

Correlation Of Clinical Presentation with Radiological Imaging in Acute Intestinal Obstruction

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ABSTRACT

Background: Acute intestinal obstruction remains one of the most common surgical emergencies globally, presenting with varied symptomatology and requiring prompt diagnosis and management. The correlation between clinical presentation and radiological findings is crucial for accurate diagnosis and optimal patient outcomes.

Objective: To evaluate the correlation between clinical presentation and radiological imaging findings in patients with acute intestinal obstruction and to assess the diagnostic accuracy of various imaging modalities.

Methods: A prospective observational study was conducted on 52 patients presenting with acute intestinal obstruction at Era's Lucknow Medical College & Hospital over 18 months. Detailed clinical evaluation including history, physical examination, and radiological assessment using X-ray abdomen and ultrasonography were performed. Data were analyzed using SPSS version 26.0.

Results: The majority of patients were aged 18-40 years (51.8%) with male predominance (84.6%). Dynamic obstruction accounted for 75% of cases. Small bowel obstruction was most common (75%). Abdominal pain (94.2%), obstipation (88.5%), vomiting (82.7%), and distension (80.7%) were predominant clinical features. Tenderness was present in 96.2% of patients. Radiologically, dilated small bowel (88.5%) on X-ray and dilated bowel loops on ultrasound (90.4%) were most frequent findings. Surgical intervention included resection and anastomosis (50%) and adhesiolysis (40.4%).

Conclusion: Strong correlation exists between clinical presentation and radiological findings in acute intestinal obstruction. Combined clinical assessment and radiological imaging enables accurate diagnosis, appropriate management planning, and improved patient outcomes in acute intestinal obstruction.

Keywords: Acute intestinal obstruction, clinical presentation, radiological imaging, abdominal pain, ultrasonography, computed tomography, bowel obstruction

I. INTRODUCTION

Acute intestinal obstruction represents one of the most frequently encountered surgical emergencies worldwide, characterized by partial or complete blockage of the intestinal lumen, leading to impaired passage of intestinal contents and significant clinical morbidity. The condition affects all age groups and accounts for approximately 20% of all surgical admissions globally, making it a critical concern in emergency surgical practice.¹ Despite significant advances in diagnostic techniques, surgical interventions, and perioperative care over the past century, acute intestinal obstruction continues to pose substantial challenges to clinicians, with mortality rates varying from 3% to 30% depending on various factors including age, etiology, duration of symptoms, and presence of complications.^{2,3}

The pathophysiology of intestinal obstruction involves complex mechanisms including accumulation of gas and fluid proximal to the obstruction site, bacterial overgrowth, increased intraluminal pressure, compromised bowel wall perfusion, and potential progression to ischemia, necrosis, and perforation if left untreated.⁴ These pathophysiological changes result in the characteristic clinical presentation of abdominal pain, vomiting, distension, and obstipation, though the severity and sequence of these symptoms vary depending on the site, degree, and completeness of obstruction.⁵ The condition represents a true surgical emergency requiring prompt recognition, accurate diagnosis, and timely intervention to prevent life-threatening complications and reduce morbidity and mortality.

The etiology of acute intestinal obstruction demonstrates significant geographical and demographic variations worldwide. In developed countries, postoperative adhesions constitute the leading cause of small bowel obstruction, accounting for 60-75% of cases, followed by malignancies, hernias, and inflammatory conditions.^{6,7} Conversely, in developing nations including India and several African countries, incarcerated hernias remain the predominant cause, accounting for 30-50% of cases, followed by adhesions, volvulus, and tuberculosis.^{8,9} This geographical variation reflects differences in healthcare infrastructure, surgical practices, disease prevalence, and socioeconomic factors that influence the epidemiological pattern of intestinal obstruction across different populations.

Based on anatomical location, intestinal obstruction is classified into small bowel obstruction and large bowel obstruction, with small bowel obstruction being considerably more common and accounting for approximately 80% of all mechanical obstructions.¹⁰ Small bowel obstruction most frequently results from postoperative adhesions, incarcerated hernias, malignancies, inflammatory bowel disease, and intussusception, while large bowel obstruction is predominantly caused by colorectal malignancies, diverticular disease, and volvulus.¹¹ Furthermore, based on pathophysiological mechanisms, obstruction can be categorized as mechanical obstruction, where there is a physical barrier to intestinal flow, or functional obstruction known as paralytic ileus, where intestinal motility is impaired without mechanical blockage.¹²

The clinical presentation of acute intestinal obstruction varies considerably depending on the site, degree, and duration of obstruction. Proximal small bowel obstruction typically presents with early and profuse vomiting, minimal abdominal distension, and severe colicky abdominal pain, whereas distal small bowel and large bowel obstruction present with progressive abdominal distension, late-onset vomiting, and absolute constipation.¹³ Physical examination findings include visible abdominal distension, increased or absent bowel sounds, abdominal tenderness, and in cases of strangulation or perforation, signs of peritonitis including guarding, rigidity, and rebound tenderness. Recognition of clinical features suggesting strangulation or closed-loop obstruction is particularly crucial, as these conditions require immediate surgical intervention to prevent bowel necrosis and septic complications.¹⁴

Radiological imaging plays an indispensable role in the diagnosis, evaluation, and management planning of acute intestinal obstruction. Plain abdominal radiography, though readily available and cost-effective, has limited sensitivity of approximately 60% in detecting intestinal obstruction and provides minimal information regarding the cause, exact level, and presence of complications.¹⁵ The characteristic radiographic findings include dilated bowel loops, multiple air-fluid levels, and absence of gas in the distal bowel, though these features may be absent in early obstruction or when the bowel is completely fluid-filled. Ultrasonography has gained increasing importance in the evaluation of intestinal obstruction, particularly in resource-limited settings, with sensitivity approaching 85% for high-grade obstruction and additional advantages of being radiation-free, bedside availability, and ability to detect free fluid and other abdominal pathologies.

Computed tomography has emerged as the gold standard imaging modality for evaluating acute intestinal obstruction, with sensitivity exceeding 90% and specificity approaching 95% in detecting obstruction and determining its cause. CT imaging provides comprehensive information including the precise level and cause of obstruction, presence of transition points, bowel wall thickness, mesenteric edema, free peritoneal fluid, pneumatosis intestinalis, and portal venous gas, all of which aid in distinguishing simple obstruction from strangulated obstruction and guide decision-making regarding conservative versus surgical management. Advanced CT findings such as the whirl sign in volvulus, coffee bean sign in sigmoid volvulus, and closed-loop obstruction with C-shaped or U-shaped dilated bowel loops have high specificity for specific etiologies and complications of intestinal obstruction.

The management of acute intestinal obstruction requires a systematic approach beginning with adequate resuscitation, correction of fluid and electrolyte imbalances, nasogastric decompression, and broad-spectrum antibiotic coverage, followed by definitive treatment based on the underlying etiology and clinical course. Conservative management with bowel rest, intravenous fluids, and nasogastric suction is successful in 65-85% of patients with partial small bowel obstruction, particularly those with adhesive obstruction and no signs of strangulation. However, complete obstruction, signs of peritonitis, hemodynamic instability, radiological evidence of closed-loop obstruction or ischemia, and failure of conservative management for 48-72 hours mandate surgical intervention. Surgical options include adhesiolysis, hernia repair, bowel resection with primary anastomosis, or resection with stoma formation, depending on the viability of the bowel and general condition of the patient.

Despite advances in diagnostic and therapeutic modalities, acute intestinal obstruction continues to be associated with significant morbidity and mortality, particularly in elderly patients, those with delayed presentation, and cases complicated by strangulation or perforation. Postoperative complications including wound infection, intra-abdominal abscess, anastomotic leak, prolonged ileus, and respiratory complications occur in 15-35% of patients undergoing surgery for intestinal obstruction. Mortality rates range from 2-8% in uncomplicated cases but increase to 20-35% in patients with strangulated obstruction, bowel perforation, or advanced age with multiple comorbidities.

The correlation between clinical presentation and radiological imaging findings in acute intestinal obstruction is essential for accurate diagnosis, appropriate triage, and optimal management decisions. While clinical assessment provides valuable information regarding the severity and urgency of the condition, radiological imaging confirms the diagnosis, determines the level and cause of obstruction, and identifies complications requiring immediate surgical intervention. Understanding this correlation enables emergency physicians and surgeons to make informed decisions regarding patient disposition, timing of intervention, and selection of appropriate surgical procedures, ultimately improving patient outcomes and reducing unnecessary laparotomies and their associated complications.

The present study was undertaken to evaluate the clinical profile of patients presenting with acute intestinal obstruction at our tertiary care institution, to assess the diagnostic accuracy of various radiological imaging modalities, and to determine the correlation between clinical presentation and radiological findings in the diagnosis and management of acute intestinal obstruction.

II. AIMS AND OBJECTIVES

Aim

To find the correlation between clinical presentation and radiological imaging in acute intestinal obstruction.

Objectives

1. To evaluate the clinical profile (abdominal pain, abdominal distension, vomiting, non-passage of flatus/stool) of patients with acute intestinal obstruction.
2. To correlate the clinical features of acute intestinal obstruction with radiological findings.

III. MATERIALS AND METHODS

Study Design and Setting

This was a prospective observational study conducted at the Department of General Surgery, Era's Lucknow Medical College & Hospital, Lucknow, over a period of 18 months from January 2023 to June 2024. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants or their legal guardians before enrollment.

Study Population and Sample Size

The study included all patients aged between 18 and 70 years presenting to the emergency department or surgical outpatient department with clinical features suggestive of acute intestinal obstruction. Based on previous studies and using the formula for sample size estimation with a proportion of 91.84%, allowable error of 10% for detecting results with 90% power, and considering a 10% data loss factor, the calculated sample size was 52 patients.

Inclusion Criteria

1. Patients aged 18 to 70 years
2. Patients presenting with clinical features of acute intestinal obstruction
3. Patients with radiological documentation including X-ray abdomen, ultrasonography whole abdomen, or computed tomography whole abdomen
4. Patients willing to provide informed consent

Exclusion Criteria

1. Patients who did not provide consent
2. Patients below 18 years of age
3. Patients with intestinal perforation at presentation
4. Patients with incomplete clinical or radiological data

Data Collection

For each enrolled patient, comprehensive demographic and clinical data were recorded at the time of admission. The data collection included patient identification details, age, gender, occupation, date of admission, and contact information. Detailed history was obtained including chief complaints with duration, history of present illness, past medical and surgical history, family history, and personal history including dietary habits and lifestyle factors.

Clinical Examination

All patients underwent thorough clinical examination at the time of presentation. General physical examination included assessment of vital signs including blood pressure, pulse rate, respiratory rate, and temperature. General appearance, nutritional status, presence of pallor, icterus, cyanosis, clubbing,

lymphadenopathy, and pedal edema were documented. Systemic examination included evaluation of cardiovascular, respiratory, and central nervous systems.

Detailed per-abdomen examination was performed to assess for inspection findings including abdominal contour, visible peristalsis, distension, and surgical scars. Palpation was done to elicit tenderness, guarding, rigidity, organomegaly, and palpable masses. Percussion was performed to assess for shifting dullness and tympany. Auscultation was conducted to evaluate bowel sounds for presence, absence, or altered characteristics. Digital rectal examination was performed when clinically indicated.

Radiological Assessment

All patients underwent plain X-ray abdomen in erect and supine positions as the initial imaging modality. Radiological parameters assessed included presence of dilated bowel loops, air-fluid levels, bowel gas pattern, free air under diaphragm, and other abnormalities. Ultrasonography of the whole abdomen was performed using standard protocols to evaluate for dilated bowel loops, loss of peristalsis, presence of free fluid, bowel wall thickness, and identification of any masses or other pathologies. In selected cases where diagnosis remained uncertain or additional information was required, contrast-enhanced computed tomography of the abdomen was performed to determine the site, level, and cause of obstruction, and to identify complications such as ischemia or perforation.

Laboratory Investigations

Routine laboratory investigations were performed including complete blood count, renal function tests, serum electrolytes, liver function tests, blood glucose, and coagulation profile. Arterial blood gas analysis was performed in patients with hemodynamic instability or suspected metabolic derangements.

Classification and Grouping

Patients were categorized based on the type of intestinal obstruction into dynamic (mechanical) obstruction and adynamic (paralytic) obstruction. Further classification was done based on the site of obstruction into small bowel obstruction, large bowel obstruction, and paralytic ileus. The etiology of obstruction was determined based on clinical, radiological, and intraoperative findings.

Management Protocol

All patients received initial resuscitation with intravenous fluid therapy, nasogastric decompression, correction of electrolyte imbalances, and broad-spectrum antibiotics. Patients were managed either conservatively or surgically based on clinical assessment, radiological findings, and response to initial conservative measures. Surgical intervention was performed in patients with signs of peritonitis, strangulation, complete obstruction not responding to conservative management within 48-72 hours, or deteriorating clinical condition.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics were calculated for demographic and clinical variables. Categorical variables were presented as frequencies and percentages. Continuous variables were expressed as mean $\pm$ standard deviation. Correlation between clinical presentation and radiological findings was evaluated using appropriate statistical tests. A p-value of less than 0.05 was considered statistically significant.

IV. RESULTS

Table 1: Demographic Profile and Type of Obstruction

Parameter	Category	Number (n=52)	Percentage
Age Groups	18-30 years	11	21.1%
	31-40 years	16	30.7%
	41-50 years	10	19.2%
	51-60 years	7	13.5%
	>60 years	8	15.4%
	Mean $\pm$ SD	46.87 $\pm$ 7.6 years	-
Gender	Male	44	84.6%
	Female	8	15.4%
Type of Obstruction	Dynamic	39	75.0%
	Adynamic	13	25.0%
Site of Obstruction	Small Bowel	39	75.0%

Parameter	Category	Number (n=52)	Percentage
	Large Bowel	11	21.2%
	Paralytic Ileus	2	3.8%

The study included 52 patients with acute intestinal obstruction. The age distribution showed that the majority of patients (51.8%) were in the age group of 18-40 years, with the highest proportion (30.7%) in the 31-40 years age group. The mean age of presentation was 46.87 ± 7.6 years. There was significant male predominance with males accounting for 84.6% of all cases. Dynamic (mechanical) obstruction was more prevalent, accounting for 75% of all cases. Small bowel obstruction was the most common site of obstruction, accounting for 75% of all cases, followed by large bowel obstruction in 21.2% of patients.

Table 2: Clinical Presentation and Physical Examination Findings

Clinical Features	Number (n=52)	Percentage
Symptoms		
Abdominal Pain	49	94.2%
Obstipation	46	88.5%
Vomiting	43	82.7%
Abdominal Distension	42	80.7%
Physical Signs		
Tenderness	50	96.2%
Guarding	43	82.7%
Rigidity	2	3.8%

The clinical presentation analysis revealed that abdominal pain was the most frequent symptom, present in 94.2% of patients, followed by obstipation in 88.5%, vomiting in 82.7%, and abdominal distension in 80.7% of cases. Physical examination findings showed that tenderness was the most common abdominal sign, present in 96.2% of patients. Guarding was observed in 82.7% of cases. Rigidity was relatively rare and present in only 3.8% of patients.

Table 3: Radiological Findings

Imaging Modality	Findings	Number (n=52)	Percentage
X-ray Abdomen	Dilated Small Bowel	46	88.5%
	Dilated Central Loops	18	34.6%
	Multiple Air-Fluid Levels	11	21.1%
	String of Beads Appearance	13	25.0%
	Pneumoperitoneum	11	21.1%
	Gasless Abdomen	4	7.7%
USG Abdomen	Dilated Bowel Loops (>3cm)	47	90.4%
	Loss of Peristalsis	41	78.8%
	Extraluminal Free Fluid	8	15.4%

Plain radiography findings demonstrated that dilated small bowel was the most common radiological feature, observed in 88.5% of patients. Dilated central loops were seen in 34.6% of cases. The string of beads appearance was present in 25% of patients. Multiple air-fluid levels were documented in 21.1% of cases. Pneumoperitoneum was identified in 21.1% of patients. Ultrasonography findings revealed that dilated bowel loops measuring more than 3 cm were present in 90.4% of patients. Loss of peristalsis was observed in 78.8% of cases. Extraluminal free fluid was detected in 15.4% of patients.

Table 4: Surgical Management

Surgical Procedure	Number (n=52)	Percentage
Adhesiolysis and Release of Bands	21	40.4%
Resection and Anastomosis	26	50.0%
Foreign Body Removal with Primary Repair	3	5.8%
Resection with Stoma	2	3.8%

Among the 52 patients in the study, surgical intervention was required in the majority of cases. Resection and anastomosis was the most frequently performed procedure, accounting for 50% of all surgical interventions. Adhesiolysis and release of bands was performed in 40.4% of cases. Foreign body removal with primary repair was necessary in 5.8% of patients. Resection with stoma formation was performed in 3.8% of cases.

Table 5: Correlation Between Clinical Features and Radiological Findings

Clinical Feature	Radiological Correlation	Correlation Strength
Abdominal Pain + Distension	Dilated Bowel Loops on X-ray/USG	Strong (92.3%)
Obstipation	Multiple Air-Fluid Levels	Moderate (68.5%)
Vomiting + Pain	Small Bowel Dilatation	Strong (88.4%)
Tenderness + Guarding	Free Fluid on USG	Moderate (62.8%)
Rigidity	Pneumoperitoneum	Strong (100%)

The correlation analysis demonstrated strong correlation between clinical features and radiological findings. Patients presenting with abdominal pain and distension showed dilated bowel loops on imaging in 92.3% of cases. Vomiting combined with pain correlated with small bowel dilatation in 88.4% of patients. All patients with rigidity on examination had pneumoperitoneum on imaging, indicating perforation.

V. DISCUSSION

Acute intestinal obstruction represents a critical surgical emergency that continues to challenge clinicians worldwide due to its varied presentation, multiple etiologies, and potential for rapid deterioration leading to serious complications. The present study aimed to evaluate the correlation between clinical presentation and radiological imaging findings in patients with acute intestinal obstruction, thereby enhancing diagnostic accuracy and facilitating timely and appropriate management decisions. The findings of this study provide valuable insights into the demographic profile, clinical characteristics, radiological features, and surgical outcomes of patients presenting with acute intestinal obstruction at our tertiary care institution.

The demographic analysis in our study revealed that the majority of patients (51.8%) were in the younger age group of 18-40 years, with the mean age of presentation being 46.87 ± 7.6 years. This finding is consistent with the study by Patil MR et al²⁶, who reported that the majority of patients with acute intestinal obstruction were in the 40-60 years age group with 57.14% in this category and a mean age of 51.4 years. Similarly, Mariam TG et al²⁷ in their Ethiopian study found that 39.2% of patients were within the 5-40 years age group with a mean age of 37.21 years. The relatively younger age of presentation in developing countries compared to Western literature may be attributed to the higher prevalence of communicable diseases, hernias, and tuberculosis affecting younger populations in resource-limited settings. Jena SS et al²⁸ reported that the largest number of patients with intestinal obstruction were in the 41-60 years age group, accounting for 35% of cases with a mean age of 50.1 years, which is comparable to our findings. Kirubakaran B et al²⁹ documented a mean age of 54.21 years with a standard deviation of 17.47 in their prospective study, reflecting the variable age distribution across different populations.

Our study demonstrated significant male predominance with males constituting 84.6% of cases and females only 15.4%, resulting in a male to female ratio of approximately 5.5:1. This striking gender disparity is in agreement with multiple previous studies. Adhikari S et al³⁰ reported male predominance of 75.20% with 276 male patients compared to 91 female patients in their study of 367 patients with acute intestinal obstruction. Similarly, Mariam TG et al²⁷ found that 72.2% of patients were males among 227 patients studied. Patil MR et al²⁶ also reported male predominance with 60.2% male patients in their cohort of 98 patients. Jena SS et al²⁸ documented 57.7% males and 42.3% females in their large study of 743 patients. The higher incidence in males may be explained by the greater prevalence of inguinal hernias in men due to anatomical differences, higher rates of tobacco use and malignancies, and potentially greater occupational exposure to risk factors. However, Kirubakaran B et al²⁹ reported contrasting findings with 55.6% female patients in their emergency department-based study of 90 patients, suggesting that demographic patterns may vary based on study settings and geographical locations.

In our study, dynamic (mechanical) obstruction was significantly more common than adynamic obstruction, accounting for 75% of cases compared to 25% for adynamic obstruction. This predominance of mechanical causes is consistent with the established literature indicating that mechanical obstruction constitutes the majority of acute intestinal obstruction cases requiring hospitalization and surgical intervention. The higher proportion of mechanical obstruction reflects the prevalence of anatomical and pathological causes such as adhesions, hernias, and malignancies in our patient population.

The anatomical site analysis revealed that small bowel obstruction was the predominant type, accounting for 75% of all cases, while large bowel obstruction comprised 21.2% and paralytic ileus 3.8% of cases. These findings are remarkably consistent with the study by Baskey SC et al³¹, who reported that the site of obstruction

was small bowel in 65% of cases and large bowel in 35% in their prospective study of 186 patients. Similarly, Ojo EO et al³² documented that obstructions involved the small bowel in 77.8% and large bowel in 22.1% of 217 patients. The preponderance of small bowel obstruction aligns with global epidemiological data showing that small bowel obstruction is three to four times more common than large bowel obstruction. This pattern is attributed to the smaller luminal diameter of the small intestine, making it more susceptible to obstruction from adhesions, bands, and hernias. Additionally, the greater length and mobility of the small bowel increase the likelihood of torsion, internal herniation, and adhesive obstruction following abdominal surgery.

The clinical presentation in our study showed that abdominal pain was the most frequent symptom, present in 94.2% of patients, followed by obstipation (88.5%), vomiting (82.7%), and abdominal distension (80.7%). These findings closely correlate with multiple previous studies documenting similar symptom profiles. Khan M et al³³ reported that abdominal pain was present in 95% of patients, obstipation in 55%, vomiting in 38.3%, and distension as the most predominant physical finding at 88.3% in their clinico-morphological study of 60 patients. Bugalia RP et al³⁴ found pain abdomen in 95.38% of patients, absence of passage of flatus and feces in 89.23%, nausea and vomiting in 84.62%, and abdominal distension in 81.54% of 65 patients. Shivakumar CR et al³⁵ documented abdominal pain in 94% of patients, distension in 86%, and vomiting in 68% of 50 cases. Ojo EO et al³² reported abdominal pain in 100% of patients, vomiting in 86%, distension in 82%, and constipation in 75% of cases. The high consistency of these clinical features across multiple studies confirms that the tetrad of abdominal pain, vomiting, distension, and obstipation represents the cardinal clinical manifestation of acute intestinal obstruction, regardless of geographical location or patient demographics.

Physical examination findings in our study revealed that tenderness was the most common abdominal sign, present in 96.2% of patients, followed by guarding in 82.7%, while rigidity was relatively rare at 3.8%. These findings are comparable to Khan M et al³³, who reported tenderness in 78.3% and guarding in 33.3% of patients. Bugalia RP et al³⁴ found abdominal tenderness as the most common physical finding in 96.92% of patients on clinical examination. Ojo EO et al³² documented tenderness in 97% of patients and peritonitis in 46% of cases. The high prevalence of tenderness reflects the inflammatory response and peritoneal irritation that occurs due to bowel distension, mesenteric stretch, and in some cases, ischemia or early perforation. The presence of guarding indicates parietal peritoneal involvement and suggests more advanced disease or complications. The relatively low incidence of rigidity in our study (3.8%) is reassuring, as this sign typically indicates established peritonitis or perforation requiring urgent surgical intervention.

Radiological findings on plain X-ray abdomen in our study demonstrated that dilated small bowel was the most common feature, observed in 88.5% of patients, followed by dilated central loops in 34.6%, string of beads appearance in 25%, multiple air-fluid levels in 21.1%, and pneumoperitoneum in 21.1% of cases. These findings are consistent with Sharma P et al³⁶, who reported that X-rays showed findings in 40% of patients, with pneumoperitoneum found in 20% and multiple air-fluid levels along with dilated bowel loops in 20% of 50 patients studied. Pundeer S et al³⁷ reported that the most common X-ray finding was dilated gut loops seen in 82% of patients, with air-fluid levels present in 46% of cases. Tiwari SJ et al³⁸ documented multiple air-fluid levels in 70% of patients in their clinical study of 60 adults. Khan M et al³³ found that X-rays of 41.6% of patients were suggestive of dilated bowel loops, 30% had multiple air-fluid levels, while X-rays were inconclusive in 28.3% of patients. The sensitivity of plain radiography in our study (88.5%) was higher than that reported in some previous studies, possibly due to the relatively advanced stage of presentation in our patient population and the experience of radiologists in interpreting emergency abdominal films.

Ultrasonography findings in our study revealed that dilated bowel loops measuring more than 3 cm were present in 90.4% of patients, loss of peristalsis was observed in 78.8%, and extraluminal free fluid was detected in 15.4% of cases. These findings are concordant with Khan M et al³³, who reported that out of 51 patients who underwent USG, 76.4% were found to have dilated bowel loops and sluggish peristalsis, with USG being inconclusive in 11.76% of patients. Pundeer S et al³⁷ found that the most common USG finding was small bowel obstruction in 62% of patients. Sharma P et al³⁶ documented that sonography diagnosed 52% of patients with acute abdomen. Ogata M et al³⁹ reported in their landmark study that an akinetic, dilated loop of bowel observed on real-time USG has high sensitivity (90%) and specificity (93%) for the recognition of strangulation, with a positive predictive value of 73%. The presence of free peritoneal fluid on ultrasound was also found to be sensitive for strangulation. The high sensitivity of ultrasound in our study (90.4%) supports the growing body of evidence that ultrasonography is a valuable bedside diagnostic tool for acute intestinal obstruction, particularly in resource-limited settings where CT availability may be restricted.

The surgical management in our study showed that resection and anastomosis was the most frequently performed procedure, accounting for 50% of all surgical interventions, followed by adhesiolysis and release of bands in 40.4% of cases. These findings are comparable to Khan M et al³³, who reported that resection and anastomosis was performed in 31.7% of patients, stoma creation in 20%, hernia repair in 8.3%, and adhesiolysis in 3.3% of 40 operated cases. Tiwari SJ et al³⁸ documented that resection anastomosis was performed in 45.7% of patients, followed by adhesiolysis in 14% of 60 cases. The high rate of resection and anastomosis in our study

(50%) indicates that half of our patients had compromised bowel viability requiring resection, which may reflect delayed presentation, severity of disease, or the presence of strangulation in a significant proportion of cases.

The strong correlation observed in our study between clinical presentation and radiological findings has important implications for the diagnosis and management of acute intestinal obstruction. Hanif KM et al⁴⁰ in their 2024 study found significant association between clinical symptoms such as tenderness and anorexia with specific intraoperative findings ($p=0.004$), and radiological findings, particularly air-fluid levels, were strongly associated with surgical diagnoses ($p=0.001$). Pundeer S et al³⁷ reported that out of 49 patients who underwent CT scan abdomen and surgery, CT findings matched with intraoperative findings in 91.84% of patients, emphasizing the superior diagnostic capability of advanced imaging. The integration of clinical assessment with radiological imaging provides a comprehensive approach to diagnosis that enhances accuracy and guides appropriate treatment planning.

Several studies have emphasized the importance of multimodal diagnostic approach. Sharma P et al³⁶ concluded that clinical evaluation, X-rays, or ultrasound alone are not sufficient to diagnose the cause of non-traumatic acute abdomen in all cases, and that clinical evaluation combined with X-rays and ultrasound increases the number and accuracy of pre-operative diagnosis. This underscores the complementary nature of clinical and radiological assessment in the diagnostic workup of acute intestinal obstruction.

The postoperative outcomes and complications reported in various studies highlight the continued challenges in managing acute intestinal obstruction. Patil MR et al²⁶ documented that the most common postoperative complications were fever (11.02%) and wound infection (9.18%), with a mortality rate of 9.18%. Girma H et al⁴¹ reported that 86.4% of cases had favorable outcomes, while 13.6% had unfavorable outcomes including 4.7% mortality, with surgical site infection and pneumonia being the most common postoperative complications. Kirubagaran B et al²⁹ found that 13.5% of operated patients had surgical complications, with fever and wound dehiscence being most common at 2.7%, and a mortality rate of 2.7%. Baskey SC et al³¹ reported a mortality rate of 4.5%, with most deaths due to multiple organ failure. The variable mortality rates across studies reflect differences in patient populations, disease severity, timing of intervention, and healthcare resources available.

The present study reinforces the critical importance of early recognition of clinical features, prompt radiological evaluation, and timely surgical intervention in improving outcomes for patients with acute intestinal obstruction. The strong correlation between clinical presentation and radiological findings validates the complementary role of these diagnostic modalities in the comprehensive assessment of patients with suspected intestinal obstruction. Future research should focus on developing standardized protocols that integrate clinical scoring systems with radiological criteria to optimize decision-making regarding conservative versus surgical management and to identify high-risk patients who may benefit from early aggressive intervention.

VI. CONCLUSION

Acute intestinal obstruction remains a common and challenging surgical emergency requiring prompt recognition, accurate diagnosis, and timely intervention. The present study demonstrated that young adult males are predominantly affected, with small bowel obstruction being the most common type. The clinical tetrad of abdominal pain, obstipation, vomiting, and distension, combined with physical findings of tenderness and guarding, provides a reliable clinical picture of acute intestinal obstruction. Radiological imaging, particularly plain X-ray and ultrasonography, strongly correlates with clinical presentation, with dilated bowel loops being the most consistent finding across modalities.

The strong correlation between clinical presentation and radiological findings validates the importance of comprehensive clinical assessment combined with appropriate imaging studies in the diagnosis and management planning of acute intestinal obstruction. This integrated approach enables accurate diagnosis, appropriate triage, and optimal management decisions, ultimately improving patient outcomes. Surgical intervention, particularly resection and anastomosis and adhesiolysis, remains the mainstay of definitive treatment in the majority of cases.

Early recognition of clinical features, prompt radiological evaluation, adequate resuscitation, and timely surgical intervention are crucial factors in reducing morbidity and mortality associated with acute intestinal obstruction. Future studies with larger sample sizes and multicenter collaboration are needed to develop standardized diagnostic and management protocols that can be universally applied to optimize outcomes in this challenging surgical emergency.

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