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Clinical profile, etiological spectrum, management patterns and outcomes of acute intestinal obstruction at a tertiary care centre: A prospective observational study

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Abstract
Background: Acute intestinal obstruction is a common surgical emergency associated with significant morbidity and mortality, particularly when diagnosis or treatment is delayed. This study evaluated the clinical profile, etiological pattern, management approach, and outcomes among patients with acute intestinal obstruction at a tertiary health centre.
Materials and Methods: This prospective observational study included 70 adult patients with clinically and radiologically confirmed acute intestinal obstruction over an 18-month period. Demographic details, presenting symptoms, clinical findings, laboratory and radiological investigations, etiology, site of obstruction, mode of management, intraoperative findings, postoperative complications, ICU stay, oral feeding initiation, and mortality were recorded and analyzed.
Results: Age 31–40 years 21 (30.00%) was most common; males predominated 46(65.71%). Vomiting 58 (82.86%) led, followed by abdominal distension 54 (77.14%) and obstipation 49 (70.00%). Previous abdominal surgery occurred in 42 (60.00%) patients. Adhesions/bands were the leading cause 24 (34.29%), followed by obstructed hernia 14 (20.00%) and malignancy 11 (15.71%). Small bowel 49 (70.00%) exceeded large bowel 21 (30.00%). Operative management 51 (72.86%); conservative management 19 (27.14%). Postoperative complications 21 (30.00%), most commonly surgical site infection 11 (15.71%). Mortality 3 (4.29%); delayed presentation was significantly associated with complications and mortality.
Conclusion: Acute intestinal obstruction commonly presented with vomiting, abdominal distension, and obstipation, with adhesions/bands being the leading etiology. Most patients required exploratory laparotomy. Early diagnosis, timely referral, adequate resuscitation, and prompt surgical intervention are essential to reduce complications and mortality.

Keywords: Acute intestinal obstruction, exploratory laparotomy, adhesions, bowel obstruction, postoperative complications

Introduction

Acute intestinal obstruction is one of the most frequent surgical emergencies encountered in general surgical practice and represents an important cause of acute abdomen requiring urgent evaluation. It occurs when the normal passage of intestinal contents is partially or completely interrupted due to mechanical or functional causes. Mechanical obstruction may involve the small bowel or large bowel and may progress rapidly from simple luminal obstruction to strangulation, bowel ischemia, gangrene, perforation, sepsis, and death if diagnosis or treatment is delayed [1, 2]. Therefore, acute intestinal obstruction continues to be associated with significant morbidity, prolonged hospitalization, operative burden, and mortality, especially in patients presenting late or with compromised bowel viability [2, 3].

The clinical presentation of intestinal obstruction is usually characterized by abdominal pain, vomiting, abdominal distension, constipation, and obstipation, although the pattern and severity of symptoms vary according to the level, duration, completeness, and cause of obstruction [2, 4]. Small bowel obstruction often presents with early vomiting and colicky abdominal pain, whereas large bowel obstruction commonly presents with marked abdominal distension and constipation. Clinical examination remains essential for identifying dehydration, tachycardia, abdominal tenderness, guarding, peritonitis, hernia, and features suggestive of strangulation or perforation [1, 4]. Early recognition of these warning signs is important because patients with bowel ischemia or peritonitis require prompt operative intervention.

The etiological spectrum of acute intestinal obstruction varies across regions and patient populations. Adhesions and bands are widely reported as the leading cause of small bowel obstruction, particularly among patients with a previous history of abdominal surgery [5, 6]. Other important causes include obstructed hernia, malignancy, volvulus, intussusception, and inflammatory or tubercular strictures [2, 3]. In developing countries, obstructed hernia and tuberculosis-related strictures continue to contribute significantly, whereas recent Indian tertiary-care data suggest an increasing burden of postoperative adhesive obstruction, reflecting changing surgical and demographic patterns [3]. Understanding the local etiological profile is important for planning timely diagnosis, operative preparedness, referral pathways, and preventive strategies.

Diagnosis of acute intestinal obstruction requires integration of clinical assessment with laboratory and radiological evaluation. Plain abdominal radiography is often used as an initial investigation to demonstrate dilated bowel loops and air-fluid levels, while ultrasonography may help identify free fluid, hernia, intussusception, or bowel dilatation in selected cases. Contrast-enhanced computed tomography has become a key imaging modality because it helps define the level, site, cause, and transition point, severity of obstruction, bowel wall changes, ischemia, closed-loop obstruction, perforation, and intra-abdominal collections [7, 8]. CT-based assessment is particularly useful in

differentiating patients who may respond to conservative treatment from those requiring urgent surgery.

Management depends on the cause, site, and completeness of obstruction, physiological status of the patient, and presence or absence of strangulation, ischemia, perforation, or peritonitis. Initial management includes nil per oral status, intravenous fluid resuscitation, correction of electrolyte imbalance, nasogastric decompression, urinary output monitoring, and antibiotics when indicated, and close serial clinical assessment [4, 6]. Conservative management may be appropriate in selected patients with partial adhesive obstruction without signs of ischemia or peritonitis; however, complete obstruction, failed conservative treatment, strangulation, gangrene, perforation, or generalized peritonitis requires operative management [6, 9]. Operative procedures vary according to intraoperative findings and may include adhesiolysis, hernia repair, detorsion of volvulus, reduction of intussusception, bowel resection with anastomosis, or stoma formation.

Despite advances in imaging, anesthesia, critical care, and surgical techniques, outcomes of acute intestinal obstruction remain strongly influenced by time to presentation, bowel viability, comorbid illness, sepsis, and delay in definitive treatment. Previous studies have shown that treatment delay, advanced age, comorbidity, nonviable strangulation, and need for bowel resection increase postoperative complications and mortality [10]. Hence, prospective evaluation of the clinical profile, etiological pattern, management approach, and outcomes of acute intestinal obstruction is necessary to identify local disease patterns and improve decision-making. The present study was therefore undertaken to assess the clinical profile, etiological spectrum, management patterns, and outcomes of acute intestinal obstruction at a tertiary care centre.

Materials and Methods Study Design and Setting

This hospital-based prospective observational study evaluated the clinical profile, etiology, management, and outcomes of patients presenting with acute intestinal obstruction at a tertiary health centre. It was conducted in the Department of General Surgery of a medical college and tertiary care hospital with emergency surgical, radiological, operative, postoperative, and intensive care support.

Study Duration

The study was conducted over a period of 18 months. All eligible patients presenting during the study period were screened and enrolled consecutively after applying the predefined inclusion and exclusion criteria. Patients were followed during hospitalization until discharge, referral, discharge against medical advice, or death.

Study Population

The study population included adult patients admitted with clinical and radiological features suggestive of acute intestinal obstruction. Patients were evaluated by clinical examination, laboratory investigations, imaging, and, where applicable, intraoperative findings. Both conservatively managed and surgically managed patients were included to assess the complete clinical profile and outcomes of acute intestinal obstruction.

Sample Size and Sampling Technique

The sample size determination was based on an estimated 9% prevalence of acute intestinal obstruction necessitating surgical intervention, with a 95% confidence level and a 7% margin of error. Taking into account potential dropouts and incomplete data, the sample size was adjusted to 70 patients. A consecutive sampling method was employed, enrolling all patients who met the selection criteria until the target sample size was reached.

Eligibility Criteria Inclusion Criteria

Patients were included if they m*et a*l of the following criteria:

1. Adult patients aged 18 years and above.
2. Patients clinically diagnosed with acute intestinal obstruction.
3. Patients with radiological confirmation of acute intestinal obstruction.

Exclusion Criteria

Patients were excluded if they met any of the following criteria:

1. Patients unwilling to participate in the study.
2. Patients with terminal illness not suitable for surgical intervention.
3. Patients with advanced malignancy in whom surgical management was not feasible.

Patient Enrollment and Ethical Considerations

All patients presenting to the Department of General Surgery with suspected acute intestinal obstruction were screened for eligibility. The purpose and nature of the study were explained to the patients or their legally authorized representatives. Written informed consent was obtained before enrollment. The study was conducted after approval from the Institutional Ethics Committee. Confidentiality of patient identity, clinical records, and collected data was maintained throughout the study period.

Clinical Assessment

For every patient who participated, a comprehensive clinical history was gathered, covering initial symptoms like abdominal pain, vomiting, abdominal swelling, constipation, obstipation, fever, and the length of time these symptoms had been present. Information regarding any past abdominal surgeries, hernias, tuberculosis, cancer, injuries, and related health conditions was also collected. Demographic information such as age, gender, occupation, place of residence, and socioeconomic status was systematically recorded in a structured study form.

A complete general and systemic examination was performed. Vital parameters including pulse rate, blood pressure, respiratory rate, temperature, and oxygen saturation were recorded. General examination included assessment for dehydration, pallor, icterus, cyanosis, pedal edema, and shock. Abdominal examination included evaluation for distension, tenderness, guarding, rigidity, visible peristalsis, abdominal mass, bowel sounds, and signs of peritonitis. Hernial orifices were examined routinely, and per rectal examination was performed in all patients.

Initial Resuscitation and Supportive Management

All patients received standard initial management after admission. Intravenous crystalloid fluids, mainly Ringer's lactate and normal saline, were administered to correct dehydration, maintain intravascular volume, and restore electrolyte balance. Nasogastric decompression was

performed using a Ryle's tube. Urinary catheterization was done whenever required for monitoring urine output. Patients were kept nil by mouth during the acute phase. Electrolyte abnormalities were corrected based on laboratory findings. Broad-spectrum intravenous antibiotics were administered, particularly in patients with suspected strangulation, bowel ischemia, perforation, or sepsis. Continuous monitoring of vital parameters, abdominal signs, urine output, and nasogastric aspirate was performed.

Diagnostic Evaluation

All patients underwent relevant laboratory and radiological investigations. Laboratory evaluation included complete blood count, blood grouping and cross-matching, renal function tests, serum electrolytes, blood glucose, liver function tests, coagulation profile, and urine examination. Plain erect abdominal radiography was performed to identify multiple air-fluid levels, dilated bowel loops, and absence of distal bowel gas. Ultrasonography of the abdomen was performed in selected cases to assess bowel dilatation, free fluid, abdominal mass, obstructed hernia, or intussusception. Contrast-enhanced computed tomography of the abdomen was performed in hemodynamically stable patients when required to identify the site, level, cause, severity, transition point, bowel wall changes, ischemia, perforation, volvulus, adhesions, intussusception, or intra-abdominal collections.

Management Protocol Conservative Management

Patients with partial intestinal obstruction and no clinical or radiological evidence of strangulation, perforation, generalized peritonitis, or bowel ischemia were managed conservatively. Conservative management included nil per oral status, nasogastric decompression, intravenous fluid therapy, electrolyte correction, antibiotics, and close clinical monitoring. Improvement was assessed by reduction in abdominal pain and distension, return of bowel sounds, passage of flatus or stool, and decrease in nasogastric aspirate.

Operative Management

Patients with complete obstruction, failed conservative management, suspected strangulation, bowel ischemia, perforation, or generalized peritonitis underwent operative management after adequate resuscitation and optimization. Exploratory laparotomy was performed using standard surgical techniques. The operative procedure was selected according to the intraoperative findings and included adhesiolysis, reduction of intussusception, hernia repair, detorsion of volvulus, bowel resection with anastomosis, or stoma formation.

Intraoperative Assessment

In surgically managed patients, intraoperative findings were recorded systematically. The site and cause of obstruction, bowel viability, presence of adhesions or bands, volvulus, intussusception, obstructed hernia, malignancy, bowel ischemia, gangrene, perforation, contamination, and need for resection or stoma were documented. Bowel condition was categorized as viable, dusky or ischemic, and gangrenous.

Histopathological Examination

Resected bowel specimens, suspicious lesions, or biopsies obtained during surgery were sent for histopathological examination whenever indicated. Specimens were preserved in formalin and submitted to the Department of Pathology. Histopathology was used to confirm etiologies such as malignancy, tuberculosis, ischemic pathology, inflammatory lesions, or other bowel pathology.

Postoperative Care and Follow-up

After surgery, patients were shifted either to the surgical ward or intensive care unit depending on their clinical condition, severity of illness, extent of surgery, and presence of sepsis or toxaemia. Postoperative care included monitoring of vital parameters, urine output, abdominal signs, nasogastric aspirate, fluid balance, electrolyte status, analgesia, antibiotics, nutritional support, and respiratory care. Ryle's tube aspiration was continued until bowel function returned. Oral feeding was gradually initiated after return of bowel sounds and tolerance of enteral intake. Patients were monitored for postoperative complications such as surgical site infection, wound dehiscence, anastomotic leak, sepsis, respiratory complications, paralytic ileus, prolonged ICU stay, and mortality.

Study Variables

The study categorized its variables into five groups: demographic, clinical, radiological, operative, and outcome variables. Demographic variables encompassed age, gender, job, and socioeconomic status. Clinical variables covered symptoms at presentation, symptom duration, medical history, existing health conditions, vital signs, abdominal examination results, and rectal examination findings. Radiological variables consisted of results from abdominal X-rays, ultrasonography, and contrast-enhanced CT scans. Operative variables involved the obstruction's cause and location, bowel condition, and the type of surgery conducted. Outcome variables included management approach, ICU duration, the day oral feeding began, postoperative complications, discharge status, and mortality rate.

Outcome Measures

The primary outcome measure was the proportion of patients requiring exploratory laparotomy among patients with acute intestinal obstruction. Secondary outcome measures included clinical presentation, diagnostic findings, etiology and site of obstruction, intraoperative bowel condition, postoperative complications, ICU stay, and timing of oral feeding initiation, discharge status, and mortality.

Data Collection

Data were collected prospectively using a predesigned structured proforma. Information was obtained from patient history, bedside clinical assessment, physical examination, laboratory reports, radiological reports, operative notes, histopathology reports, postoperative progress records, and discharge records. Data were checked regularly for completeness, accuracy, and internal consistency before statistical analysis.

Statistical Analysis

Data were compiled into a comprehensive chart and examined with SPSS version 25.0 alongside Microsoft Excel. For continuous variables like age, symptom duration, ICU stay, the day oral feeding began, and hospital stay, the

mean and standard deviation were used to express them. Categorical variables, including sex, symptoms, radiological findings, etiology, management approach, bowel condition, complications, and mortality, were represented by frequency and percentage. The Chi-square test or Fisher's exact test, depending on suitability, was employed to analyze associations between categorical variables. The independent t-test was utilized to compare continuous variables between two groups. A p-value below 0.05 was deemed statistically significant.

Results

The present study included 70 patients diagnosed with acute intestinal obstruction. The results were analyzed according to demographic profile, clinical presentation, diagnostic findings, management pattern, etiological spectrum, operative findings, postoperative outcomes, and factors associated with operative intervention and mortality.

Baseline demographic and clinical profile

The majority of patients belonged to the 31–40 years age group 21 (30.00%), followed by patients aged >60 years 18 (25.72%). Male predominance was observed, with 46 males (65.71%) and 24 females (34.29%). Service occupation was the most common occupational group 26 (37.14%). Most patients belonged to lower socioeconomic status 26 (37.14%) or upper-lower socioeconomic status 24 (34.29%). A history of previous abdominal surgery was present in 42 (60.00%) patients, while hernia was documented in 13 (18.57%) patients. The mean duration of symptoms was 3.07 ± 1.47 days (Table 1).

Table 1: Baseline demographic and clinical profile of patients with acute intestinal obstruction (n = 70)

Variable	Category	Frequency	Percentage (%)
Age group	18–30 years	7	10.00
	31–40 years	21	30.00
	41–50 years	12	17.14
	51–60 years	12	17.14
	>60 years	18	25.72
Gender	Male	46	65.71
	Female	24	34.29
Occupation	Service	26	37.14
	Housewife	16	22.86
	Farmer	16	22.86
	Laborer	12	17.14
Socioeconomic status	Lower	26	37.14
	Upper lower	24	34.29
	Lower middle	20	28.57
Past history	Previous abdominal surgery	42	60.00
	Hernia	13	18.57
	No significant history	**15**	**21.43**
Duration of symptoms	Mean ± SD, days	3.07 ± 1.47	—

Clinical presentation and examination findings

Vomiting was the most common presenting symptom, observed in 58 (82.86%) patients, followed by abdominal distension in 54 (77.14%) and obstipation in 49 (70.00%). Fever was present in 18 (25.71%) patients. Colicky abdominal pain was the most frequent pain pattern 48 (68.57%). On examination, 41 (58.57%) patients had stable vital parameters, while tachycardia was present in 21 (30.00%) and hypotension in 8 (11.43%). Distension with tenderness was the commonest abdominal finding 39 (55.71%), and an empty rectum was the most common per-rectal finding 52 (74.29%) (Table 2).

Table 2: Clinical presentation and examination findings (n = 70)

Variable	Category	Frequency	Percentage (%)
Vomiting	Present	58	82.86
	Absent	12	17.14
Abdominal distension	Present	54	77.14
	Absent	16	22.86
Obstipation	Present	49	70.00
	Absent	21	30.00
Fever	Present	18	25.71
	Absent	52	74.29
Nature of abdominal pain	Colicky pain	48	68.57
	Diffuse pain	14	20.00
	Localized pain	8	11.43
Vital findings	Stable	41	58.57
	Tachycardia	21	30.00
	Hypotension	8	11.43
Per-abdominal findings	Distension with tenderness	39	55.71
	Distension only	18	25.71
	Guarding/rigidity	13	18.58

Per-rectal findings	Empty rectum	52	74.29
	Ballooning	11	15.71
	Fecal staining	7	10.00

Laboratory and radiological findings

Leukocytosis was observed in 44 (62.86%) patients. On ultrasonography, dilated bowel loops were the commonest finding 39 (55.71%), followed by multiple air-fluid levels 18 (25.71%). On CECT abdomen, small bowel obstruction was identified in 36 (51.43%) patients, large bowel obstruction in 14 (20.00%), adhesions/bands in 12 (17.14%), and strangulation/ischemia in 8 (11.43%). Radiological findings showed a statistically significant association with final diagnosis or intraoperative findings for both USG ($\chi^2 = 12.64$, $p = 0.013$) and CECT ($\chi^2 = 18.92$, $p = 0.001$) (Table 3).

Table 3: Laboratory and radiological findings with diagnostic correlation (n = 70)

Variable	Category / finding	Frequency	Percentage (%)	Statistical finding
Laboratory findings	Leukocytosis	44	62.86	—
	Normal findings	26	37.14	—
USG findings	Dilated bowel loops	39	55.71	$\chi^2 = 12.64$, p = 0.013*
	Multiple air-fluid levels	18	25.71	
	Obstructed hernia	7	10.00	
	Intussusception	6	8.58	
CECT findings	Small bowel obstruction	36	51.43	$\chi^2 = 18.92$, p = 0.001*
	Large bowel obstruction	14	20.00	
	Adhesions/bands	12	17.14	
	Strangulation/ischemia	8	11.43	

*Statistically significant at $p < 0.05$.

Management pattern, etiology, site, bowel condition, and outcomes

Operative management was required in 51 (72.86%) patients, while 19 (27.14%) were managed conservatively. The 95% confidence interval for exploratory laparotomy requirement was 61.18%–82.09%. Adhesions/bands were the most common cause of obstruction 24 (34.29%), followed by obstructed hernia 14 (20.00%) and malignancy 11 (15.71%). Small bowel obstruction was more common 49 (70.00%) Than large bowel obstruction 21 (30.00%). Viable bowel was recorded in 46 (65.71%) patients, while dusky bowel and gangrenous bowel were observed in 15 (21.43%) and 9 (12.86%) patients, respectively. The mean ICU stay was 2.14 ± 1.36 days, and the mean oral feeding initiation day was 3.82 ± 1.21 days. Overall, 49 (70.00%) patients had no complications, surgical site infection occurred in 11 (15.71%), sepsis in 6 (8.57%), and respiratory complications in 4 (5.72%). Mortality was observed in 3 (4.29%) patients (Table 4).

Table 4: Management pattern, etiology, site, bowel condition, and clinical outcomes (n = 70)

Variable	Category	Frequency	Percentage (%)
Mode of management	Conservative management	19	27.14
	Operative management / exploratory laparotomy	51	72.86
Cause of obstruction	Adhesions/bands	24	34.29
	Obstructed hernia	14	20.00
	Malignancy	11	15.71
	Volvulus	8	11.43
	Intussusception	7	10.00
	Tubercular stricture	6	8.57
Site of obstruction	Small bowel	49	70.00
	Large bowel	21	30.00
Bowel condition	Viable bowel	46	65.71
	Dusky/ischemic bowel	15	21.43
	Gangrenous bowel	9	12.86
ICU stay	Mean ± SD, days	2.14 ± 1.36	—
Oral feeding initiation	Mean ± SD, days	3.82 ± 1.21	—
Complications	None	49	70.00
	Surgical site infection	11	15.71
	Sepsis	6	8.57
	Respiratory complications	4	5.72
Discharge status	Discharged	64	91.43
	DAMA/referral	3	4.29
	Death	3	4.29
Mortality	Yes	3	4.29
	No	67	95.71

Factors associated with operative management

Vomiting, abdominal distension, and obstipation were significantly associated with operative management. Vomiting was present in 47 (92.16%) patients in the operative group compared with 11 (57.89%) in the conservative group (p = 0.001). Abdominal distension was present in 44 (86.27%) operated patients compared with 10 (52.63%) conservatively managed patients (p = 0.003). Obstipation was observed in 40 (78.43%) patients requiring surgery compared with 9 (47.37%) managed conservatively (p = 0.012). Fever was not significantly associated with operative management (p = 0.247). The duration of symptoms was significantly higher in the operative group 3.43 ± 1.42 days compared with the conservative group 2.11 ± 0.94 days (p < 0.001). Small bowel obstruction was also significantly associated with operative intervention (p = 0.045) (Table 5).

Table 5: Factors associated with operative management (n = 70)

Variable	Category	Conservative management n (%)	Operative management n (%)	Test value	p-value
Vomiting	Present	11 (57.89)	47 (92.16)	χ^2 = 11.42	0.001*
	Absent	8 (42.11)	4 (7.84)		
Abdominal distension	Present	10 (52.63)	44 (86.27)	χ^2 = 8.97	0.003*
	Absent	9 (47.37)	7 (13.73)		
Obstipation	Present	9 (47.37)	40 (78.43)	χ^2 = 6.28	0.012*
	Absent	10 (52.63)	11 (21.57)		
Fever	Present	3 (15.79)	15 (29.41)	χ^2 = 1.34	0.247
	Absent	16 (84.21)	36 (70.59)		
Duration of symptoms	Mean ± SD, days	2.11 ± 0.94	3.43 ± 1.42	t = 4.86	<0.001*
Site of obstruction	Small bowel	10 (52.63)	39 (76.47)	χ^2 = 4.01	0.045*
	Large bowel	9 (47.37)	12 (23.53)		

*Statistically significant at p < 0.05.

Factors associated with complications, mortality, ICU stay, and recovery

Etiology of obstruction was significantly associated with bowel condition (χ^2 = 18.76, p = 0.004). Volvulus and obstructed hernia showed comparatively higher proportions of ischemic or gangrenous bowel changes. Mode of management was significantly associated with postoperative complications (χ^2 = 9.84, p = 0.020), with complications more frequent among surgically managed patients. Surgical site infection occurred only in the operative group 11 (21.57%). Mortality was significantly associated with etiology of obstruction (Fisher exact test = 10.27, p = 0.041), with deaths occurring in obstructed hernia, malignancy, and volvulus groups. ICU stay and oral feeding initiation were significantly prolonged in the operative group compared with the conservative group (p < 0.001 for both). Delayed presentation was significantly associated with complications and mortality; patients with complications had a longer mean symptom duration 4.24 ± 1.31 days compared with those without complications

2.57 ± 1.02 days, and patients who expired had a longer mean symptom duration 5.67 ± 1.15 days compared with sur*vivo*rs 2.95 ± 1.29 days (Table 6).

Table 6: Factors associated with bowel condition, complications, mortality, and recovery outcomes

Analysis	Key findings	Test value	p-value
Etiology of obstruction vs bowel condition	Adhesions/bands were mostly associated with viable bowel 20/24 (83.33%); volvulus showed higher ischemic/gangrenous changes	χ^2 = 18.76	0.004*
Mode of management vs complications	Complications were more common after operative management; SSI occurred in 11 (21.57%) operated patients	χ^2 = 9.84	0.020*
Etiology vs mortality	Mortality occurred in obstructed hernia 1 (7.14%), malignancy 1 (9.09%), and volvulus 1 (12.50%)	Fisher exact = 10.27	0.041*
ICU stay by management	Conservative: 1.11 ± 0.46 days; operative: 2.53 ± 1.38 days	t = 5.27	<0.001*
Oral feeding initiation by management	Conservative: 2.47 ± 0.61 days; operative: 4.33 ± 1.02 days	t = 8.14	<0.001*
Delay in presentation vs complications	Complications present: 4.24 ± 1.31 days; absent: 2.57 ± 1.02 days	t = 4.62	<0.001*
Delay in presentation vs mortality	Mortality present: 5.67 ± 1.15 days; absent: 2.95 ± 1.29 days	t = 3.41	0.001*

*Statistically significant at p < 0.05.

Discussion

Acute intestinal obstruction remains a major surgical emergency because deterioration can occur rapidly if strangulation, ischemia, or perforation is not recognized early. In the present study of 70 patients, the most affected age group was 31–40 years 21 (30.00%), and males predominated 46 (65.71%), consistent with published series where men form a larger proportion of admitted patients [1, 3].The younger age distribution may reflect local demographics, occupational exposure, delayed health-seeking behavior, and postoperative adhesive obstruction and obstructed hernia. The classical symptom complex of vomiting, abdominal distension, abdominal pain, and obstipation was frequently observed [2, 4].Vomiting was the most common symptom 58 (82.86%), followed by abdominal distension 54 (77.14%) and obstipation 49 (70.00%), supporting careful clinical assessment in early diagnosis. Previous abdominal surgery was documented in

42 (60.00%) patients, and adhesions/bands were the leading etiology 24 (34.29%). Comparable findings were reported by Jena *et al*., where adhesions were the commonest cause of obstruction 273 (36.70%) and increased over time [3].Miller *et al*. also reported adhesions as the dominant cause of small bowel obstruction, accounting for 74.00% of cases in their series [5].The WSES Bologna guidelines emphasize that postoperative adhesions are a leading cause of small bowel obstruction related to previous abdominal surgery [6].Obstructed hernia 14 (20.00%) and malignancy 11 (15.71%) were the next most common causes, consistent with Markogiannakis *et al*., who reported incarcerated hernias and large bowel cancer [2].Their persistence suggests delayed presentation, lack of early elective hernia repair, and limited awareness of warning symptoms.

Small bowel obstruction was more common 49 (70.00%) than large bowel obstruction 21 (30.00%) in the present study, consistent with Markogiannakis *et al*., who reported rates of 76.00% and 24.00%, respectively [2].This higher proportion likely reflects the predominance of adhesions, bands, obstructed hernia, and intussusception. Radiological evaluation was important in confirming diagnosis and guiding management. USG and CECT findings correlated significantly with final diagnosis or intraoperative findings, with CECT showing a stronger association ($\chi^2 = 18.92$, $p = 0.001$). Li *et al*. reported considerable CT accuracy in diagnosing small bowel obstruction, ischemia, etiology, transition point, and need for surgery [11].These findings reinforce using CT whenever feasible, especially in stable patients with suspected complete obstruction, strangulation, ischemia, volvulus, malignancy, or uncertain diagnosis. Operative management was required in 51 (72.86%) patients, while 19 (27.14%) were managed conservatively. This high operative rate may reflect complete obstruction, obstructed hernia, volvulus, malignancy, gangrenous bowel, and delayed presentation. In contrast, guidelines suggest many uncomplicated adhesive small bowel obstructions can initially be managed non-operatively without peritonitis, strangulation, or ischemia [6, 9].However, vomiting, abdominal distension, and obstipation were significantly associated with operative management. Symptom duration was higher in the operative group than the conservative group (3.43 ± 1.42 vs 2.11 ± 0.94 days; $p < 0.001$). Zielinski *et al*. reported similar predictors for operative intervention [12].Thus, delayed presentation and signs of complete or complicated obstruction should prompt early surgery.

Postoperative complications occurred in 21 (30.00%) patients, most commonly surgical site infection 11 (15.71%), followed by sepsis 6 (8.57%) and respiratory complications 4 (5.72%). Mortality was 3 (4.29%). These findings align with literature showing that outcomes in intestinal obstruction are influenced by delayed presentation, strangulation, gangrene, comorbidity, sepsis, and bowel resection [2, 12]. Fevang *et al*. reported old age, comorbidity, nonviable strangulation, treatment delay, and repeat surgery as factors associated with death and complications after small bowel obstruction surgery [10].In this study, delayed presentation was associated with complications and mortality; patients with complications and those who expired had longer symptom duration, confirming that time to presentation and timely intervention determine outcome. The association between etiology and bowel condition was significant ($\chi^2 = 18.76$, $p = 0.004$), with volvulus and obstructed hernia showing more ischemic or gangrenous bowel. This matters because closed-loop obstruction, strangulation, and vascular compromise can rapidly progress to gangrene and sepsis. Millet *et al*. showed that CT features including reduced bowel wall enhancement, closed-loop mechanism, and diffuse mesenteric haziness help predict strangulation in adhesive small bowel obstruction [13].Mortality occurred in patients with obstructed hernia, malignancy, and volvulus, and malignant bowel obstruction requires careful management because emergency surgery carries higher morbidity.

The study confirms that acute intestinal obstruction is a heterogeneous emergency requiring rapid assessment, resuscitation, imaging, and surgical judgment. Strengths include its prospective design, inclusion of conservative and operative cases, and assessment of clinical, radiological, operative, and outcome variables. However, it was conducted at a tertiary care centre with a sample of 70 patients, and long-term outcomes were not assessed. Despite this, adhesions/bands remain the leading cause, most patients require operative intervention, and delayed presentation increases morbidity and mortality. Early referral, imaging, resuscitation, recognition of strangulation, and operative intervention are essential to improve outcomes.

Conclusion

Acute intestinal obstruction remains an emergency with morbidity risk, especially in patients presenting late. Vomiting, abdominal distension, obstipation, and abdominal pain were the features, and adhesions/bands were the commonest cause, followed by hernia and malignancy. Small bowel obstruction was commoner than large bowel obstruction, and most patients required exploratory laparotomy. Delayed presentation was associated with intervention, postoperative complications, prolonged ICU stay, delayed feeding, and mortality. Early suspicion, prompt evaluation, resuscitation, timely surgery, and monitoring are essential.

References

1. Catena F, De Simone B, Coccolini F, Di Saverio S, Sartelli M, Ansaloni L. Bowel obstruction: a narrative review for all physicians. World J Emerg Surg,2019:14:20. https://doi.org/10.1186/s13017-019-0240-7.
2. Markogiannakis H, Messaris E, Dardamanis D, Pararas N, Tzertzemelis D, Giannopoulos P, et al. Acute mechanical bowel obstruction: clinical presentation, etiology, management and outcome. World J Gastroenterol,2007:13:432–7. https://doi.org/10.3748/wjg.v13.i3.432.
3. Jena SS, Obili RCR, Das SAP, Ray S, Yadav A, Mehta NN, et al. Intestinal obstruction in a tertiary care centre in India: Are the differences with the western experience becoming less? Ann Med Surg (Lond),2021:72:103125. https://doi.org/10.1016/j.amsu.2021.103125.
4. Jackson P, Vigiola Cruz M. Intestinal Obstruction: Evaluation and Management. Am Fam Physician,2018:98:362–7.
5. Miller G, Boman J, Shrier I, Gordon PH. Etiology of small bowel obstruction. Am J Surg,2000:180:33–6. https://doi.org/10.1016/s0002-9610(00)00407-4.

6. Ten Broek RPG, Krielen P, Di Saverio S, Coccolini F, Biffl WL, Ansaloni L, et al. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2017 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. World J Emerg Surg,2018:13:24. https://doi.org/10.1186/s13017-018-0185-2.
7. Expert Panel on Gastrointestinal Imaging, Chang KJ, Marin D, Kim DH, Fowler KJ, Camacho MA, et al. ACR Appropriateness Criteria® Suspected Small-Bowel Obstruction. J Am Coll Radiol,2020:17:S305–14. https://doi.org/10.1016/j.jacr.2020.01.025.
8. Mallo RD, Salem L, Lalani T, Flum DR. Computed tomography diagnosis of ischemia and complete obstruction in small bowel obstruction: a systematic review. J Gastrointest Surg,2005:9:690–4. https://doi.org/10.1016/j.gassur.2004.10.006.
9. Maung AA, Johnson DC, Piper GL, Barbosa RR, Rowell SE, Bokhari F, et al. Evaluation and management of small-bowel obstruction: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg,2012:73:S362-369. https://doi.org/10.1097/TA.0b013e31827019de.
10. Fevang BT, Fevang J, Stangeland L, Soreide O, Svanes K, Viste A. Complications and death after surgical treatment of small bowel obstruction: A 35-year institutional experience. Ann Surg,2000:231:529–37. https://doi.org/10.1097/00000658-200004000-00012.
11. Li Z, Zhang L, Liu X, Yuan F, Song B. Diagnostic utility of CT for small bowel obstruction: Systematic review and meta-analysis. PLOS ONE,2019:14:e0226740. https://doi.org/10.1371/journal.pone.0226740.
12. Zielinski MD, Eiken PW, Bannon MP, Heller SF, Lohse CM, Huebner M, et al. Small bowel obstruction-who needs an operation? A multivariate prediction model. World J Surg,2010:34:910–9. https://doi.org/10.1007/s00268-010-0479-3.
13. Millet I, Boutot D, Faget C, Pages-Bouic E, Molinari N, Zins M, et al. Assessment of Strangulation in Adhesive Small Bowel Obstruction on the Basis of Combined CT Findings: Implications for Clinical Care. Radiology,2017:285:798–808. https://doi.org/10.1148/radiol.2017162352.