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Evaluation of Etiology, Clinical Presentation and Management of Intestinal Obstruction

Dr. U. Ramakrishna
Department of General Surgery, Mamata Medical College, Khammam, India

Abstract
Intestinal obstruction is a common surgical emergency and a significant cause of acute abdomen. Delay in diagnosis and management may result in bowel ischemia, perforation, sepsis, and increased mortality. The etiology and clinical presentation vary across populations, necessitating institution-based evaluation. Aim of the study was to evaluate the etiology, clinical presentation, radiological findings, management, and outcomes of patients presenting with intestinal obstruction. This prospective observational study was conducted in the Department of General Surgery, Mamata Medical College and General Hospital, Khammam. Fifty adult patients diagnosed with intestinal obstruction were included. Detailed clinical evaluation, laboratory investigations, and radiological assessment were performed. Patients were managed conservatively or surgically based on clinical and radiological criteria. Intraoperative findings, postoperative complications, duration of hospital stay, and mortality were recorded and analyzed using descriptive statistics. The mean age of patients was 48.6 ± 14.2 years, with male predominance (male:female ratio 1.8:1). Abdominal pain (92%) was the most common presenting symptom, followed by vomiting (76%) and abdominal distension (70%). Postoperative adhesions (36%) were the leading cause of obstruction, and small bowel obstruction constituted 68% of cases. Radiological evaluation commonly showed dilated bowel loops and multiple air-fluid levels. Conservative management was successful in 38% of patients, while 62% required surgical intervention. Surgical site infection was the most frequent postoperative complication. The mean hospital stay was 8.6 ± 3.9 days, and mortality was 6%. Postoperative adhesions remain the most common cause of intestinal obstruction. Early diagnosis, timely imaging, and appropriate surgical intervention are crucial in reducing morbidity and mortality.

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Key Words
Intestinal obstruction, adhesions, small bowel obstruction, acute abdomen, surgical management

Corresponding Author
Dr. U. Ramakrishna,
Department of General Surgery, Mamata Medical College, Khammam, India

Author Designation
Assistant Professor

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INTRODUCTION

Intestinal obstruction is one of the most frequently encountered surgical emergencies and constitutes a significant cause of acute abdomen requiring prompt diagnosis and management. It is defined as a partial or complete interruption in the normal propulsion of intestinal contents and may result from mechanical obstruction or functional impairment of bowel motility. If not recognized and treated early, intestinal obstruction can lead to serious complications such as bowel ischemia, perforation, septicemia, and death[1]. The clinical importance of intestinal obstruction lies not only in its high incidence but also in the variability of its etiology, presentation, and outcomes across different populations.

The etiological spectrum of intestinal obstruction varies with age, geographical location, and prior surgical history. Adhesions following abdominal surgery are the most common cause of small bowel obstruction, while hernias, neoplasms, volvulus, and strictures also contribute significantly. Large bowel obstruction is most commonly caused by colorectal malignancy, volvulus, and diverticular disease[2]. The presenting symptoms typically include colicky abdominal pain, vomiting, abdominal distension, and constipation or obstipation, though the severity and pattern depend on the level and duration of obstruction[3].

Early diagnosis is essential to differentiate simple obstruction from strangulating obstruction, as the latter requires urgent surgical intervention. Imaging, particularly computed tomography, has been shown to improve diagnostic accuracy by identifying the level, cause, and complications of obstruction, thereby guiding management decisions[4,5]. Management strategies include initial resuscitation and conservative treatment in selected cases, while timely surgical intervention remains the definitive treatment in patients with complete obstruction, strangulation, or failed conservative management[6,7].

Despite advances in diagnostic modalities and treatment protocols, intestinal obstruction continues to be associated with significant morbidity and recurrence. The relative frequency of etiological factors, clinical presentation, and outcomes may vary between institutions, highlighting the need for local studies to evaluate patterns of disease and effectiveness of management strategies. The aim of this study is to evaluate the etiology, clinical presentation, and management outcomes of patients presenting with intestinal obstruction, with emphasis on identifying common causes, presenting features, treatment modalities employed, and associated morbidity and mortality.

MATERIALS AND METHODS

Study Design and Setting: This was a prospective observational study conducted in the Department of General Surgery, Mamata Medical College and General Hospital, Khammam. The study included patients admitted with a clinical diagnosis of intestinal obstruction and managed either conservatively or surgically during the study duration.

Sample Size: A total of 50 patients diagnosed with intestinal obstruction and fulfilling the inclusion criteria were enrolled in the study. The sample size was determined based on feasibility, admission rates, and the study period.

Study Population: All adult patients presenting to the emergency department or surgical wards with features suggestive of intestinal obstruction and subsequently confirmed by clinical evaluation and radiological investigations were included after obtaining informed consent.

Methodology: On admission, a detailed history was obtained and thorough clinical examination was performed for all patients. Relevant laboratory investigations and radiological imaging were carried out to confirm the diagnosis and identify the level and cause of obstruction. Patients were initially managed with standard resuscitative measures. Based on clinical condition, radiological findings, and response to conservative treatment, patients were either continued on non-operative management or taken up for surgical intervention. Intraoperative findings and postoperative outcomes were documented and analyzed.

Inclusion Criteria:

- Patients aged 18 years and above
- Patients presenting with clinical features of intestinal obstruction
- Radiologically confirmed cases of intestinal obstruction
- Patients willing to participate and provide informed consent

Exclusion Criteria:

- Patients below 18 years of age
- Patients with paralytic ileus or pseudo-obstruction
- Patients with subacute or chronic constipation without evidence of obstruction
- Pregnant women
- Patients unwilling to give consent

Study Tools:

- Structured proforma for data recording
- Clinical examination findings

- Laboratory investigations (hemoglobin, total leukocyte count, electrolytes)
- Radiological investigations (plain X-ray abdomen, ultrasonography, CT abdomen where indicated)
- Operative notes and postoperative records

Data Collection:
- Demographic data (age, sex)
- Presenting symptoms and duration
- Physical examination findings
- Etiology and level of obstruction
- Radiological findings
- Type of management (conservative or surgical)
- Intraoperative findings (for operated cases)
- Postoperative complications
- Duration of hospital stay
- Mortality, if any

Statistical Analysis: Data collected were entered into a master chart and analyzed using appropriate statistical methods. Descriptive statistics such as percentages and proportions were used to summarize categorical variables, and results were presented in tables and charts where applicable.

RESULTS AND DISCUSSIONS

In the present study, the majority of patients with intestinal obstruction belonged to the middle-aged and elderly age groups. The mean age of the study population was 48.6 ± 14.2 years, with an age range of 19-78 years, and the highest incidence was observed in the 41-50 years (26%) and 51-60 years (24%) age groups. A clear male predominance was noted, with 64% males and 36% females, resulting in a male-to-female ratio of 1.8:1 (Table 1).

In the present study, abdominal pain was the most common presenting symptom, observed in 92% of patients, followed by vomiting (76%) and abdominal distension (70%). Constipation or obstipation was present in nearly two-thirds of cases, while fever was noted in about one-fourth of patients, suggesting associated inflammation or infection in a subset of cases. With regard to the duration of symptoms, the majority of patients (42%) presented within 24-48 hours of symptom onset. However, 30% of patients presented after 48 hours, indicating delayed presentation, which is clinically significant as it is often associated with increased risk of complications (Table 2).

On physical examination, abdominal tenderness was the most frequently observed finding, present in 80% of patients, followed by abdominal distension (74%). Altered bowel sounds were commonly noted, with increased bowel sounds in 56% of cases, particularly in early obstruction, while absent bowel sounds were observed in 24% of patients, often indicating advanced or complicated obstruction. Clinical signs of dehydration were present in 60% of patients, reflecting fluid sequestration and vomiting associated with intestinal obstruction. Guarding or rigidity, suggestive of peritoneal irritation, was noted in 20% of cases, and a palpable abdominal mass was detected in 12% of patients. These findings emphasize the importance of thorough clinical examination in assessing the severity and possible complications of intestinal obstruction (Table 3).

In the present study, postoperative adhesions were the most common etiological factor for intestinal obstruction, accounting for 36% of cases. This was followed by hernia (22%), malignancy (16%), and volvulus (14%), while intestinal strictures (8%) and intussusception (4%) constituted a smaller proportion of cases. These findings highlight the predominance of adhesions and hernias as major causes of intestinal obstruction in clinical practice.

With respect to the level of obstruction, small bowel obstruction was observed in 68% of patients, whereas large bowel obstruction accounted for 32% of cases. The higher incidence of small bowel obstruction reflects the greater susceptibility of the small intestine to adhesive disease and hernias (Table 4).

Radiological evaluation revealed dilated bowel loops in 84% of patients and multiple air–fluid levels in 76%, confirming intestinal obstruction in most cases. CT imaging identified a transition point in 48% of patients and detected closed-loop obstruction (12%) and signs of bowel ischemia (10%), indicating complicated obstruction. Free intraperitoneal air was observed in 6% of cases, suggestive of bowel perforation. These findings highlight the diagnostic value of radiological investigations, particularly CT scan, in assessing the severity and complications of intestinal obstruction (Table 5).

In the present study, 38% of patients were successfully managed conservatively with resuscitative and supportive measures, while 62% required surgical intervention. Surgical management was predominantly undertaken in patients with complete obstruction, suspected strangulation, or failure of conservative treatment. This distribution reflects the need for operative management in a significant proportion of patients presenting with intestinal obstruction (Figure 1).

Among the 31 operated cases, adhesive bands were the most common intraoperative finding (38.7%), followed by obstructed hernia (29.0%) and malignant obstruction (19.4%). Volvulus was identified in 12.9% of patients. Features of complicated obstruction were evident, with gangrenous bowel observed in 22.6% and bowel

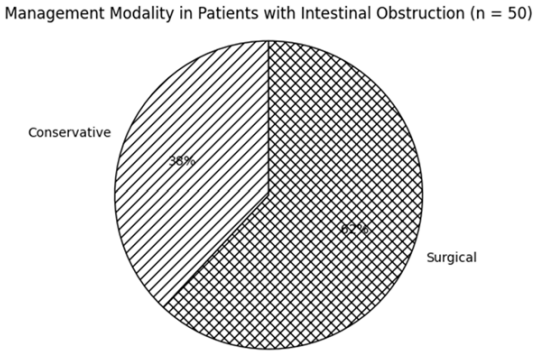

Fig. 1: Type of Management (n = 50)

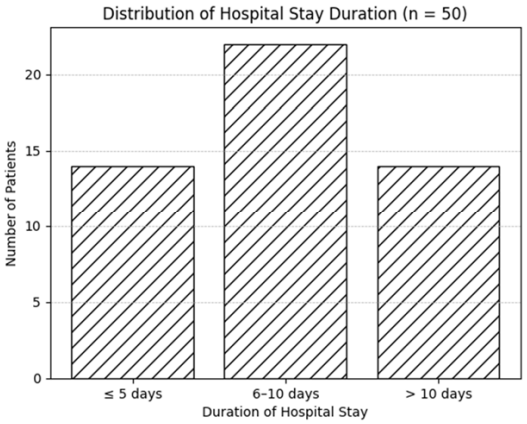

Fig. 2: Duration of Hospital Stay (n = 50)

perforation in 9.7% of cases, particularly in patients with delayed presentation.

Postoperatively, 38.7% of patients had no complications. The most frequent complication was surgical site infection (19.4%), followed by paralytic ileus (16.1%) and respiratory complications (12.9%). Wound dehiscence and septicemia were observed in 6.5% of cases each (Table 6).

The distribution of hospital stay in the present study shows that the majority of patients (44%) required hospitalization for 6-10 days. Equal proportions of patients (28% each) had a hospital stay of =5 days and >10 days. Shorter hospital stay was generally observed in patients managed conservatively or those without complications, whereas prolonged hospitalization was associated with surgical intervention, postoperative complications, and complicated obstruction such as gangrene or perforation (Figure 2).

In the present study, the overall outcome was favorable, with 94% of patients surviving and a mortality rate of 6%. Deaths were mainly observed in patients with delayed presentation, complicated intestinal obstruction such as bowel gangrene or perforation, and those who developed septicemia and postoperative complications. The relatively low mortality rate reflects the importance of early

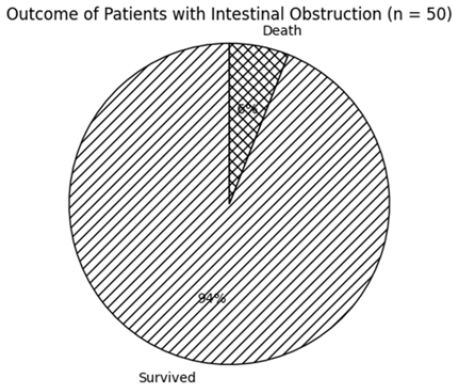

Fig. 3: Mortality (n = 50)

diagnosis, prompt resuscitation, appropriate radiological evaluation, and timely surgical intervention in improving outcomes in patients with intestinal obstruction (Figure 3).

Intestinal obstruction continues to be a significant surgical emergency, contributing substantially to morbidity and mortality if diagnosis and treatment are delayed. The present prospective observational study of 50 patients was undertaken to evaluate the etiology, clinical presentation, radiological findings, management strategies, and outcomes of intestinal obstruction in a tertiary care teaching hospital.

In the present study, intestinal obstruction was more commonly observed in middle-aged and elderly patients, with a mean age of 48.6 ± 14.2 years. The majority of patients were in the fifth and sixth decades of life. This age distribution is comparable with observations by Miller et al. and Fevang et al., who reported peak incidence in the 40-60-year age group[8,9]. A male predominance was noted (male:female ratio 1.8:1), which has been consistently reported in earlier studies and may be attributed to higher rates of hernia, previous surgeries, and occupational exposure among males[10,11].

Abdominal pain was the most common presenting symptom (92%), followed by vomiting (76%) and abdominal distension (70%). Constipation or obstipation was present in nearly two-thirds of patients. Similar symptom patterns have been reported by Bhatnagar *et al.* emphasizing that abdominal pain remains the most reliable presenting feature of intestinal obstruction[12]. The majority of patients presented within 48 hours of symptom onset; however, delayed presentation beyond 48 hours was associated with increased complications, including gangrenous bowel and perforation.

Abdominal tenderness and distension were the most frequent clinical signs. Guarding and rigidity were observed in 20% of cases and were often associated with strangulation or bowel ischemia.

Table 1: Demographic Profile of Patients with Intestinal Obstruction (n = 50)

Parameter	Category	Number of Patients (n)	Percentage (%)	Mean ± SD	Range
Age (years)	18-30	6	12.0		
	31-40	9	18.0		
	41-50	13	26.0		
	51-60	12	24.0		
	>60	10	20.0		
	Overall Age	50	100	48.6 ± 14.2	19–78
Sex	Male	32	64.0		
	Female	18	36.0		
	Total	50	100		
Sex Ratio	Male : Female	—	—	1.8 : 1	

Table 2: Presenting Symptoms and Duration of Symptoms in Patients with Intestinal Obstruction (n = 50)

Parameter	Category	Number of Patients (n)	Percentage
Presenting Symptoms*	Abdominal pain	46	92.0
	Vomiting	38	76.0
	Abdominal distension	35	70.0
	Constipation / obstipation	32	64.0
	Fever	12	24.0
Duration of Symptoms	< 24 hours	14	28.0
	24–48 hours	21	42.0
	> 48 hours	15	30.0

*Multiple symptoms were present in several patients.

Table 3: Physical Examination Findings (n = 50)

Clinical Finding	Number of Patients (n)	Percentage
Abdominal tenderness	40	80.0
Abdominal distension	37	74.0
Increased bowel sounds	28	56.0
Absent bowel sounds	12	24.0
Guarding / rigidity	10	20.0
Dehydration	30	60.0
Palpable abdominal mass	6	12.0

Table 4: Etiology and Level of Intestinal Obstruction (n = 50)

Parameter	Category	Number of Patients (n)	Percentage
Etiology	Postoperative adhesions	18	36.0
	Hernia	11	22.0
	Malignancy	8	16.0
	Volvulus	7	14.0
	Intestinal strictures	4	8.0
	Intussusception	2	4.0
	Total	50	100
Level of Obstruction	Small bowel obstruction	34	68.0
	Large bowel obstruction	16	32.0
	Total	50	100

Table 5: Radiological Findings (n = 50)

Radiological Finding	Number of Patients (n)	Percentage
Dilated bowel loops	42	84.0
Multiple air-fluid levels	38	76.0
Transition point on CT	24	48.0
Closed-loop obstruction	6	12.0
Signs of bowel ischemia	5	10.0
Free intraperitoneal air	3	6.0

Table 6: Intraoperative Findings and Postoperative Complications in Operated Cases (n = 31)

Parameter	Category	Number of Patients (n)	Percentage
Intraoperative Findings*	Adhesive bands	12	38.7
	Obstructed hernia	9	29.0
	Malignant obstruction	6	19.4
	Volvulus	4	12.9
	Gangrenous bowel	7	22.6
	Bowel perforation	3	9.7
Postoperative Complications	Surgical site infection	6	19.4
	Paralytic ileus	5	16.1
	Respiratory complications	4	12.9
	Wound dehiscence	2	6.5
	Septicemia	2	6.5
	No complications	12	38.7

*Multiple intraoperative findings were observed in some patients

These findings are consistent with classical descriptions in standard surgical literature, which emphasize that signs of peritonitis indicate complicated obstruction and mandate early surgical intervention[13].

Postoperative adhesions were the leading cause of intestinal obstruction (36%), followed by hernias (22%), malignancy (16%), and volvulus (14%). This pattern is consistent with studies by Miller *et al*. and Ellis *et al*., who reported adhesions as the

Comparison of Present Study with Earlier Studies

Parameter	Present Study	Miller et al.	Fevang et al.	Bhatnagar et al.
Mean age (years)	48.6	45-55	50	46
Male predominance	Yes	Yes	Yes	Yes
Commonest cause	Adhesions	Adhesions	Adhesions	Adhesions
SBO (%)	68	70	72	65
Surgical management (%)	62	60-70	64	66
Mortality (%)	6	5-8	4-7	6

most common cause of small bowel obstruction in modern surgical practice[8,13]. Small bowel obstruction constituted 68% of cases, while large bowel obstruction accounted for 32%, a distribution similar to earlier Indian and Western studies[14].

Plain X-ray abdomen showing dilated bowel loops and multiple air-fluid levels was the most common radiological finding. CT abdomen, when performed, aided in identifying the level, cause, and complications such as closed-loop obstruction and ischemia. The diagnostic value of CT scan in intestinal obstruction has been well established by Donckier *et al*. and Zalcman *et al*., who emphasized its role in early detection of strangulation and surgical decision-making[15,16].

In the present study, 62% of patients required surgical intervention, while 38% were successfully managed conservatively. Conservative management was mainly successful in adhesive small bowel obstruction without signs of strangulation. Similar success rates of non-operative management in selected cases have been reported by Barkan *et al*. and Fevang *et al*.[9,11]. Early surgical intervention was necessary in patients with complete obstruction, strangulation, or failed conservative treatment.

Adhesive bands and obstructed hernias were the most common intraoperative findings. Gangrenous bowel was observed in 22.6% of operated cases, largely among patients presenting late. Surgical site infection was the most frequent postoperative complication, followed by paralytic ileus. These findings correlate with earlier studies, which report wound infection as the most common postoperative morbidity in intestinal obstruction surgeries[12].

The mean duration of hospital stay was 8.6 ± 3.9 days, comparable to previous studies. Mortality in the present study was 6%, which is within the reported range of 3-10% in earlier literature. Mortality was mainly associated with delayed presentation, bowel gangrene, and septicemia[10].

CONCLUSION

Intestinal obstruction remains a common and potentially life-threatening surgical emergency. The present study demonstrates that postoperative adhesions are the most common cause, with small bowel obstruction being more prevalent than large bowel obstruction. Early presentation, accurate clinical assessment, and appropriate use of radiological investigations, particularly CT scanning, play a crucial role in timely management. While conservative treatment is effective in selected cases, early surgical intervention is essential in patients with complete obstruction or features of strangulation. Delayed presentation is associated with increased morbidity and mortality. Early diagnosis, prompt resuscitation, and judicious decision-making can significantly improve patient outcomes.

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