

## Original Research Article

# DECIPHERING THE ETIOLOGY AND CLINICAL ASPECTS OF INTESTINAL OBSTRUCTION: AN OBSERVATIONAL STUDY

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**ABSTRACT**

**Background:** Acute intestinal obstruction is a medical emergency due to partial /complete blockage of intestine requiring emergency intervention.

**Objective:** Study is aimed to identify the etiological factors of acute intestinal obstruction, assess the outcome of surgical interventions, analyze the postoperative morbidity and mortality cases.

**Materials and Methods:** Study enrolled 30 patients presented with severe abdominal pain, vomiting, abdominal distention from July 2022 to December 2023 at Dr. B.R Ambedkar Medical College and Hospital. Clinical history, radiological investigations, intraoperative findings were recorded.

**Results:** Adhesion (40%), followed by strangulated hernia and carcinoma rectum (13.33%), adenocarcinoma of the distal ileum (3.33%) are the commonest causes. Radiological findings revealed the multiple air fluid levels indicative of bowel obstruction in 30% of cases. Intra-operative finding included adhesions, dilated bowel loops, gangrenous bowel loops. Postoperative complications were observed in 13.33% of patients, primarily wound infections. 10% of mortality rate was observed.

**Conclusion:** This study highlights the postoperative adhesions which is the common etiology behind obstruction. Significant postoperative morbidity and mortality is observed; which can be reduced with vigilant postoperative monitoring and care.

**Keywords:** Acute Intestinal Obstruction, Postoperative Adhesion, Emergency Surgical Care.

**INTRODUCTION**

Acute intestinal obstruction is the interruption of partial or complete progression of in-traluminal content through the large or small intestine. Basically, it may occur either due to functional or mechanical failure. Inappropriate muscle mobility leading to inefficient peristalsis leads to functional failure. Narrowing of luminal dimensions of the intestine due to adhesions, tumors, presence of foreign objects, hernia, or intussusception is seen in mechanical obstruction. It can also be classified as dynamic (mechanical), in which peristalsis is working against the mechanical obstruction, or adynamic, (functional) due to atone of intestine with absence of peristalsis without any mechanical cause or pseudo-obstruction.

In a study conducted in Ethiopia, 50.7% of patients with acute abdomen and 34.6% of surgical admissions were of obstruction, thus implying it to be one of the most common cause during diagnosis.<sup>[1]</sup> Intestinal obstruction often requires emergency intervention as associated with high mortality of 3-30% across the globe.<sup>[2,3]</sup> Across the globe, adhesions (74%) resulting from previous surgeries account to leading cause in developed countries.<sup>[4]</sup> Early identification of the etiology of obstruction guides the treatment plan favoring prognosis and also lowers the mortality and irreversible complications as ischemia and perforation. Intestinal obstruction often presents as loss of appetite, constipation, vomiting, trauma of the abdomen, etc. Variability in symptoms due to diverse etiology poses difficult diagnosis. Advanced diagnostic aids help to treat such medical emergencies by identifying the etiology, thus resulting in good prognosis and efficient

postoperative care. This article will lay more focus to recognize etiologies behind intestinal obstruction to de-crease mortality related.

### Objectives of study

1. To observe changes in etiology of intestinal obstruction with the advent of lapro-scopy and mesh placement.
2. To evaluate long term effects of surgery.
3. To determine morbidity and mortality rates in intestinal obstruction.

## MATERIALS AND METHODS

**Study Design:** Prospective Observational Study,

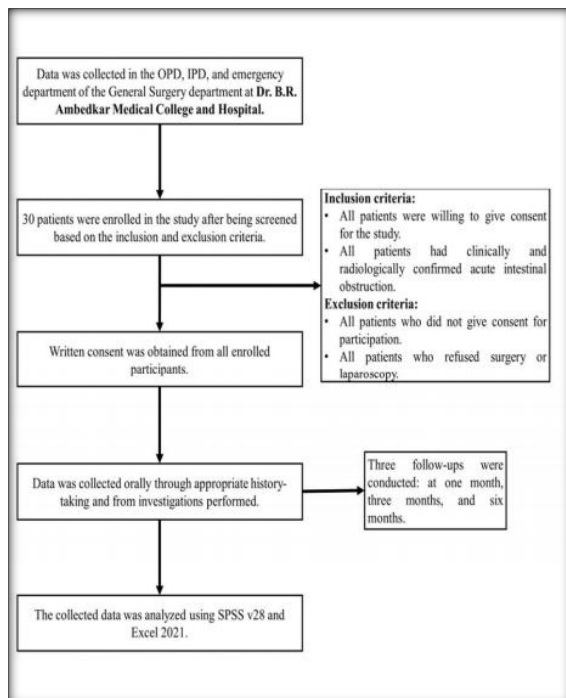
**Data Collection and Method:** A total of 30 patients who came in the emergency, OPD, IPD in the Department of Gen-eral Surgery at Dr. D. R. Ambedkar Medical College and Hospital presenting symptoms of severe abdominal pain, vomiting, abdominal distension and constipation were included in the study. This prospective observational study was conducted from July 2022 to December 2023.

### Inclusion Criteria

1. Patients willing to give consent for the study.
2. Dynamic obstruction,
3. Patients who had clinical and radio graphically confirmed acute interstitial obstruction.

### Exclusion Criteria

1. Patient who did not give consent for participation.
2. Patients with adynamic obstruction.



Diagnostic evaluation - necessary laboratory and radiological tests were performed.

1. CBC,
2. ESR
3. Serum electrolyte

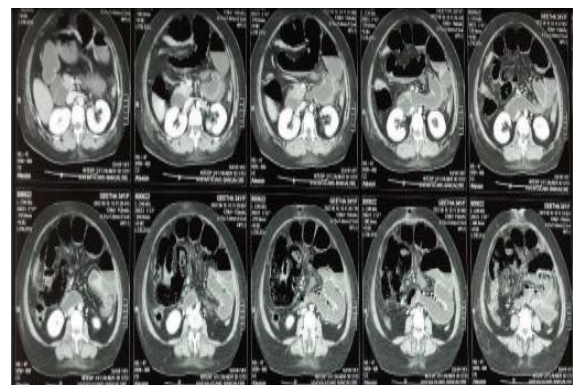
4. Abdomen erect x-ray,
5. CT abdomen and pelvis SOS,
6. USG abdomen and pelvis,
7. MRI abdomen and pelvis SOS



A

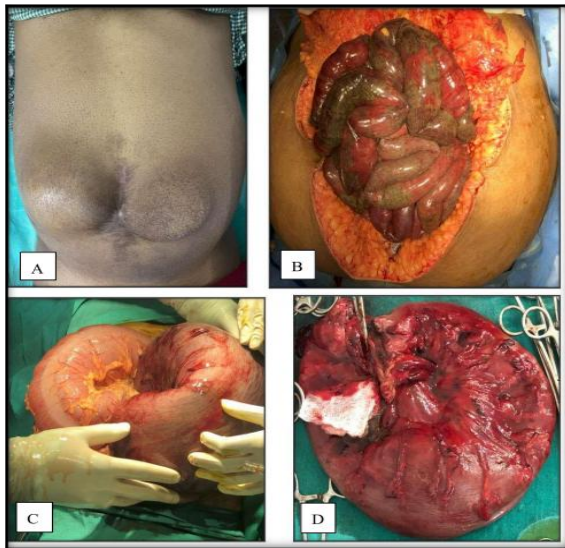


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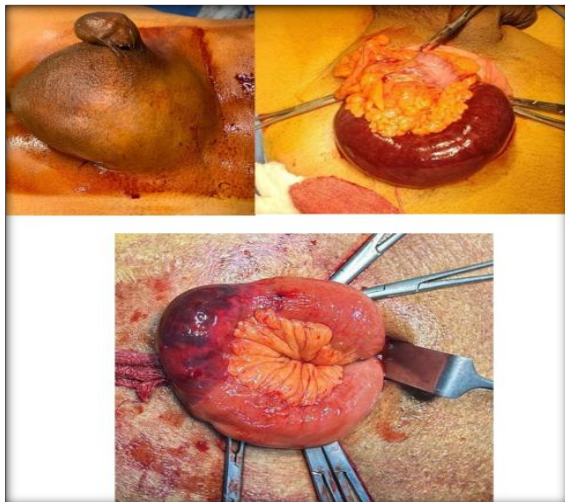


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Radiological findings noted- A. Sigmoid Volvulus, B. Circumferential mural thickening at ICJ, C. CT scan suggestive of Dilated small bowel loops with interbowel fluid.



Pre-operative and Intra-operative photos, A. Obstructed Incisional hernia, B.SMA syndrome, C & D. Sigmoid volvulus. Strangulated hernia



### Sample Size Estimation

Formula used:

$$N = (Z_{\alpha/2})^2 * (pq) / d^2$$

After taking 90% confidence interval with 15%  $\alpha$  error.

P- Prevalence q- 100-p d- 5% absolute error

Sample size is 30

## RESULTS

The study included 30 participants with a mean age of 50 years, with a standard deviation of 13.19 years, indicating a diverse age range among the participants. In terms of gender distribution, 56.7% (17 individuals) were male, and 43.3% (13 individuals) were female. This overview indicated that the sample had a slight male predominance.

### CLINICAL PRESENTATION.

The clinical presentation of study participants revealed that the abdominal pain was most common (96.7%) while only 3.3% did not report. Remarkable number of patients presented with Vomiting (83.3%) and abdominal distension (93.3%). Constipation was a significantly notable finding accounting for 100% of the participants experiencing this issue. [Table 1]

**Table 1: Clinical presentation of study participants**

Variables	Value
ABDOMINAL PAIN, n (%)	
Yes	29 (96.7)
No	1 (3.3)
VOMITING, n (%)	
Yes	25 (83.3)
No	5 (16.7)
ABDOMINAL DISTENSION, n (%)	
Yes	28 (93.3)
No	2 (6.7)
CONSTIPATION, n (%)	
Yes	29 (96.7)
No	1 (3.33)

### DIAGNOSIS.

Range of conditions were spotted amongst the participants. Adenocarcinoma of the distal ileum was diagnosed in 3.33% of cases, while rectal cancer

in 13.33% and obstructed umbilical hernia in 10% of participants. Postoperative bowel adhesions affected 40% of individuals. Sigmoid volvulus was diagnosed

in 6.66% of cases and superior mesenteric artery (SMA) syndrome was found in 10% of participants.

### USE OF MESH

During previous surgical procedure mainly for hernia, abdominal mesh was placed in 16.66% of

participants. In these cases mesh lead to adhesions which was attributed to be the cause of obstruction thus significantly increasing the risk of postoperative bowel obstruction. [Table 2]

**Table 2: History of mesh use in participants**

Variables	Value
MESH	
ABSENT	25 (83.33)
PRESENT	5 (16.66)

### History of abdominal surgery

Noteworthy number of participants (73.33%) had undergone abdominal surgeries, out of which 50% underwent laparoscopic procedure and 23.33% had

open surgeries. Though minimally invasive technique have lesser risk for adhesions but the club of people were at higher risk who experienced open surgery. [Table 3]

**Table 3: History of abdominal surgery among the study participants**

Variables	Value
Present	22 (73.33)
Laparoscopic	15 (50)
Open surgery	7 (23.33)
Absent	8 (26.66)

### Intra-Operative Findings

The intra-operative findings reveal predominantly adhesions in 40% of the cases. Significant patients show gangrenous bowel in a hernia sac and 10%

having a completely gangrenous small bowel due to superior mesenteric artery (SMA) thrombus. [Table 4]

**Table 4: Intra-operative findings of study participants**

Variables	Value
Adhesion	12 (40)
Circumferential mural thickening at ICJ	1 (3.33)
Mass at ICJ	1 (3.33)
Dilated sigmoid	2 (6.67)
Mass in rectum	4 (13.33)
Gangrenous entire small bowel (SMA thrombus)	3 (10)
Gangrenous bowel in hernial sac	4 (13.33)
Healthy bowel in hernial sac	3 (10)

The follow-up data over six months shows that wound infections were observed in 13.33% of participants during the first month. Additionally, 10% of participants died during the first month of follow-up. By the third and sixth months, no new cases of wound infection, burst abdomen, fistula, or death were reported. This indicates that the majority of complications, including wound infections and deaths, occurred early in the follow-up period.

## DISCUSSIONS

Acute intestinal obstruction is a surgical emergency. This study was conducted including 30 participants of an average of 50yrs of age with slight male predominance seen accounting to 56.7% of male patients and 43.3% female patients. Various other studies also support percentage of male predominance in occurrence of intestinal obstruction. Shivkumar et al<sup>6</sup> in their analysis demonstrated clear prevalence amongst male over female proving significant ratio of 1.95:1. Nassirudin et al also concluded similar findings.

The study reveals 96.7% patients presented with abdominal pain and 100% with constipation thus accounting to be consistent and major presenting symptoms of intestinal obstruction. Shivkumar et al<sup>6</sup> stated abdominal pain as most commonly presenting complaint. However abdominal distention was second common symptom witnessed by them which differs in our study. Tiwari et al however found peak incidence of abdominal distention followed by vomiting which was contrasting to our study.<sup>7,8</sup>

While analyzing the causes of obstruction, postoperative bowel adhesions accounts for 40% of the cases thus being the commonest cause followed by strangulated hernia 13.33% and intestinal hernia (10%), SMA syndrome (10%), sigmoid volvulus (6.66%) colorectal carcinoma (3.33%), intestinal tuberculosis in 3.33%. Most commonly adhesions are seen as the cause of the obstruction which may be due to previous abdominal surgery, inflammatory and congenital bands. Abdominal adhesions are the fibrous bands formed post operatively spanning abdominal organs and/or peritoneal wall. In absence

of surgery, abdominopelvic radiations cause inflammatory response leading to adhesions. Thampi et al 9 Vanathi et al,<sup>[10]</sup> (40%), Playforth et al,<sup>[11]</sup> (54%), showed similar results. Strangulated hernia and malignancy are second common causes seen in our study. Shivkumar et al<sup>6</sup> also mirrored these findings. Malik et al,<sup>[12]</sup> declared adhesions to be the commonest cause followed by abdominal tuberculosis and hernia. Use of mesh for hernia repair proved to expose 16.66% of patients to intestinal obstruction. Theophile in his study conducted on 815 patients concluded that undergoing laparoscopic intraperitoneal mesh have an increased risk of bowel obstruction compared with patients who have a similar surgical history but no incisional hernia repair. Various other studies also support these findings.<sup>[13,14]</sup>

We must rely on clinical severity and mindfully assessment of the complications for choosing the approach of resection either by laparotomy or through open surgery.<sup>[16]</sup> Lapa-rotomy is still considered as operative approach in obstruction treatment though reduction in working space, increased fragility caused by bowel distention converts the approach towards open surgery.

Over the period of 6 months postoperative complications were carefully studied which reduced substantially from 13.33% patients developed wound infection to no further in-stance till 6 months. Despite the reduction in morbidity, the study recorded a mortality rate of 10%. This consistent mortality underscores the severe nature of acute intestinal obstruction and the potential for life-threatening complications. Sudarshan et al in their study including 50 patients witnessed mortality in 5 patients (10%). The high mortality is observed in individuals who develop strangulation and gangrene of the bowel, though early treatment can reduce the mortality, advanced age and associated metabolic, cardiopulmonary diseases, still leads to high rate of mortality.<sup>[17]</sup>

The small size is the limitation of this study. A minority of patients had a language barrier, which was resolved with the help of a translator.

## CONCLUSION

Acute intestinal obstruction is an emergency life-threatening medical condition most commonly because of adhesions either due to previous surgery or inflammatory post abdominopelvic radiation. There can be varied presenting symptoms though most common being abdominal pain and constipation. Early diagnosis helps to prevent complications like ischemia, perforations. Treatment varies from conservative management (fluid resuscitation, nasogastric decompression) to surgical intervention in severe cases. Clinical evaluation and studies show that despite having low morbidity rate, patients witness mortality in cases with gangrenous bowel leading to septicemia thus proving to be fatal,

patients presenting later than 72 hrs, elderly aged people, delayed treatment, patients having comorbidities. Thus early diagnosis and good postoperative care reduces the morbidity and mortality in patients. Follow up is also noteworthy in such cases to timely manage the complications as much as possible.

## Limitations of the Study

1. Small sample Size of 30 participants doesn't allow to generalize the findings.
2. Selection bias is an important risk due to specific inclusion criteria included which may miss patients with large scale of population of patients with gastrointestinal conditions.
3. Limited follow-up period of six months is insufficient to capture long-term complications, efficacy of the surgical interventions.
4. Reliance on Basic Diagnostic tools or biomarkers, depth of diagnosis can be widely affected.
5. The study did not account for patient comorbidities, nutritional status, or variations in postoperative care, which could have influenced the outcomes.
6. Future research should address these limitations by incorporating larger sample sizes, extended follow-up periods, and rigorous control of confounding variables.

## Strength of the study

1. Focus on Postoperative Complications helps to identify the etiology of mortality.
2. The existing research strengthens and generalizes the data to the wider population.
3. Contribution to the Field: Overall, the study makes a significant contribution to the ongoing discourse in gastrointestinal surgery, providing valuable insights that can inform future research and clinical practice.

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