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Research Article

A STUDY ON INTESTINAL OBSTRUCTION REGARDING ITS EPIDEMIOLOGY, ETIOLOGY AND MANAGEMENT IN A PERIPHERAL MEDICAL COLLEGE

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ABSTRACT

Objectives: The intestinal obstruction is a widespread emergency problem in our surgical practice day by day. It is a significant cause of morbidity and mortality in our health system. It is caused by adhesions, hernias, malignancies, endometriosis, inflammatory bowel disease stenosis, intussusception, and others. Our research aims to identify the etiology, epidemiology, and clinical presentations of the pathology so that we can manage the disease as early as possible for better outcomes in our peripheral institution.

Methods: The study was performed on 100 cases of the age group 12–76 years admitted in the surgical ward of Midnapore Medical College and Hospital, Paschim Medinipur (W.B.) from December 2016 to June 2018. Cases of acute intestinal obstruction who underwent operation were included in our research to establish the pathology of intestinal obstruction.

Results: In our study, the incidence of acute intestinal obstruction is 1.6% of total surgical cases. Maximum patients (25%) were in the age group 51–60 years. The most common cause of intestinal obstruction was obstructed/strangulated hernia (40%). The most common symptoms were pain abdomen (88%), abdominal distension (84%), and vomiting (78%). An X-ray revealed presence of air-fluid levels in 75% of patients. The overall mortality rate was 10%.

Conclusion: The morbidity and mortality of intestinal obstruction are dependent on early diagnosis, prompt resuscitation, and proper management. The critical determinants of the morbidity are age of the patient, duration of the disease, existing comorbidity, and delay in treatment. X-ray in erect view is an essential mode of diagnostic method and obstructed hernia is the most common etiology of obstruction in our research study.

Keywords: Adhesion, Intestinal obstruction, Malignancy, Mortality, Obstructed hernia.

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INTRODUCTION

The bowel obstruction is a common abdominal pathology for surgeons. The intestinal obstruction of the small bowel or large bowel continues to be a significant cause of morbidity and mortality [1]. They occur for nearly 20% of emergency surgical admissions [2]. Presentations of acute intestinal obstruction can be from a slight abdominal discomfort and distension to a state of shock which requires an emergency surgical operation. The idea of this study is to identify the etiology, epidemiology, and clinical presentations of the pathology so that we can manage the disease as early as possible for better outcomes in our peripheral institution [3]. The mortality of acute intestinal obstruction is significantly decreasing due to better knowledge of pathophysiology, improvement in diagnostic methods, fluid and electrolyte correction, much more potent antibiotics, and knowledge of intensive care. Most of the deaths occur in elderly patients who seek late treatment and having comorbidity such as diabetes mellitus, cardiac or respiratory problems, liver pathology, and other immune-compromised conditions. It is essential to differentiate from strangulated to non-strangulated intestinal obstruction. Early and prompt diagnosis of obstruction, proper technique during surgical intervention and post-operative care carries a better outcome. In spite of this, surgeons usually face problems to correct the diagnosis, optimal timing of surgery, and appropriate management. Ultimately, a clinical decision about managing these patients needs a thorough history, examination, pre-operative investigation, and prior experience of potential complications.

Aims and objective

Our study aims to identify the etiological factors, clinical presentation, and treatment methods associated with acute intestinal obstruction along with the incidence of intestinal obstruction due to mechanical and adynamic causes.

METHODS

A prospective observational study was conducted on 100 patients with acute intestinal obstruction who underwent surgical intervention in the Department of General Surgery, Midnapore Medical College and Hospital, Paschim Medinipur (WB) from December 2016 to June 2018. Ethical clearance obtained from the Institution Ethical Committee November 28, 2016 with Memo No- MMC/IEC-2016, before the commencement of the study. Patient's written informed consent was obtained. After the admission of a patient in the ward, a history and clinical examination of the patient was done followed by blood and radiological investigations. Patients were having sub-acute intestinal obstruction managed conservatively and were excluded from the study. Only those cases of acute intestinal obstruction who underwent surgical intervention were studied to establish the pathology of intestinal obstruction to know the mode of presentation, physical findings, radiological and hematological findings, operative findings, and outcome of acute intestinal obstruction. A pro forma was used to collect the patient's detailed clinical history, physical examination, operative details, and post-operative complication details.

Inclusion criteria

Patients of age 12–76 years and of either sex had developed acute intestinal obstruction and underwent surgical treatment.

Exclusion criteria

Patients with acute intestinal obstruction who are <12 years of age, All patients who underwent conservative management, Patients not willing to participate in the study.

Physical examination and tests used to confirm the diagnosis: History of all patients was taken carefully, and vital parameters and physical examination were also noted.

Blood investigations

Complete blood count, RBS, urea, creatinine, blood grouping and typing, bleeding time, computed tomography (CT), prothrombin time, platelet count, serum electrolytes, viral serology, amylase, and lipase.

Imaging study

X-ray in erect view of the abdomen, ultrasonography of the abdomen, and CT scan of the whole abdomen in selected cases.

Management

Treatment of intestinal obstruction depends on the cause of obstruction, duration of disease, severity of disease, and patient condition.

Immediate resuscitation started with intravenous fluid (NS/RL), oxygen support, nasogastric decompression with Ryles tube, antibiotic prophylaxis, monitoring of vitals (pulse rate, blood pressure, respiratory rate, TEMP, oxygen saturation, Glasgow coma scale), catheterization, blood transfusion (select cases only). Patients who showed a reduction in abdominal distension and improvement and conservative management were continued for the next 24 h. Patients with clear-cut signs and symptoms of acute obstruction were operated by appropriate surgical procedures after resuscitation. The empirical use of antibiotics is essential for preventing septicemia, decreasing hospital-related infections, and maintaining cost-effectiveness. It is expected to prescribe an empirical antibiotic [4]. Indication of operation was: Distension not relieved, the appearance of rebound tenderness and rigidity, the appearance of features of shock/strangulation, and conservative treatment failure. H.P. examination of the specimen was done whenever necessary. Patient was monitored in the post-operative period and all parameters were recorded hourly or for four hours depending on the patient's condition. Any complications noted and treated accordingly. Post-operative follow-up was done up to 3 months after discharge. Data were collected using a pro forma regarding patient's signs and symptoms, etiology of obstruction, surgical procedure, post-operative complication, and mortality. Discharge criteria included patients oriented to time, place, and person with stable vitals, tolerated oral foods, passed urine, adequate pain control, could ambulate, and had no wound site complaints.

Statistical analysis plan

Data were collected in an MS Excel spreadsheet. SPSS 11.0 (IBM Corporation) and Systat 8.0 were applied for data analysis. Descriptive statistics were elaborated as means/standard deviations and medians for continuous variables, and frequencies and percentages for categorical variables. Data were presented in a graphical manner wherever appropriate for data visualization using histograms/box-and-whisker plots/column charts for continuous data. Chi-square test was used for comparisons of categorical data. A $p<0.05$ was considered statistically significant.

RESULTS AND ANALYSIS

During 18 months, the total number of admissions in surgery was 14236 cases, of which 228 cases of intestinal obstruction were treated which comprises 1.6% of the total number of admissions. Out of these 228 cases, 100 cases (43.9%) who underwent surgical intervention form the basis of the study in this series. The total number of emergency surgeries done in the Department of Surgery was 1569 and surgery for acute intestinal obstruction consisted of about 6.4% (100 cases). The intestinal obstruction is most common in age group 51–60 years. About 72% of the participants were gender male. About 28% of the participants were gender female. Male patients were more commonly affected than females in the ratio of 4:1 in our study. About 76% of patients belong to low socioeconomic status while 24% belong to high socioeconomic status. Out of 100 cases, 64 patients were taking a non-vegetarian diet and 36 patients were vegetarian. In our study, the most common symptoms were pain abdomen (86%), vomiting (80%), and the most common signs were tachycardia (80%), and tenderness (60%). It is shown in Table 1.

Incidence of different etiology

The most common instances of intestinal obstruction in our study were obstructed hernia (40%), followed by post-operative adhesions (30%). Other conditions include malignancy (14%), intussusception (6%), volvulus (4%), tuberculosis (6%), and mesenteric ischemia (2%). Among obstructed hernia, there were 34 cases of obstructed inguinal hernia, five cases of obstructed umbilical hernia, and one case of obstructed femoral hernia. It is shown in Table 2.

Surgical procedures

In our study of 100 cases, according to the etiology, the management and the surgical procedure were done as shown in Table 3. Release of adhesion with herniorrhaphy was done in 27% of the cases and resection anastomosis in 31% of cases. Only release of adhesion was done in 16% of cases for band adhesion, diverting loop ileostomy in 14% of cases, Hartman's procedure in 6% of cases, and loop colostomy in 4% of cases. Reduction of obstructed inguinal hernia was performed

Table 1: Signs and symptoms

Symptoms and signs	Number of cases (%)
Pain abdomen	86 (86)
Vomiting	80 (80)
Distension	84 (84)
Constipation	64 (64)
Tachycardia	80 (80)
Previous surgical scar	44 (44)
Tenderness	60 (60)
Rigidity	26 (26)
Mass/aboriginal	23 (23)

Table 2: Etiology of intestinal obstruction in adults

Clinical condition	Number of cases (%)
Obstructed hernia	40 (40)
Post-operative adhesion	30 (30)
Volvulus	4 (4)
Tb abdomen	4 (4)
Malignancy	14 (14)
Intussusception	6 (6)
Mesenteric ischemia	2 (2)
Total	100 (100)

Table 3: Surgical procedures

Management	Number of cases (%)
Release and herniorrhaphy	27 (27)
Release of adhesion	16 (16)
Diverting loop ileostomy	14 (14)
Hernia reduction	2 (2)
Resection and anastomosis	31 (31)
Hartman procedure	6 (6)
Loop colostomy	4 (4)
Total	100 (100)

Table 4: Post-operative complications

Post-operative complication	Number of cases
Wound infection	8
Respiratory tract infection	8
Wound dehiscence	4
Fecal fistula	4
Septicemia	10

Table 5: Cause of death

Age (years)/sex	Symptoms before admission (days)	Operative findings	Operative procedure	Cause of death
75/female (case number 8)	3	CA sigmoid colon	Resection and anastomosis	Septicemia
72/(case number 11)	8	CA rectum	Hartmann procedure	Respiratory tract infection
65/(case number 21)	5	Mesenteric ischemia	Resection and anastomosis	Septicemia
45/male (case number 36)	3	CA cecum	Resection and anastomosis	Respiratory tract infection
38/female (case number 37)	5	CA ovary with sigmoid colon infiltration	Transverse loop colostomy	Septicemia
63/male (case number 39)	3	CA rectum	Hartmann procedure	Septicemia
55/male (case number 43)	4	CA colon	Resection and anastomosis	Septicemia
54/male (case number 54)	2	Obstructed inguinal hernia	Release and herniorrhaphy	Respiratory tract infection
56/male (case number 75)	3	Obstructed femoral hernia	Release and herniorrhaphy	Respiratory tract infection
67/male (case number 92)	7	Ileo-cecal tuberculosis	Resection and anastomosis	Respiratory tract infection

Table 6: Follow-up complications

Follow up complication	1st month	3rd month
Wound infection	One patient	-
Colostomy complications	-	Four patients
Enterocutaneous fistula	Two patients	-
Incisional hernia	-	Six patients
Fever	Two patients	-
Infection	Two patients	-

in 2% of cases.

Post-operative complications

In our study, there were ten cases of septicemia, eight cases of the respiratory tract, eight cases of wound infection, four cases of wound dehiscence, and four cases of fecal fistula. It is shown in Table 4.

Mortality

In our study, ten patients died. The deaths were due to septicemia (five patients) and respiratory failure (5 patients). It is shown in Table 5.

Follow-up status

In the follow-up of patients in this study up to 3 months, it was found that there was one case of wound infection, and four cases of colostomy complications (such as stoma prolapse, and stoma retraction). Two instances of enterocutaneous fistula occurred in the 1st post-operative month and there were six cases of incisional hernia observed during 3rd post-operative month. Two instances of respiratory tract infection and fever were found in the 1st month of the post-operative period. Follow-up complication is shown in Table 6 below.

DISCUSSION

Obstructed hernia was the most common surgical emergency in our study [5]. In our research work, a total of 228 patients were having features of acute intestinal obstruction. Out of these 100 cases who underwent surgical intervention were selected for the study.

Disease incidence

In our clinical study, the incidence of acute intestinal obstruction is 1.6% of total surgical cases. In the study of Adhikari *et al.* [6], incidence was 9.87% of total surgical cases.

Age incidence

Intestinal obstruction occurs in all age groups, in our study, the peak incidence is in the age group 51–60 years (25%) which is slightly higher than the study of Adhikari *et al.* [6] and Cole [7]. Usually in rural areas, patients face many problems such as lack of medical facilities, lack of transport facilities, and low socioeconomic conditions. The mean age in our study was 55 years. Study by Adhikari *et al.* [6] shows mean age of 44 years whereas a study by Khan *et al.* [8] shows a mean age of 33 years.

Sex incidence

In our study, male-to-female ratio is 4:1 which is comparable with the previous study by Adhikari *et al.* [6], in which male-to-female ratio was also 4:1. In a study by Osuigwe and Anyanwu [9], male-to-female ratio was 2:1.

Etiology

The cause of intestinal obstruction differs from different locations. In our study, about 76% of the patients were belong to the lower socioeconomic class and the remaining 24% were of the higher class which was considered to be statistically significant (p=0.0001). Our hospital is a government hospital, which mainly serves the population of low socioeconomic status; hence, the percentage of low socioeconomic status patients is high. The diet pattern in this study showed 64% non-vegetarians and 36% vegetarians which is considered statistically significant (p=0.0267). In the present study of 100 cases of acute intestinal obstruction, 40% of the cases are due to obstructed/strangulated hernias. A comparison of etiology with other studies is shown in Table 7.

Clinical features

In our study, the clinical feature of pain abdomen was present in 86% of patients followed by vomiting in 80% of patients, which is comparable with the study of Adhikari *et al.* [6] and Khan *et al.* [8]. About 84% of the patients in our study had distension of the abdomen. This may be due to the late approach to the hospital by patients in the present study. The mass per abdomen on palpation was present in 23% of the total study cases due to malignancy, intussusception, and ileocecal tuberculosis.

Radiology

A study by Maglinte *et al.* [12] shows 90% of cases with multiple air-fluid levels. In our study, 75% of X-ray shows various air-fluid levels. Contrast study (barium enema) may help locate the obstruction in the colon but in our survey contrast study was not done. Ultrasonography of the abdomen showed dilated gut loops in most of the study, and etiology in some cases as well. CT scan showed the exact etiology in most of the cases.

Mortality

The frequency of mortality in our study is 10% (10 cases out of 100 cases). Nearly one million new cases of colorectal carcinoma are diagnosed worldwide each year and about half of them die [13]. Most of the deaths are due to intestinal obstruction. Among these six cases were due to malignancy, one due to mesenteric ischemia, two due to obstructed hernia, and one due to ileocecal tuberculosis. Comparison of mortality with other studies is shown in Table 8.

The mortality rate in our study is comparable with Ramachandran [15] but it is more when compared to a survey by Adhikari *et al.* [6] and Khan *et al.* [8]. The patient's prognosis is directly proportional to the duration of the symptom the higher the duration, the higher the mortality. However, it does not yield much statistical significance (p=0.7458). This study has some shortcomings in that there was no comparative

Table 7: Comparison of etiology with other studies

Cause	Adhikari *et al*. [6]	Khan *et al*. [8]	Cole [7]	Brooks and Butler [10]	Playforth *et al*. [11]	Our study
Hernia (%)	36	34	35	25	23	40
Adhesions (%)	16	39	10	23	54	30
Volvulus (%)	6	5	3	1	3	4
Tuberculosis (%)	14	1	3	-	-	4
Malignancy (%)	17	3	9	5	9	14
Intussusception (%)	2	6	12	18	5	6
Mesenteric ischemia (%)	9	2	-	-	6	2

Table 8: Comparison of mortality with other studies

The study	Year	Number of the cases studied	Mortality (%)
Our study	2018	100	10
Adhikari *et al*. [6]	2005	367	7.35
Sufian and Matsumoto [14]	1975	171	19
Khan *et al*. [8]	2001	100	7
Ramachandran [15]	1982	417	12.7

group and was carried out at only a single institution. Further study is necessary for validation.

CONCLUSION

Acute intestinal obstruction remains an essential surgical emergency in the surgical practice. Success of the treatment depends mainly on early diagnosis, skillful management, and treating the pathological causes of the obstruction. X-ray (abdomen) - erect view is a valuable investigation for diagnosis. Obstructed hernias are the common cause of intestinal obstruction in our study. Mortality is still significantly high in acute intestinal obstruction.

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AUTHOR CONTRIBUTIONS

MA- Data Collection and analysis, concept, manuscript preparation, and treating surgeon; AB- Concept and design, manuscript writing, editing, and treating surgeon. PkS- Data collection and analysis, manuscript preparation; AS- Data analysis, manuscript editing and review and treating surgeon.

CONFLICTS OF INTEREST

None.

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