

A prospective observational study on etiology and management influencing outcome in operatively managed cases of acute intestinal obstruction in adults



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ABSTRACT

Background: Acute intestinal obstruction (IO) is an important cause for acute abdomen in surgery which presents as abdominal pain, vomiting, distension, and constipation depending on the level and extent of obstruction of gastrointestinal tract. Early diagnosis of acute IO with understanding of various etiologies, use of better diagnostic techniques, and skillful operative management and good postoperative care, carries a good outcome. **Aims and Objectives:** The objective of the study was to find out the prevalence of various etiologies of acute IO and to study the various post-operative morbidity and mortality. **Materials and Methods:** This was a hospital-based observational study in the Department of General Surgery of Calcutta National Medical College and Hospital among patients with a diagnosis of acute IO during the study period of December 2016-April 2018. **Results:** Acute IO commonly affects male with a male: female ratio 7:3 and the most common occurrence in the age group of 40–59 years (30%). The most common etiology was obstructed/strangulated hernia (36%), followed by large bowel neoplasm (18%), adhesion (16%), intestinal tuberculosis (12%), and volvulus (10%). The most common surgical procedure performed was the resection of gangrenous bowel and creation of stoma (30%), followed by prosthetic repair of hernia (28%). The mortality rate of the present study was 12%. The morbidity rate was 46% attributing mainly to respiratory complications (30.4%) and surgical site infections (26.08%). **Conclusion:** This study demonstrates that the pattern of IO differs from the Western world with obstructed hernias being the most important cause and also emphasizes the fact that intestinal tuberculosis assumes a prominent role.

Key words: Adhesions; Complications; Etiology; Intestinal obstruction

INTRODUCTION

Bowel obstruction is defined by the lack of aborad transit of intestinal contents, regardless of etiology.¹ Intestinal obstruction (IO) is a common surgical emergency accounting for 20% of the acute abdomen and 80% of these being small bowel obstruction.² It consumes considerable health-care resources and results in morbidity and mortality in a substantial number of patients.

IO is of two types - dynamic and adynamic. Dynamic obstruction is when there is a physical entity clocking the lumen of the intestine from inside or outside with the body trying to overcome it by increased peristalsis. Adynamic obstruction is a result of reduced or absent peristalsis due to disturbance in neuromuscular transmission.²

Obstruction of the small intestine and large intestine are fundamentally different in their cause and management.

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Small intestine obstruction presents with colicky abdominal pain and vomiting while large bowel obstruction presents with distension and absolute constipation. The exact combination of these symptoms varies and depends on the level, and the degree, of the obstruction. Thus, a “high” small bowel obstruction may present predominantly with nausea and vomiting without distension or constipation, whereas a distal obstruction may initially present with abdominal distension and pain with vomiting occurring later in the clinical course.

Untreated obstruction may culminate in strangulation leading to bowel gangrene secondary to ischemia. Strangulated bowel with full thickness ischemia is irreversible and, if left untreated, rapidly results in fatal peritonitis due to a leakage of gastrointestinal contents heavily laden with bacteria.

Large bowel obstruction is abdominal emergency associated with high morbidity and mortality rates. Colorectal carcinoma is by far the most common cause of large bowel obstruction. When causes other than primary colonic cancer are considered, diverticular disease and volvulus are the most frequent reasons of large bowel obstruction. Emergency surgery is usually required to relieve the obstruction. The signs and symptoms of large bowel obstruction depend on the cause and location of the obstruction. Regardless of the cause of the blockage, the clinical manifestations of large bowel obstruction include the failure to pass stool and flatus associated with increasing abdominal distention and cramping abdominal pain.

There is a global change in the spectrum of etiology of acute IO and thereby in the management as well as the outcome.³ Hence, this study was taken up to observe the etiology, management, complications, and mortality among the patients who underwent surgery due to acute mechanical bowel obstruction in adult population.

Aims and objectives

- To find out the prevalence of various etiologies of acute IO among the study population.
- To find out the prevalence of various post-operative morbidity.

MATERIALS AND METHODS

This is a hospital-based prospective observational study carried out in the general surgery wards of Calcutta National Medical College and Hospital, Kolkata, West Bengal, from December 2016 to April 2018, after the approval from the institutional Ethics Committee.

The study population included all the patients who were admitted in surgical wards with clinical features of acute IO.

Clinical features of acute IO included abdominal pain, vomiting, abdominal distension, and obstipation.

On presentation, the resuscitative measures were taken. These measures included intravenous fluid resuscitation, nasogastric suction, Foley’s catheterization, and moist oxygen by inhalation (if required). The patient was stabilized, and local examination was carried out following which the patient underwent certain investigations. Radiological investigation included a digital skiagram of the abdomen in erect posture (presence of multiple [>3] air–fluid levels and a paucity of gas shadow in the rectum was suggestive of IO). Laboratory investigations included complete hemogram, electrolytes, blood glucose and renal function status, and serology.

50 patients were selected from the study population by simple random sampling and were included after their informed consent.

Inclusion criteria

All patients in the age group of 18–85 years who have been admitted with clinical as well as radiological diagnosis of acute IO.

Exclusion criteria

- Patients having ileus due to electrolytes abnormalities, hyperglycemia, hypothyroidism, and uremia; history of intake of medication such as opiates, anticholinergics, alpha adrenergic agonists, antihistamines, suffering from pancreatitis, pyelonephritis; suffering from head trauma, pelvic fracture, and acute spinal cord injury. Apart from history and clinical examinations, these patients shall deranged laboratory findings and the X-ray of the abdomen shall show generalized dilatation of both small bowel and large bowel with no step ladder pattern or abrupt cut-off of the intestinal gas shadow.
- All pregnant women.

After data collection, they were recorded and analyzed using means and percentages through SPSS software version 25.

RESULTS

Demography

The mean age of the study sample was 55.78 ± 19.04 years, with the majority of the cases being seen in the age group of 40–59 years (15.30%), followed by those patients >75 years (13.26%), 18–40 years (12.24%), and 60–75 years (10.20%) (Figure 1).

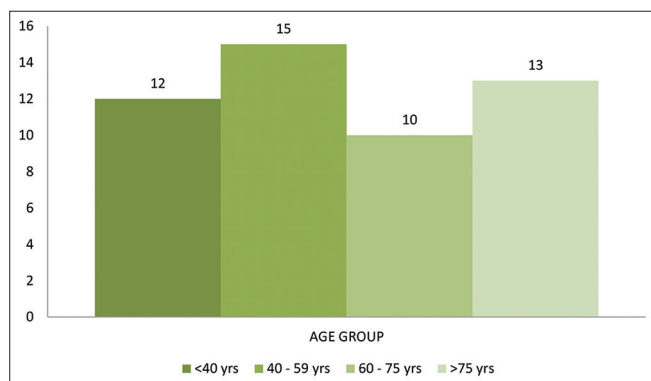


Figure 1: The age distribution of the study sample

Out of the 50 patients, 35 were male and 15 were female.

In this study, 36 (72%) patients suffered from small bowel obstruction, whereas 14 (28%) patients suffered from large bowel obstruction.

Etiology

Figure 2 below illustrates the various etiologies of acute IO among the patients in our study. Obstructed hernias, which included inguinal hernia, femoral hernia, incisional hernia, and umbilical hernia, were the major causes of obstruction, seen in 18 (36%) patients. It was a cause of both small bowel and large bowel obstruction depending on the content of the hernia sac. Other causes included malignancy (9.18%), adhesions (8.16%), intestinal tuberculosis (6.12%), sigmoid volvulus (5.10%), intussusception (2.4%), and inflammatory bowel disease (2.4%).

Management

All patients were initially treated conservatively with fluid resuscitation, nasogastric decompression, and the correction of electrolyte abnormalities for 24 h. If the patient developed increased abdominal pain and distension or developed sign of shock or peritonitis, then he was taken up for exploratory laparotomy and proceeded accordingly. In our study, all patients had to be taken up for surgical management. Figure 3 shows that resection of bowel followed by the creation of stoma (15.30%) was the most common procedure that was performed. Other surgical procedures included prosthetic repair of hernia (14.28%). Hernia repair along with resection and anastomosis (4.8%), adhesiolysis (8.16%), and resection and anastomosis (9.18%).

Morbidity

Out of the 50 patients, 23 (46%) patients suffered from complications following surgery. The most common complication included respiratory complications such as basal atelectasis, pneumonia (7). This was followed by surgical site infection (6), intra-abdominal abscess

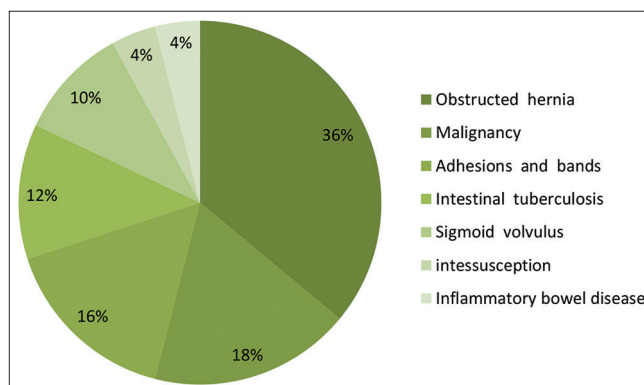


Figure 2: A pie chart depicting the various etiologies of intestinal obstruction along with percentage of the patients suffering from it

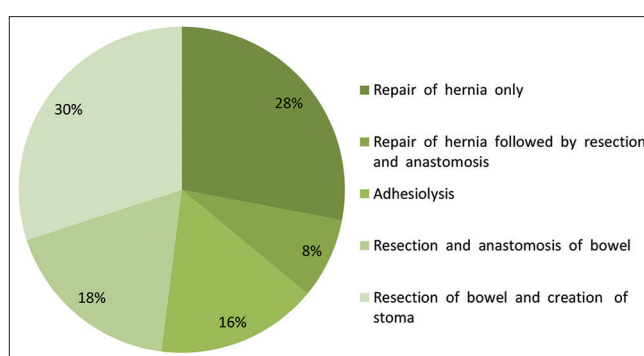


Figure 3: A pie chart depicting the various surgical managements for the different causes of intestinal obstruction along with percentage of the patients undergoing it

(4), prolonged paralytic ileus (3), acute renal failure (1), cardiovascular complications (1), and enterocutaneous fistula (1) (Figure 4).

Mortality

6 (12%) patients out of the 50 patients expired in the post-operative period. These six patients suffered from one or the other complication as mentioned above. The most common cause was septicemia with multiorgan failure. The majority (4) of the fatalities occurred in patients presenting with intestinal tuberculosis, followed by those suffering from colonic malignancy (2).

DISCUSSION

This study showed acute IO is an emergency surgical disease which is seen among a wide age group.

In this study, the most common IO was small bowel obstruction (72%), whereas large bowel obstruction was relatively less common (28%). The most common cause for acute IO according to the observations of the study was obstructed hernia (43%), followed by malignancy (21%) and adhesions (14%). This is consistent with

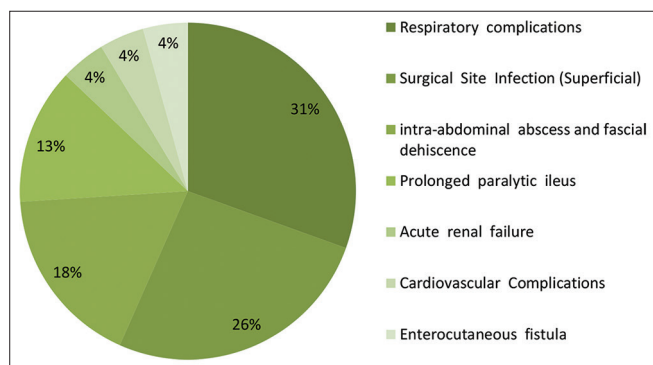


Figure 4: A pie chart depicting the various complications following surgery among the patients

observations regarding the causes of IO in studies carried out in other countries. According to a study carried out by Jackson and Cruz in 2018,⁴ the most common causes of acute IO were adhesions, neoplasms, and herniations. Unlike this study, adhesions following lower abdominal and pelvic surgeries were the predominant cause of small bowel obstruction accounting for 60–75% of the cases, while neoplasms mainly caused large bowel obstruction (13–20%) and herniations accounted for 2–15% of the cases of bowel obstruction. Similar observations were made by Catena et al.,⁵ in their study in 2019, that demonstrated adhesions (55–70%) to be the leading cause of small bowel obstruction followed by herniations (15–25%) and 60% of large bowel obstruction being caused by malignant neoplasm. Cancer was a rare cause of small bowel obstruction (5–10%).

Among the other causes of acute IO observed in our studies, intestinal tuberculosis has come up to be a significant etiology of IO which is not seen in most other studies carried out in the developed countries. Despite improvement in public health conditions, due to emergence of new drug-resistant TB strains, the use of immunosuppressant and increase in human immunodeficiency virus (HIV) infection,⁶ intestinal tuberculosis, as primary or secondary infection, continues to have increasing incidence in both developing and developed countries. According to a hospital-based 3-year study carried out by Abro et al.,⁷ from 2006 to 2008 in Hyderabad, India, the majority of the patients of intestinal tuberculosis presented with features of IO such as abdominal pain (76.7%), vomiting (43.3%), and abdominal distension (36.7%). The majority of the patients had ulcerostenotic type of intestinal tuberculosis, with single stricture in ileum seen in 25% of patients, multiple strictures in ileum in 21.7% of patients, and ileal perforation in 10% of patients.

In all clinically stable patients, non-operative management should be attempted. It includes intravenous fluid

resuscitation, nasogastric intubation for decompression, bladder catheterization, correction of electrolytes, and usage of antibiotics in cases of fever and leukocytosis. 40–70% of clinically stable patients improved with non-operative management; however, the recurrence rate was high.⁴ Gastrograffin challenge test is used in the diagnosis of small bowel obstruction. 90–120 mL of gastrograffin is given by nasogastric tube to the patient and serial abdominal radiographs are taken.⁸ The absence of dye in the colon within 24 h warrants surgery, else the patient can be continued on conservative management. Therapeutic role of this test is still controversial.⁸

Clinical deterioration at any point during the hospital stay requires conversion to operative management. The signs and symptoms suggestive of strangulation obstruction are fever, tachycardia, leukocytosis, localized tenderness, continuous abdominal pain, and peritonitis – three of these signs have 82% predictive value, while four or more of these signs have 100% predictive value.¹

In this study, all the patients had to undergo exploratory laparotomy to relieve the IO. With time and availability of better investigations, exploratory laparotomy is being replaced by laparoscopy. The surgical treatment depends on whether the bowel is gangrenous or not, the presence of peritonitis, and level and amount of bowel resection.

The morbidity rate in this study was 46%, with respiratory complications being the major issue. This is consistent with a prospective study carried out by Mariam et al.,⁹ in 2018 to explore the outcomes following surgical management of acute IO – 23% (majority) of the patients were found out to have pneumonia. Similar to our study, other complications noted by them were fascial dehiscence (15.7%), surgical site infection (superficial, deep, and organ specific) (36.5%), hypokalemia, sudden cardiac arrest, and septic shock (21%). Respiratory complications include basal atelectasis, pulmonary edema, and pneumonia. A reduced regional transpulmonary pressure in dependent lung areas is accentuated by inflammation induced by surgery, bacterial translocation, chest wall restriction, and cephalad diaphragm displacement by surgical retraction followed by post-operative pain and inflammation all contribute to respiratory complications.¹⁰ Post-operative wound infection which is another significant complication occurring within 3–7 days after the surgery. Patient factors such as advanced age, malnutrition, hypovolemia, obesity, steroid use, diabetes, use of immunosuppressive agents, smoking, and coexistent infection at a remote site and procedure-related risk factors such as hematoma, use of drains, preoperative shaving, long surgery, poor

surgical technique, hypothermia, contamination from the operating room, and prolonged perioperative stay in hospital play part in causing surgical site infection.¹¹

The mortality rate of this study was 12%. It is similar to a prospective study carried out by Malik et al.,¹² in 2017 in Maharashtra. According to their observation, the mortality rate of their sample was 15%. In accordance with their observation, patients who died had gangrenous or strangulated bowel, had reached the hospital late with other factors such as age, general condition of the patient, duration of the symptoms, and the operative procedure that he had underwent. Similar to our study, the cause of death was septicemia.

There are limitations of the study that a small sample size is adopted here due to limited time frame, and as a tertiary care center, these cases are referred from primary or secondary level health-care system; therefore, the cases presented here late and less time is available for conservative management as well as to assess the accurate etiology of mechanical bowel obstruction.

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CONCLUSION

The present study revealed that obstructed hernias rather than adhesions, colorectal malignancies, and sigmoid torsion are common causes of mechanical bowel obstruction in the study population despite limitations. Intestinal tuberculosis assumes great importance in this part of the country as a cause of obstruction with increasing numbers of HIV-positive cases. Morbidity and mortality rates are still high, and the most common complications were respiratory disorders and wound infection. Depending on these results, we believe that morbidity and mortality rates may be decreased with considering the etiological cause of mechanical bowel obstruction and the related risk factors of the patients, early referral to higher center for assessment, and increasing the awareness of the people about acute IO and universal precaution for HIV.

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DM- Concept and design of the study, primary draft preparation; **AB-** Interpretation of results, statistical analysis and interpretation, manuscript preparation; **SD-** Review of Literature; **PSD-** Concept, coordination, preparation and revision of manuscript.

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