sounds. The lack of

coordinated intestinal activity and reduced peristalsis characterize postoperative ileus, with patients experiencing varying degrees of symptoms, ranging from asymptomatic to abdominal pain, cramping, and bloating.[3]

Postoperative recovery is a dynamic process in which patients strive to regain their independence and return to their everyday lives. Restoration of physical functions is a crucial aspect of this recovery, but it is often beyond the control of the individual. Predictably, major abdominal operations lead to postoperative gastrointestinal (GI) tract dysfunction, while minor surgical procedures can also occasionally cause similar issues. Large incisions, extensive manipulation of the intestines, and exposure of the peritoneum to irritants are factors that contribute to the occurrence of postoperative ileus.[4]

The recovery of intestinal motility after surgery follows a relatively predictable course, with small intestinal motor activity returning within 5-10 hours, gastric motor activity recovering more slowly (24-48 hours), and resumption of colonic motility occurring on postoperative days 3-5. The return of colonic motor function often limits the resolution of postoperative ileus.[5] In this prospective study, we aim to investigate the prevalence of postoperative ileus as an indicator of bowel motility dysfunction in patients undergoing abdominal surgeries. Additionally, we will assess the role of various risk factors associated with the occurrence and progression of postoperative ileus. By identifying these factors, we hope to contribute to a better understanding of the condition and potentially develop strategies for its prevention and management.[6]

Understanding the prevalence and risk factors of postoperative ileus is crucial for improving patient outcomes, reducing complications, shortening hospital stays, and minimizing healthcare costs. By shedding light on this common complication, we aim to enhance surgical care and promote faster recovery for patients undergoing abdominal surgeries.[7]

MATERIALS AND METHODS

This study was undertaken after the approval of the ethical committee and after obtaining informed consent from the patients.

Source of data: Hospitalized patients who was undertaken for surgery in the Department of General Surgery at Rabindranath Tagore Medical College (RNTMC), Udaipur from June 2021 to September 2022.

Type of Study: Hospital based Prospective Study.

Sample size: Sample size was calculated using the formula.

$n = 4pq/L^2$

Where n is the sample size, q is the statistic corresponding to level of confidence, P is expected prevalence, and L is precision (corresponding to effect size).

Methods of Data Collection

The data was collected in a specially designed standardized proforma from the patient by relevant clinical history, including significant previous diseases, pre-operative investigations, post-operative investigations.

Inclusion criteria

1. Patients age >18yrs.
2. Patients who underwent emergency as well as elective laparotomies in Department of general surgery, RNT Medical College, Udaipur, Rajasthan.

Exclusion criteria

1. Pregnant women, cognitively impaired subjects.
2. Immunocompromised patients.

Factors studied

In this study the various factors studied were as follow.

1. Pre-operative factors

- Age
- Sex
- Co morbidities – diabetes, cardiac disease, renal disease.
- Biochemical parameters – Hemoglobin, Albumin, Renal function (Blood urea, serum Creatinine), Electrolytes.

2. Intra operative factors

- Patient related intra operative factors include.

Based on Etiology – Gangrene, malignancy, trauma

- Surgeon related intra operative factors include:

1. Type of surgery
2. Duration of surgery
3. Handling of bowel

3. Post-operative factors:

1. Post-operative variables recorded (biochemical parameter) from days 0 to 5, bowel sound, day of first flatus, day of first motion, presence and duration of prolonged POI, occurrence of other complications and length of stay.
2. Transfusion of blood and blood products.

Statistical Analysis

In the study, continuous variables were described using mean, standard deviation, and range. Categorical variables were presented as absolute numbers and percentages. To compare the quantitative data, the t-test or nonparametric test (Mann-Whitney test) was used when necessary. The Chi-square test or Fisher's exact test was employed for analyzing proportions, depending on the appropriateness. Two-tailed P values were used for all analyses, and a significance level of $P<0.05$ was considered statistically significant. Variables that showed an association with postoperative ileus (POI) with a P value less than 0.05 were included in a multivariate

logistic regression analysis. In the regression analysis, variables were eliminated one at a time, starting with the variable with the highest P value (P<0.05 was considered significant).

RESULTS

Table No. 1: Distribution of the patients studied according to appearance of bowel sound.

BOWEL SOUND	APPEARANCE OF BOWEL SOUND	NO. OF PATIENTS
GROUP BS I	<48 hrs	75 (90.36%)
GROUP BS II	>48 hrs	08 (9.36%)
TOTAL		83

The study investigated the appearance of bowel sound in two groups: Group BS I, representing patients who had bowel sound within 48 hours, and Group BS II, representing patients who had bowel sound after 48 hours. Out of a total of 83 patients, 75 patients (90.36%) belonged to Group BS I, while only 8 patients (9.36%) fell into Group BS II. These findings indicate that the majority of patients experienced the return of bowel sound within the first 48 hours after surgery.

Table No. 2: Distribution of the patients studied according to passage of flatus.

BOWEL FLATUS	PASSAGE OF FLATUS	NO. OF PATIENTS
GROUP FI	Within 72 hrs	40 (57.14%)
GROUP FII	More than 72 hrs	30 (42.85%)
TOTAL		70

The study examined the passage of bowel flatus in two groups: Group FI, representing patients who passed flatus within 72 hours, and Group FII, representing patients who took more than 72 hours to pass flatus. Out of a total of 70 patients, 40 patients (57.14%) belonged to Group FI, while 30 patients (42.85%) fell into Group FII. These findings suggest that a majority of patients were able to pass flatus within the first 72 hours after surgery.

Table No. 3: Distribution of patients studied according to passage of motion.

MOTION	PASSAGE OF MOTION	NO. OF PATIENTS
GROUP M I	Within 5 days	19 (27.16%)
GROUP M II	More than 5 days	51 (72.84%)
TOTAL		70

The study examined the passage of motion in two groups: Group M I, representing patients who passed motion within 5 days, and Group M II, representing patients who took more than 5 days to pass motion. Out of a total of 70 patients, 19 patients (27.16%) belonged to Group M I, while 51 patients (72.84%) fell into Group M II. These results indicate that a majority of patients took more than 5 days to pass motion after surgery.

Table No. 4: Correlation of bowel motility with type of surgery in the present study.

	TYPE OF SURGERY		p value
	ELECTIVE	EMERGENCY	
BOWEL SOUND			
GROUP BS I	37 (86%)	38 (95%)	
GROUP BS II	06 (14%)	02 (5%)	**0.167**
TOTAL (83)	43	40	
BOWEL FLATUS			
GROUP F I	24 (60%)	16 (53.3%)	
GROUP F II	16 (40%)	14 (46.7%)	
TOTAL (70)	40	30	**0.576**
MOTION			
GROUP M I	8 (20%)	11 (36.6%)	
GROUP M II	32 (80%)	19 (63.4%)	
TOTAL (70)	40	30	**0.120**

RESULT

The study compared elective and emergency surgeries in terms of three variables: bowel sound, bowel flatus, and motion. The data showed no statistically significant differences between the two groups for any of these variables.

DISCUSSION

The present study aimed to investigate the return of bowel function after surgery, specifically focusing on the appearance of bowel sound, passage of bowel flatus, and motion. The study population consisted of 83 patients who underwent exploratory laparotomy surgery, both elective and emergency, at the Department of General Surgery of Maharana Bhupal Government Hospital, RNT Medical College, Udaipur, from June 2021 to September 2022.[8]

The majority of patients in this study were male (59.03%), which is consistent with the findings of similar studies. However, one study reported a higher proportion of female patients (56.07%) compared to males. The age distribution of the patients showed that the majority (63.85%) were in the 30-60 years age group, followed by patients over 60 years of age (19.27%) and the 18-29 years age group (16.86%). These findings align with previous studies that reported a similar age distribution among patients undergoing surgery. The association between age and bowel motility varied across studies, with some studies finding a significant association, while others did not.[9]

In terms of the type of surgery, the study population consisted of a slightly higher proportion of patients who underwent elective procedures (51.80%) compared to emergency surgeries (48.19%). The comparison between elective and emergency surgeries did not reveal any statistically significant differences in terms of bowel sound, bowel flatus, or motion. Similar studies have reported conflicting results regarding the association between the type of surgery and the return of bowel function.[10]

The results of this study showed that the majority of patients experienced the return of bowel sound within 48 hours after surgery (90.36%), while a smaller proportion of patients had bowel sound after 48 hours (9.64%). The passage of bowel flatus occurred within 72 hours for the majority of patients (57.14%), while a smaller proportion of patients took more than 72 hours to pass flatus (42.85%). Moreover, most patients took more than 5 days to pass motion after surgery (72.84%). These findings are consistent with previous studies that have reported similar timelines for the return of bowel function.[11]

The study did not find any statistically significant differences in bowel sound, bowel flatus, or motion between the elective and emergency surgery groups. The percentages of patients with bowel sound, bowel flatus, and normal motion were slightly higher in the elective group compared to the emergency group, but the differences were not statistically significant. These results suggest that the timing of the return of bowel function may not be influenced by the type of surgery.[12]

When considering various factors such as age, sex, history of previous surgery, history of comorbidity, stoma, blood transfusions, and duration of surgery, the study found no statistically significant differences in the return of bowel function. However, some studies have reported associations between these factors and the duration of postoperative ileus, highlighting the complex nature of bowel motility after surgery.[13]

The findings of this study contribute to the existing body of literature on the return of bowel function after surgery. However, it is important to note that this study has some limitations. Firstly, the sample size was relatively small, which may limit the generalizability of the findings. Secondly, the study was conducted at a single center, which may introduce bias. Future studies with larger sample sizes and multi-center designs are needed to further investigate the factors influencing the return of bowel function after surgery.[14]

CONCLUSION

This study investigated the return of bowel function after surgery, focusing on bowel sound, flatus passage, and motion. Most patients experienced the return of bowel sound within 48 hours, indicating timely recovery, while the majority passed flatus within 72 hours. However, motion took longer, with most patients taking over 5 days. The type of surgery (elective or emergency) did not significantly affect the timing of bowel function recovery. Factors such as surgery duration, contamination, stoma presence, blood transfusions, preoperative hemoglobin, and postoperative chloride levels were identified as potential influences on bowel activity. The study recommends using flatus passage as an indicator for initiating oral intake post-laparotomy, as bowel sounds alone may not accurately reflect regional bowel activity. Understanding the return of bowel function is essential for effective management and enhanced recovery protocols. Further research with larger sample sizes and multi-center designs is needed to validate these findings and explore additional factors impacting bowel function recovery after surgery.

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