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A prospective study on acute intestinal obstruction in adults: Epidemiology, management, and outcomes

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Abstract

Background: Acute intestinal obstruction (AIO) is a common surgical emergency that can be caused by various etiologies. This study was undertaken to evaluate the epidemiology, clinical features, management strategies, and outcomes of AIO in adults, aiming to identify the predominant causes and associated complications.

Materials and Methods: This prospective study was conducted over one year (November 2017 to October 2018) at the Department of General Surgery, Sree Lakshmi Narayana Institute of Medical Sciences. A total of 30 adult patients diagnosed with AIO and treated surgically were included. Demographic data, clinical history, symptoms, and physical findings were documented. Laboratory investigations and radiological imaging, including erect abdominal X-ray, were performed for diagnosis. Surgical procedures were determined based on etiology, and postoperative monitoring was carried out for complications.

Results: The study revealed a male predominance (63.3%), with the highest incidence in patients aged <20 years and 21-30 years. Postoperative adhesions (40%) and obstructed hernias (27%) were the leading causes of AIO. Common symptoms included abdominal pain (87%) and vomiting (73%), with tachycardia observed in 80% of patients. Surgical management was primarily adhesion release (40%) and resection with anastomosis (20%). Postoperative complications included septicemia (13.3%) and respiratory infections (10%). Mortality occurred in 2 patients (6.6%) due to septic shock and respiratory infections.

Conclusion: The study highlights the predominance of postoperative adhesions and obstructed hernias in AIO. Early diagnosis, prompt surgical intervention, and close postoperative monitoring are crucial in improving patient outcomes and minimizing complications.

Keywords: Acute intestinal obstruction, postoperative adhesions, obstructed hernia, surgical management, mortality, complications, epidemiology

Introduction

Acute intestinal obstruction (AIO) is a critical surgical emergency characterized by the cessation of normal intestinal transit, leading to the accumulation of luminal contents, distension, and potential ischemic injury. This condition necessitates prompt diagnosis and intervention to mitigate morbidity and mortality^[1]. The incidence of AIO varies globally, influenced by demographic factors, healthcare infrastructure, and prevalent etiologies. In developed nations, adhesions resulting from prior abdominal surgeries are the predominant cause, accounting for 60% to 75% of cases. Conversely, in regions such as Ethiopia, volvulus and intussusception are more prevalent causes of small bowel obstruction, with small bowel volvulus being the most common etiology^[2].

The causes of AIO are diverse and can be broadly categorized into mechanical and functional obstructions. Mechanical obstructions include adhesions, hernias, neoplasms, volvulus, and intussusception. Adhesions, often sequelae of previous surgeries, are the leading cause in many developed countries. Hernias, both external and internal, can lead to strangulation and obstruction. Neoplasms, though less common, can obstruct the bowel lumen. Volvulus and intussusception are more prevalent in certain regions, such as Ethiopia, where small bowel volvulus is the most common cause of small bowel obstruction^[3].

Patients with AIO typically present with colicky abdominal pain, nausea, vomiting, abdominal distension, and cessation of flatus and bowel movements. Physical examination may reveal abdominal distension, tympanic note on percussion, and high-pitched bowel sounds. Laboratory evaluations should include a complete blood count, metabolic panel, and serum lactate level to assess for metabolic derangements^[4].

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Imaging studies are pivotal in diagnosing AIO. Abdominal radiography can reveal dilated loops of bowel and air-fluid levels. Computed tomography (CT) with intravenous or enteric contrast media is recommended in patients with suspected intestinal obstruction, as it can reliably determine the cause of obstruction and associated complications [5].

Management strategies for AIO are tailored based on the underlying etiology and the patient's clinical status. Initial management includes intravenous fluid resuscitation, correction of metabolic derangements, nasogastric decompression, and bowel rest. Surgical intervention is indicated for patients who clinically deteriorate or in whom non-operative management is ineffective after three to five days. Advancements in minimally invasive surgical techniques have made laparoscopy an accepted approach for initial exploration in most patients with uncomplicated or adhesive intestinal obstruction [6].

The prognosis of AIO depends on the promptness of diagnosis and intervention. Delayed treatment can lead to complications such as bowel ischemia, perforation, and peritonitis, which significantly increase morbidity and mortality. Early recognition and appropriate management are crucial in improving patient outcomes. This study aims to evaluate the clinico-etiological profile and outcomes of patients presenting with penetrative abdominal injuries.

Materials and Methodology: This prospective study was conducted over period of 1 year (from November 2017 to October 2018) at the Department of General Surgery, Sree Lakshmi Narayana Institute of Medical Sciences. A total of 30 adult patients diagnosed with acute intestinal obstruction (AIO) and treated surgically were included in the study. The inclusion criteria involved adult patients aged 18 years and above, while pediatric patients were excluded from the study. Patients with sub-acute intestinal obstruction treated conservatively were not included. Each patient's demographic details, medical history, and presenting symptoms, including abdominal pain, vomiting, and bloating, were recorded systematically. The history was collected in a chronological order, detailing the onset and progression of symptoms. A thorough physical examination was performed, focusing on detecting signs of abdominal distension, tenderness, guarding, and bowel sounds, which are crucial for diagnosing intestinal obstruction. Systemic examination was also carried out to assess the patient's overall health and

suitability for surgical intervention.

Laboratory investigations were carried out to assess the patient's hematological and metabolic status. Parameters such as hemoglobin levels, total and differential white blood cell counts, bleeding time, clotting time, and urinalysis were evaluated. An erect abdominal X-ray was performed for all patients, revealing signs such as dilated bowel loops and air-fluid levels indicative of intestinal obstruction. Ultrasound was also used in selected cases to gain further insight into abdominal pathology. Resuscitation with intravenous fluids, primarily Ringer's lactate and normal saline, was initiated immediately upon admission, followed by nasogastric decompression.

Surgical management was based on the specific etiology of the obstruction and operative findings. Procedures included adhesiolysis for cases involving adhesions, resection and anastomosis for gangrenous bowel, and release and repair for strangulated obstructions. Histopathological examination of resected tissues was performed when required to confirm the diagnosis.

Postoperative monitoring was conducted closely, with vital signs such as pulse, blood pressure, and respiratory rate being recorded at regular intervals. Postoperative complications, including infections or delayed recovery, were treated accordingly. Follow-up was conducted for up to six months after discharge, with most patients returning for one or two visits. The collected data were analyzed statistically using descriptive methods, with percentages and proportions calculated, and results presented in tables and graphs using Microsoft Word and Excel.

Results

The study revealed a male predominance (63.3%) among patients with acute intestinal obstruction (AIO), with 19 males and 11 females out of the 30 cases. The highest number of patients was observed in the <20 years (20%) and 21-30 years (23.3%) age groups, suggesting a relatively higher incidence of AIO among younger adults. This could be attributed to factors like hernias or trauma, which are common in these age ranges. In contrast, only 6.6% of the cases were in patients older than 60 years, indicating that AIO is less frequent in older adults in this cohort.

Table 1: Age and gender wise distribution of patients

Age (in years)	Total No. of patients	No. of males	No. of females
<20 years	6 (20%)	4	2
21-30 years	7 (23.3%)	4	3
31-40 years	4 (13%)	3	1
41-50 years	5 (17%)	3	2
51-60 years	6 (20%)	3	3
>60 years	2 (7%)	2	0
Total	30 (100%)	19 (63.3%)	11 (36.67%)

Regarding the etiology of AIO, postoperative adhesions were the most prevalent cause, accounting for 40% of cases. This is consistent with previous studies, as abdominal surgeries often lead to the formation of adhesions, causing intestinal obstruction. Obstructed hernias (27%) were the second most

common cause, highlighting the importance of early management of hernias to prevent obstruction. Malignancy (13%) and volvulus (10%) also contributed significantly, while intussusception and mesenteric ischemia were less common.

Table 2: Etiology of intestinal obstruction

Etiology	No. of patients
Postoperative adhesions	12 (40%)
Obstructed hernia	8 (27%)
Malignancy	4 (13%)
Volvulus	3 (10%)
Intussusception	2 (7%)
Mesenteric ischemia	1 (3%)
Total	30 (100%)

Abdominal pain was the most prevalent symptom, reported in 87% of the cases, followed by vomiting (73%), highlighting these as key indicators for diagnosing AIO. Abdominal distension (60%) and constipation (53%) were also commonly observed, pointing to the mechanical nature of the obstruction. Tachycardia, a significant sign of physiological stress, was noted in 80% of patients. Less frequent signs included tenderness

(27%), rigidity (23%), and visible peristalsis (50%), which were observed in a smaller proportion of cases but still important for clinical assessment. The high incidence of abdominal pain and vomiting, along with tachycardia, underscores the acute and often distressing nature of the condition, guiding clinicians in early diagnosis and intervention.

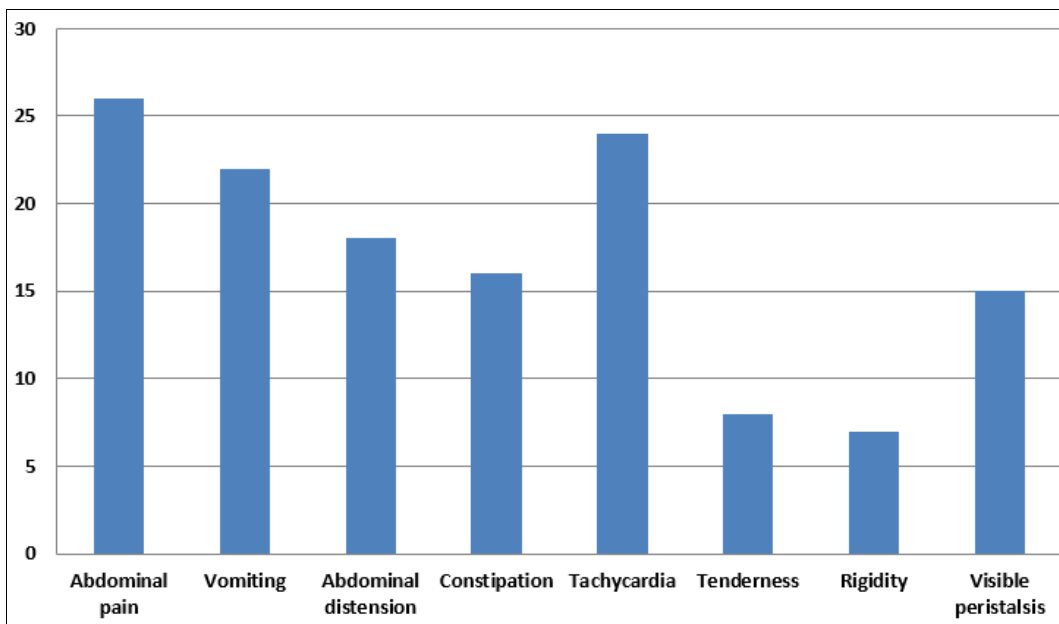


Fig 1: Clinical features

Surgical management was tailored to the underlying cause, with adhesion release (40%) being the most frequent procedure. This was followed by resection and anastomosis (20%), reflecting the severity of cases requiring bowel removal or re-establishment.

The variety of surgical interventions indicates the need for individualized approaches depending on the etiology of the obstruction.

Table 3: Management

Management Procedure	Number of Cases
Adhesion release (ROA)	12 (40%)
Resection and anastomosis	6 (20%)
Adhesion release with herniography	5 (17%)
Resection and ileostomy	3 (10%)
Reduction	2 (7%)
Other (e.g., Hartmann's procedure)	2 (7%)

Postoperative complications included septicemia (13.3%), wound infection (6.6%), and respiratory infections (10%).

Mortality occurred in 2 (6.6%) patients due to septic shock and respiratory infections.

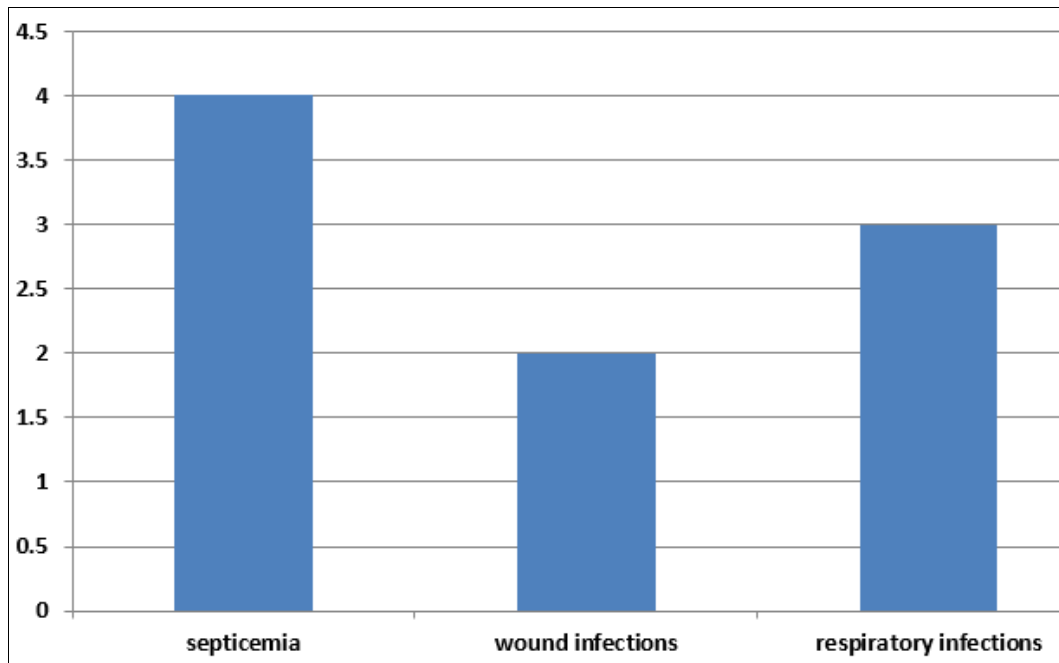


Fig 2: Post-operative complications

Discussion

This study provides important insights into the epidemiology, etiology, and management of acute intestinal obstruction (AIO) in adult patients. One of the most striking findings was the male predominance in AIO cases (63.3%), which aligns with previous studies by Gupta *et al.* [7] and Zhang *et al.* [8], where males were more frequently affected, possibly due to higher rates of hernias and trauma, conditions that are more common in men. This study also observed a higher incidence of AIO in younger adults, particularly in the <20 years and 21-30 years age groups, which is consistent with findings from Harris *et al.* [9] who identified hernias and trauma as common causes in younger adults. Interestingly, the incidence of AIO in patients older than 60 years was lower in this study (6.6%), whereas studies from Western populations, such as Zhang *et al.* [8], often report a higher incidence in the elderly, likely due to factors such as malignancy, volvulus, and ischemia. This difference may reflect regional variations in health conditions and surgical practices.

Regarding etiology, postoperative adhesions were identified as the leading cause of AIO (40%) in this study, which is consistent with findings by Gupta *et al.* [7] and Patel *et al.* [10] thus indicating that adhesions are significant contributor to bowel obstruction following previous surgeries. Adhesions are a well-known complication of abdominal surgeries, and their contribution to AIO reflects the ongoing need for improved surgical techniques and prevention strategies. Obstructed hernias were the second most common cause (27%), which is also in agreement with other studies by Smith *et al.* [11] and Kumar *et al.* [12], where hernias accounted for a substantial portion of AIO cases. The relatively lower incidence of malignancy (13%) and volvulus (10%) in the present study compared to studies conducted in Western countries may be attributed to differences in the age demographic and health factors in the study population. In contrast, studies in high-income countries often report a higher prevalence of malignancy and volvulus in older populations, possibly due to aging and delayed diagnosis.

Clinical presentation in this study, with abdominal pain (87%) and vomiting (73%) being the most common symptoms, supports findings from similar studies by Harris *et al.* [9] and Kumar *et al.* [12], where these symptoms were also the most

commonly observed. The high incidence of tachycardia (80%) further underscores the physiological stress that AIO places on the body, indicating the urgency of treatment and the need for rapid stabilization. Surgical management in this study, with adhesion release being the most common procedure (40%), is consistent with the findings of Patel *et al.* [10], who also found that adhesive obstructions often necessitate surgical intervention. The use of resection and anastomosis in 20% of cases reflects the severity of bowel gangrene or ischemia, which requires extensive surgical intervention.

Postoperative complications, including septicemia (13.3%), wound infection (6.6%), and respiratory infections (10%), were common in this cohort, which is consistent with the findings of Gupta *et al.* [7] and Zhang *et al.* [8], who reported similar complications in AIO patients. The mortality rate of 6.6% in this study, primarily due to septic shock and respiratory infections, highlights the critical nature of AIO and the potential for significant morbidity and mortality despite surgical intervention. This finding underscores the importance of early diagnosis, appropriate surgical intervention, and vigilant postoperative monitoring to reduce complications and improve patient outcomes.

The present study, while consistent with previous studies in many respects, also highlights the regional differences in AIO etiology and clinical outcomes. The lower incidence of AIO in the elderly and the significant role of postoperative adhesions in this cohort may be reflective of the regional healthcare infrastructure and the surgical history of the population under study. Further studies with larger sample sizes and broader geographic representation are necessary to confirm these findings and explore potential regional variations in the incidence, causes, and management of AIO.

Conclusion

In conclusion, this study underscores the significant incidence of acute intestinal obstruction (AIO) in younger adults, with a male predominance. Postoperative adhesions and obstructed hernias were identified as the leading causes, emphasizing the need for early diagnosis and intervention. Abdominal pain, vomiting, and tachycardia emerged as key clinical indicators for AIO. Surgical

management, primarily consisting of adhesion release, was effective in most cases. The findings highlight the importance of individualized treatment strategies and careful postoperative monitoring to minimize complications such as septicemia and respiratory infections.

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Conflicts of interest

None declared.

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