Section: General Surgery

Original Research Article

CLINICO-RADIOLOGICAL PROFILE AND OUTCOME OF PATIENTS WITH INTESTINAL OBSTRUCTION MANAGED CONSERVATIVELY IN A TERTIARY CARE HOSPITAL OF NORTH INDIA

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ABSTRACT

Background: Intestinal obstruction is a common surgical emergency with heterogeneous aetiology and variable clinical course. While early surgery was traditionally favoured, many patients with partial or subacute obstruction can now be managed safely without operation. Region-specific data correlating clinical and radiological findings with outcome of conservative management remain limited in North India. The objective is to evaluate the clinical and radiological findings and outcome of patients with intestinal obstruction managed conservatively at a tertiary care hospital in Moradabad, and to identify predictors of treatment failure. **Materials and Methods:** This hospital-based, prospective observational study was conducted in the Department of General Surgery with the Department of Radio-Diagnosis, Teerthanker Mahaveer Medical College & Research Centre, Moradabad, over 18 months after ethics approval. Eighty adults (18–70 years) with clinico-radiologically confirmed intestinal obstruction selected for initial conservative management were enrolled by consecutive sampling and followed until resolution or discharge. Data were analysed using SPSS, with $p<0.05$ taken as significant. **Result:** Mean age was 44.8 ± 13.2 years, with male predominance (65.0%) and a rural majority (57.5%). Adhesions were the commonest cause (40.0%). Conservative management succeeded in 85.0% of patients. Age ≥50 years, TLC >12,000 cells/mm³ and malignant aetiology independently predicted failure. Complications occurred in 18.8%, and 10.0% required intensive care. **Conclusion:** Conservative management is safe and effective in a well-selected majority of patients with intestinal obstruction. Advanced age, leukocytosis and malignant aetiology identify a high-risk subgroup warranting closer monitoring and a lower threshold for early surgery.

INTRODUCTION

Intestinal obstruction is a partial or complete impairment of the passage of intestinal contents, arising from a mechanical block or extrinsic compression, or from functional failure of motility (paralytic ileus). It remains one of the most common surgical emergencies, ranging from subacute obstruction that may resolve with supportive care to acute strangulating obstruction requiring urgent laparotomy. The burden is particularly high in India, where delayed presentation and a continuing prevalence of tuberculosis and complicated hernias contribute to greater morbidity. Obstruction was historically treated as an indication for early surgery; however, better understanding of its natural history and advances in imaging have shown that carefully selected patients, particularly those with partial or subacute obstruction, can be managed conservatively under close monitoring.

The aetiological spectrum varies geographically: adhesions dominate in high-income countries, while India shows a more heterogeneous pattern including tuberculosis, obstructed hernias, volvulus and malignant strictures. Reported mortality ranges from 3–10% in uncomplicated cases but rises to 30–40% once strangulation supervenes. Radiological evaluation is central to diagnosis: plain X-ray shows dilated loops and air–fluid levels but has limited specificity; ultrasonography offers a bedside alternative; and contrast-enhanced computed tomography (CECT) is the most accurate modality for identifying the level, cause and complications of obstruction.

The central clinical dilemma is distinguishing patients who can be safely observed from those needing early surgery. Region-specific data on the clinico-radiological profile of patients successfully managed without surgery are limited in North India. This study characterises the clinical presentation, radiological findings and outcome of patients managed conservatively at this centre, and identifies predictors of failure of non-operative treatment.

Aim: To study the clinico-radiological profile of patients with intestinal obstruction managed conservatively in a tertiary care hospital of Moradabad.

Objectives: (1) To evaluate clinical findings; (2) to evaluate radiological findings; (3) to evaluate outcome on the basis of clinical and radiological profile.

MATERIALS AND METHODS

This hospital-based, prospective observational study was conducted in the Department of General Surgery with the Department of Radio-Diagnosis at Teerthanker Mahaveer Medical College & Research Centre (TMMC & RC), Moradabad, over 18 months, following Institutional Ethics Committee approval and the Declaration of Helsinki. Written informed consent was obtained from all participants.

Adults aged 18–70 years with clinico-radiologically confirmed intestinal obstruction (X-ray, ultrasonography or CECT), planned for initial conservative management, were included. Patients needing immediate surgery for suspected strangulation, perforation or peritonitis, those with trauma-related obstruction, pregnant patients, and those declining consent were excluded; patients who failed conservative treatment and required surgery were retained in the outcome analysis as failures.

Sample size, calculated from a reported conservative-management success rate of 72% (95% confidence, 10% relative precision), yielded a minimum of 80 patients, enrolled consecutively.

A structured case record form captured demographics, symptom duration, surgical history, comorbidities, examination findings, Visual Analogue Scale (VAS) pain score, baseline haematology/biochemistry and radiological findings. All patients were kept nil per oral, decompressed with a nasogastric tube, and received intravenous fluids, electrolyte correction, antibiotics and analgesia, with daily monitoring until resolution (success) or deterioration requiring surgery (failure).

Continuous variables (mean ± SD) were compared using the independent t-test; categorical variables using the chi-square test. Predictors of failure were identified using univariate and multivariate logistic regression (odds ratios [OR] and adjusted odds ratios [aOR], 95% CI). Two-sided $p<0.05$ was significant.

RESULTS

Eighty patients were enrolled and followed to resolution or discharge. Demographic, clinical, radiological and outcome findings are summarised below.

Demographic characteristics

Table 1: Age distribution (n=80)

Age group (yrs)	Frequency	%
18–30	12	15.0
31–40	18	22.5
41–50	20	25.0
51–60	17	21.3
61–70	13	16.2
Mean ± SD	44.8 ± 13.2	—

Table 2: Gender distribution

Gender	Frequency	%
Male	52	65.0
Female	28	35.0

$\chi^2 = 7.20$, $p = 0.007$

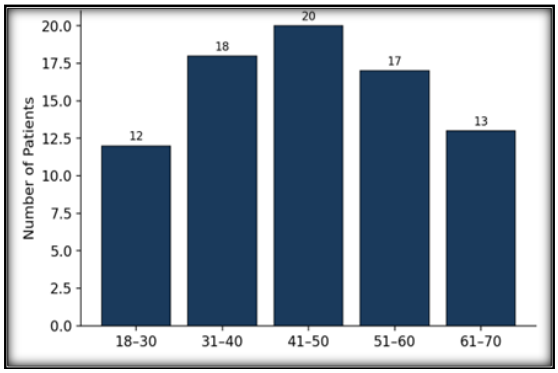

Figure 1: Age distribution among study participants

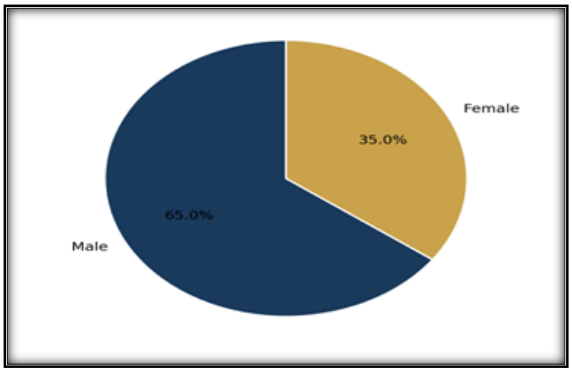

Figure 2: Gender distribution among study participants

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Table 3: Residence distribution

Residence	Frequency	%
Rural	46	57.5
Urban	34	42.5

Table 4: Socioeconomic status

Class	Frequency	%
Lower	28	35.0
Middle	38	47.5
Upper	14	17.5

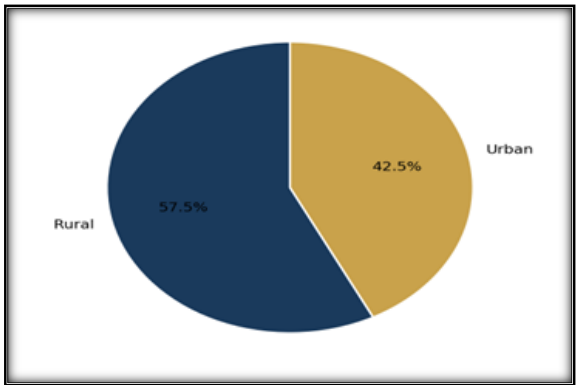

Figure 3: Residence distribution among study participants

The mean age was 44.8 ± 13.2 years, with the highest proportion in the 41–50 year group. Males significantly outnumbered females (p=0.007). A rural majority and predominance of middle/lower socioeconomic strata were observed.

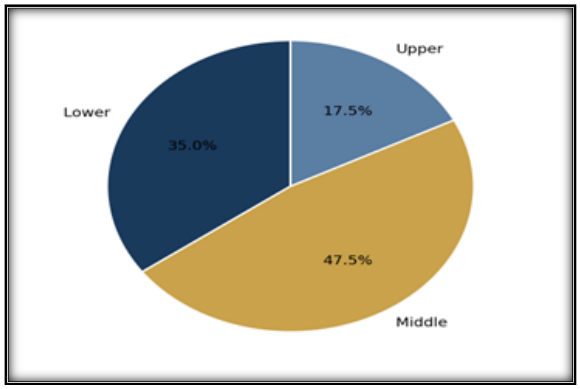

Figure 4: Socioeconomic status among study participants

Clinical characteristics

Table 5. Clinical presentation at admission (n=80)

Symptom	Frequency	%
Abdominal pain	80	100.0
Distension	68	85.0
Vomiting	61	76.3
Obstipation	55	68.8

Table 6: Duration of symptoms before admission

Duration	Frequency	%
<24 hrs	20	25.0
24–48 hrs	30	37.5
>48 hrs	30	37.5

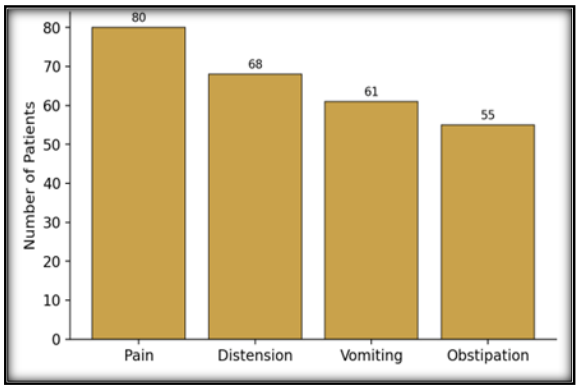

Figure 5: Clinical presentation at admission

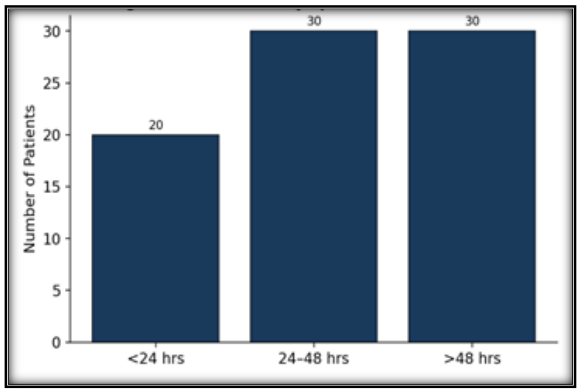

Figure 6: Duration of symptoms before admission

Table 7: Past abdominal surgery history

History	Frequency	%
Present	36	45.0
Absent	44	55.0

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Table 8: Comorbidities

Comorbidity	Frequency	%
Hypertension	22	27.5
Diabetes mellitus	18	22.5
Tuberculosis	8	10.0
None	32	40.0

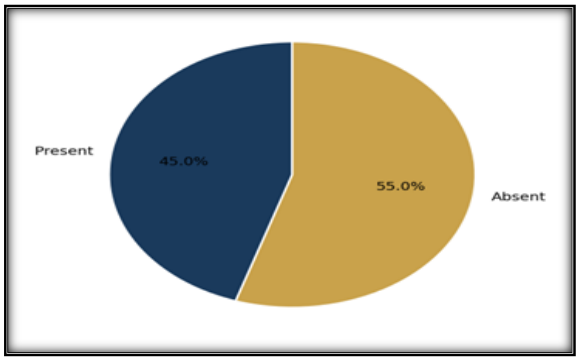

Figure 7: Past abdominal surgery history

Abdominal pain was universal, and three-quarters of patients presented more than 24 hours after symptom onset. Nearly half had a history of prior abdominal surgery, a recognised predisposing factor for adhesive obstruction.

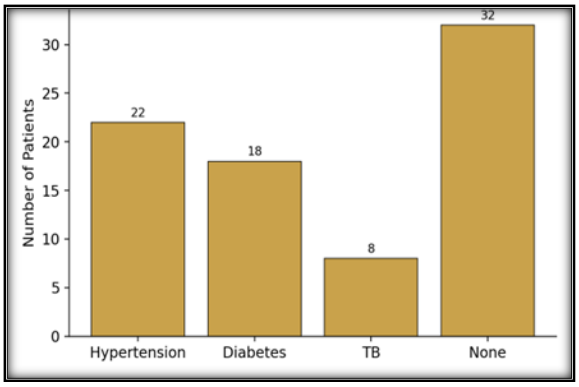

Figure 8: Comorbidities among study participants

Table 9: Type of intestinal obstruction

Type	Frequency	%
Acute	58	72.5
Subacute	22	27.5

Table 10: Aetiology of intestinal obstruction

Cause	Frequency	%
Adhesions	32	40.0
Hernia	14	17.5
Malignancy	12	15.0
Tuberculosis	8	10.0
Volvulus	6	7.5
Others	8	10.0

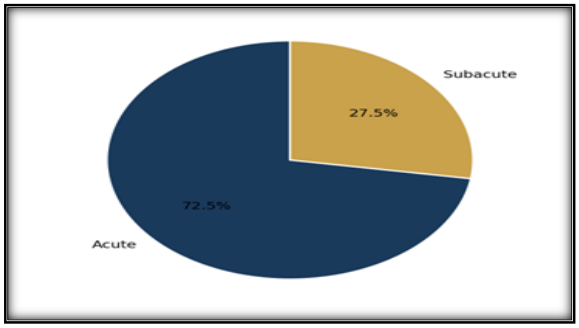

Figure 9: Type of intestinal obstruction

Acute presentation predominated, and adhesions were the leading identifiable cause, followed by hernia, malignancy and tuberculosis.

Radiological findings

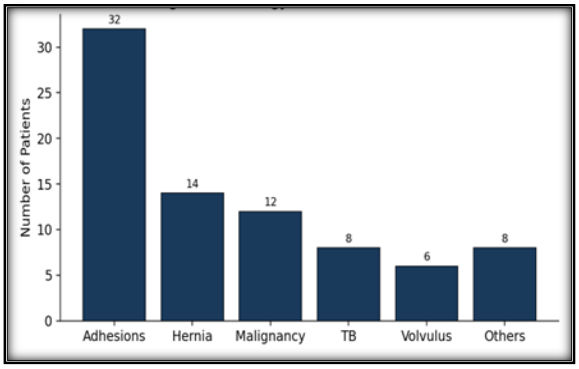

Figure 10: Aetiology of intestinal obstruction

Table 11: X-ray findings

Finding	Frequency	%
Air–fluid levels	74	92.5
Dilated bowel loops	70	87.5

Table 12: Ultrasonography (USG) findings

Finding	Frequency	%
Dilated loops	66	82.5
Free fluid	18	22.5
Mass lesion	10	12.5

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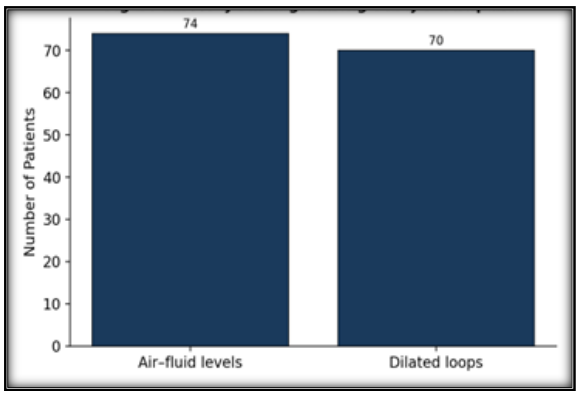

Figure 11: X-ray findings among study participants

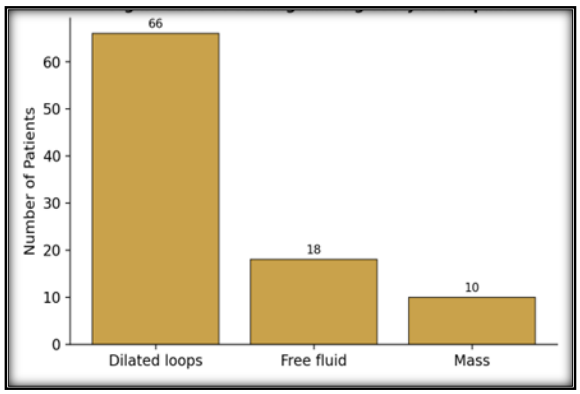

Figure 12: USG findings among study participants.

Table 13: CECT findings (patients who underwent CECT)

Finding	Frequency (n/52)	%
Level identified	48	92.3
Cause identified	45	86.5
Ischaemia	5	9.6

Table 14: Baseline haematological and biochemical parameters

Parameter	Mean ± SD
Haemoglobin (g/dL)	11.2 ± 1.8
TLC (cells/mm³)	11,800 ± 2,400
Serum sodium (mEq/L)	133.5 ± 4.2
Serum potassium (mEq/L)	3.6 ± 0.6

Air–fluid levels and dilated loops were the leading X-ray findings. Among the 52 patients who underwent CECT, the level and cause of obstruction were identified in most cases, and mesenteric ischaemia was seen in 9.6%. Baseline investigations showed mild anaemia, leukocytosis and mild hyponatraemia. Outcome measures

Table 15: Outcome of conservative management

Outcome	Frequency	%
Successful	68	85.0
Failed	12	15.0

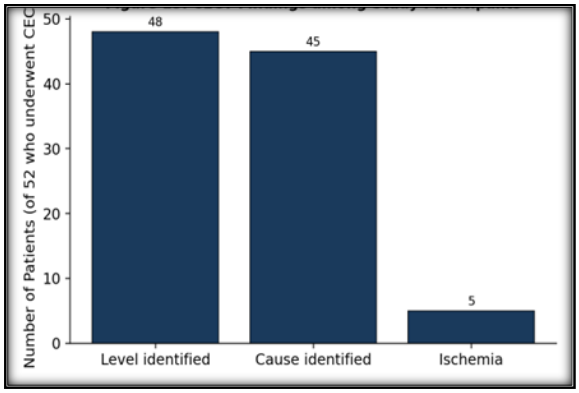

Figure 13: CECT findings among study participants

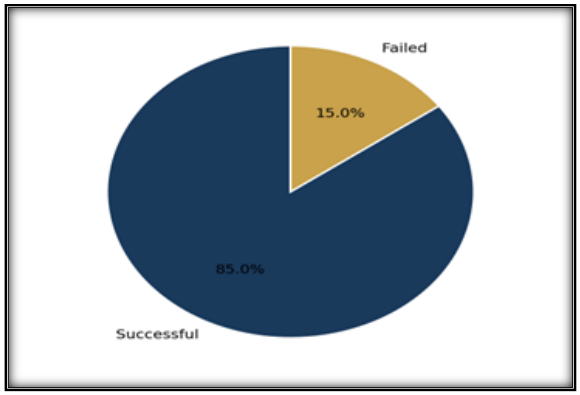

Figure 14: Outcome of conservative management

Table 16: TLC comparison between success and failure groups

Group	TLC (cells/mm³), Mean ± SD	p-value
Success	10,900 ± 1,800	—
Failure	13,400 ± 2,600	0.001

Table 17: Return of bowel sounds during treatment

Time	Frequency	%
0–24 hrs	20	25.0
24–48 hrs	36	45.0
48–72 hrs	18	22.5
>72 hrs	6	7.5

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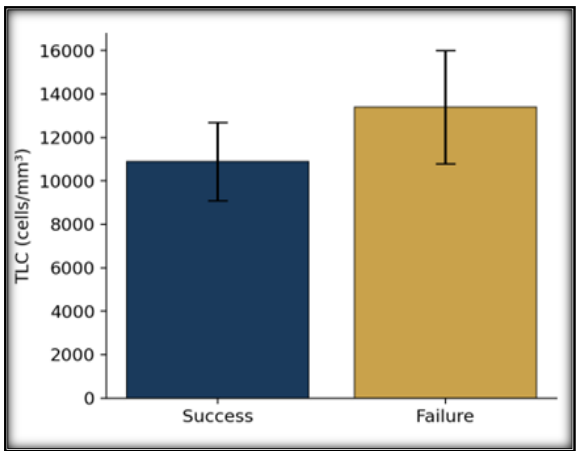

Figure 15: Mean TLC by treatment outcome

Conservative management succeeded in 85.0% of patients. Failure was associated with significantly higher TLC at presentation (p=0.001).

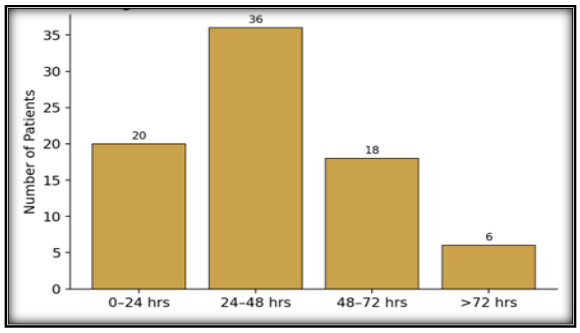

Figure 16: Return of bowel sounds during treatment

Table 18: Day of passage of flatus/stool

Day	Frequency	%
Day 1	12	15.0
Day 2	32	40.0
Day 3	24	30.0
Day ≥4	12	15.0

Table 19: Oral feeding status after return of bowel sounds

Status	Frequency	%
Allowed and tolerated	64	80.0
Allowed but not tolerated	10	12.5
Delayed	6	7.5

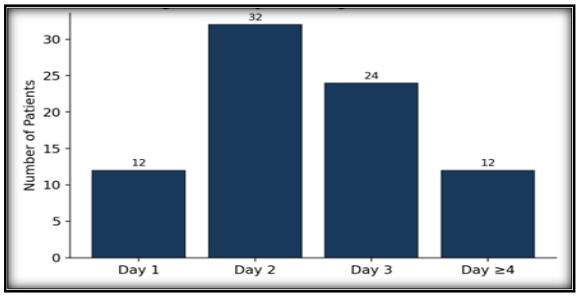

Figure 17: Day of passage of flatus/stool

Bowel sounds returned within 24–48 hours in most patients, flatus/stool was passed by day 2 in 40.0%, and oral feeding was tolerated in 80.0%.

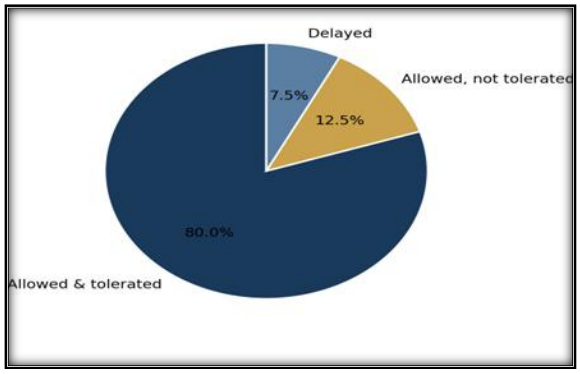

Figure 18: Oral feeding status after return of bowel sounds.

Table 20: Clinical parameters and their association with outcome

Parameter	Test	p-value	Inference
Haemoglobin vs outcome	t-test	0.08	Not significant
VAS score vs outcome	t-test	0.002	Significant
Length of stay (overall)	Descriptive	5.4 ± 2.1 days	—
Length of stay vs outcome	t-test	<0.001	Highly significant

Higher VAS pain score and longer hospital stay were significantly associated with poor outcome; baseline haemoglobin was not. Mean hospital stay was 5.4 ± 2.1 days.

Table 21: Complications during conservative management

Complication	Frequency	%
Electrolyte imbalance	12	15.0
Aspiration	3	3.8
None	65	81.2

Table 22: Requirement of ICU admission

ICU required	Frequency	%
Yes	8	10.0
No	72	90.0

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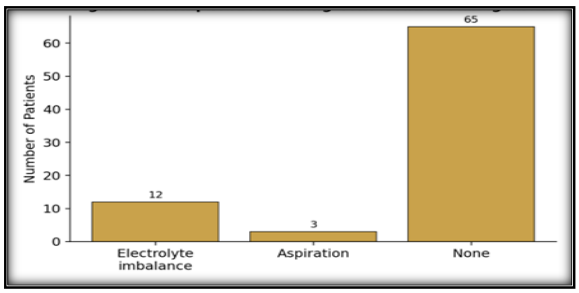

Figure 19: Complications during conservative management

Complications were infrequent overall, and only 10.0% of patients required ICU-level care.
Predictors of treatment failure

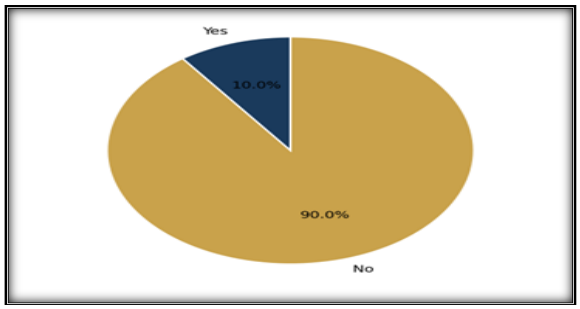

Figure 20: Requirement of ICU care

Table 23: Univariate logistic regression — predictors of failure

Variable	OR	95% CI	p-value
Age ≥50 years	2.4	1.1–5.6	0.03
TLC >12,000 cells/mm³	3.1	1.4–6.9	0.004
Malignancy	4.5	1.6–9.2	0.002

Table 24: Multivariate logistic regression — adjusted odds ratios

Variable	Adjusted OR	p-value
Age ≥50 years	2.1	0.041
TLC >12,000 cells/mm³	2.9	0.006
Malignancy	3.8	0.003

On univariate and multivariate analysis, age ≥50 years, TLC >12,000 cells/mm³ and malignant aetiology independently predicted failure of conservative management.

Summary of clinico-radiological correlation with outcome

Table 25: Clinical findings and their association with outcome (n=80)

Clinical parameter	n (%)	Association with outcome
Abdominal pain	80 (100.0%)	—
Abdominal distension	68 (85.0%)	—
Vomiting	61 (76.3%)	—
Obstipation	55 (68.8%)	—
Acute presentation	58 (72.5%)	—
Subacute presentation	22 (27.5%)	—
Past abdominal surgery	36 (45.0%)	p=0.017
Mean VAS score	7.2 ± 1.3	p=0.002
Mean TLC (cells/mm³)	11,800 ± 2,400	p=0.001

26: Radiological findings and their association with outcome (n=80)

Radiological parameter	n (%)	Association with outcome
Air–fluid levels (X-ray)	74 (92.5%)	—
Dilated bowel loops (X-ray)	70 (87.5%)	—
USG dilated loops	66 (82.5%)	—
Free fluid on USG	18 (22.5%)	p=0.042
Mass lesion on USG	10 (12.5%)	p=0.009
CECT — cause identified	45/52 (86.5%)	—
Mesenteric ischaemia on CECT	5 (9.6%)	p=0.004

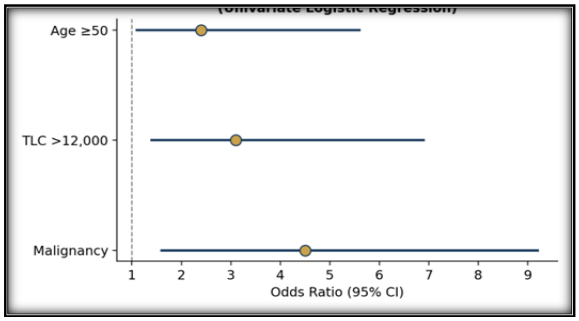

Figure 21: Predictors of failure of conservative management (odds ratios with 95% CI)

Beyond diagnosis, free peritoneal fluid, a mass lesion and mesenteric ischaemia on imaging each carried independent prognostic significance.

DISCUSSION

This study of 80 patients found a mean age of 44.8 years with peak representation in the 41–50 year group, consistent with other Indian series describing a predominantly middle-aged, economically productive population, and contrasting with the older mean age reported in higher-income settings, where

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adhesive disease related to malignancy surgery tends to present later in life. Male predominance mirrors the pattern reported across Indian series, plausibly reflecting occupational strain and earlier care-seeking among men, while the rural and lower-socioeconomic predominance reflects both referral catchment and disparities in access to earlier care.

Abdominal pain was universal, with distension, vomiting and obstipation in a majority — the classical tetrad. The 75.0% delayed presentation beyond 24 hours is consistent with resource-limited settings and likely contributed to higher leukocyte counts and pain scores at admission. Adhesions were the leading cause, followed by hernia and malignancy, paralleling other Indian series though differing from the higher proportion of adhesive disease in some Western cohorts. Tuberculosis accounted for 10.0% of cases, underscoring its continuing regional relevance, particularly in subacute presentations with weight loss or ascites.

Radiologically, X-ray findings confirmed obstruction but had limited specificity for cause; ultrasonography added value by identifying free fluid and mass lesions, both significantly associated with outcome, supporting its role as a bedside adjunct. CECT, performed in 52 patients, reliably identified the level and cause of obstruction and detected mesenteric ischaemia in almost one in ten, corroborating its established role as the most accurate modality for diagnosis and complication detection.

The 85.0% success rate is at the higher end of, but broadly comparable with, published series on non-operative management of adhesive and other partial obstructions, reaffirming that most carefully selected patients can be spared laparotomy. Failure was associated with higher TLC, pain scores and hospital stay, consistent with leukocytosis and clinical severity marking a more advanced, less resolvable process. On multivariate analysis, age ≥50 years, TLC >12,000 cells/mm³ and malignancy independently predicted failure, echoing prior work identifying these as markers warranting closer surveillance and a lower threshold for surgery — together offering a simple bedside risk-stratification tool.

Recovery was generally prompt, with most patients regaining bowel function within 48–72 hours, and complications and ICU requirement were infrequent, supporting the overall safety of a structured conservative protocol. Taken together, these findings support observing most patients with intestinal obstruction — particularly those without leukocytosis, advanced age or suspected malignancy — with nasogastric decompression, fluid/electrolyte correction and serial assessment, reserving early surgery for the smaller, identifiable high-risk subgroup.

CONCLUSION

Intestinal obstruction in this tertiary care North Indian population predominantly affected middle-aged, rural, male patients, most commonly due to postoperative adhesions, with abdominal pain, distension, vomiting and obstipation forming the near-universal clinical picture. Radiological evaluation proved central to both diagnosis and prognostication, with free fluid, mass lesions and mesenteric ischaemia on imaging each carrying independent prognostic weight. Conservative management was safe and effective in the large majority of appropriately selected patients (85.0%), with satisfactory recovery of bowel function and a low complication rate. Advanced age, leukocytosis and malignant aetiology independently predicted failure and identify a high-risk subgroup warranting closer monitoring and a lower threshold for early surgery. Structured clinico-radiological risk stratification may help balance avoidance of unnecessary laparotomy against the risk of delayed surgery.

RECOMMENDATIONS

1. Strengthen rural healthcare and peripheral diagnostic capacity given the rural predominance in this cohort.
2. Apply early risk stratification — closer monitoring and a lower surgical threshold for patients aged ≥50 years, TLC >12,000 cells/mm³, or suspected malignancy.
3. Adopt meticulous surgical technique and adhesion-prevention strategies to reduce future adhesive obstruction.
4. Optimise control of comorbidities such as hypertension and diabetes.
5. Prioritise early correction of fluid and electrolyte disturbance.
6. Encourage early mobilisation and timely oral feeding once bowel function returns.
7. Undertake larger, multicentric studies to validate these predictors.

LIMITATIONS

The observational design permits only associations, not causal relationships. A single-centre setting may introduce selection bias toward more severe presentations. Symptom duration and surgical history relied partly on recall, imaging was not uniform across all patients, long-term follow-up was not performed, and confounders such as nutritional status were not fully controlled for; findings are context-specific and may not generalise to other regions.

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