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Original Research Article

ETIO-CLINICO-PATHOLOGICAL PROFILE OF ACUTE INTESTINAL OBSTRUCTION AND ITS SURGICAL OUTCOMES AT A RURAL TERTIARY CARE HOSPITAL IN VIDARBHA, MAHARASHTRA: A PROSPECTIVE OBSERVATIONAL STUDY

Sathish J[1], Prasad Upganlawar[2], Vidhey Tirpude[3], Sandeep Ambedkar[3], Swapnil Rangari[3] , Sunil Wankhade[4]

[1]Postgraduate Resident, Department of General Surgery, Government Medical College, Gondia, Maharashtra, India
[2]Associate Professor and Head, Department of General Surgery, Government Medical College, Gondia, Maharashtra, India
[3]Assistant Professor, Department of General Surgery, Government Medical College, Gondia, Maharashtra, India
[4]Senior Resident, Department of General Surgery, Government Medical College, Gondia, Maharashtra, India

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Corresponding Author:
Dr. Sathish J,
Email: sharmasathish1624@gmail.com

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ABSTRACT

Background: Acute intestinal obstruction (AIO) is a common and potentially fatal surgical emergency. Published prospective data from rural tertiary care settings in India remain limited. This study provides a comprehensive etio-clinico-pathological profile and outcome analysis from a rural hospital in Vidarbha, Maharashtra. **Materials and Methods:** A prospective observational study was conducted over 18 months (April 2024 – October 2025) at the Department of General Surgery, Government Medical College, Gondia. One hundred consecutive patients aged ≥18 years with surgically managed acute intestinal obstruction were enrolled. Demographic, clinical, operative, histopathological, and outcome data were collected using a structured proforma. **Result:** Mean age was 49.2 years (range 19–88); 68% were male (M:F ratio 2.13:1). Postoperative adhesions and obstructed hernias were co-equal leading causes (32% each), followed by colorectal/gastric malignancy (12%), sigmoid volvulus (11%), intussusception (7%), and abdominal tuberculosis (5%). Small bowel obstruction predominated (73%). Emergency surgery was required in 80%; bowel resection and anastomosis was performed in 36%. Non-viable bowel was found in 18%. Overall postoperative complication rate was 15%, with septicaemia (6%) and surgical site infection (6%) as the leading complications. Overall in-hospital mortality was 5%. Septicaemia (case fatality rate 83.3%) and non-viable bowel (22.2%) were the strongest predictors of death. **Conclusion:** AIO in this rural population predominantly results from adhesions and hernias and carries a 5% mortality. Non-viable bowel and septicaemia are the critical determinants of death. Community-level elective hernia repair programmes, minimally invasive surgical adoption, and improved diagnostic infrastructure are essential to reducing morbidity and mortality.

INTRODUCTION

Acute intestinal obstruction (AIO) is one of the most formidable and frequently encountered surgical emergencies in clinical practice, demanding prompt recognition, accurate diagnosis, and timely intervention to avert life-threatening complications.[1] It is defined as a condition in which the normal aboral transit of intestinal contents is mechanically impeded, triggering a progressive sequence of pathophysiological events — intestinal distension, mucosal ischaemia, bacterial translocation, bowel necrosis, perforation, peritonitis, and septicaemic shock.[2]

Globally, intestinal obstruction accounts for approximately 12–16% of all emergency surgical admissions.[1,3] In India, reported incidences vary between 15% and 25% of all acute abdominal admissions across different institutional series.[4,5] Despite advances in perioperative care, mortality and morbidity remain disproportionately high in resource-constrained rural settings, where delayed presentation, limited diagnostic infrastructure,

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nutritional deprivation, and the prevalence of locally distinctive etiologies conspire to worsen outcomes.[6] The etiological profile in developing countries differs substantially from that in the West. While postoperative adhesions account for 60–75% of small bowel obstruction in high-income settings,[7] the Indian context is characterised by a greater diversity of causes, with hernias, abdominal tuberculosis, and sigmoid volvulus playing proportionally larger roles.[4,5,8] The management of AIO in rural India is further complicated by delayed presentation (often >48 hours from symptom onset), frequent finding of gangrenous bowel at exploration, and limited access to CT imaging and intensive care.

Despite the high burden of this condition, prospective, observational data comprehensively capturing the etio-clinico-pathological profile — including demographics, clinical and radiological findings, intraoperative findings, histopathology, and outcomes — from rural Indian tertiary care hospitals are scarce. The present study was therefore designed to address this gap, generating a robust, locally relevant dataset from Government Medical College, Gondia, a rural tertiary care hospital serving a predominantly agrarian and socioeconomically underprivileged population in Vidarbha, Maharashtra.

MATERIALS AND METHODS

Study Design and Setting: A prospective observational study was conducted at the Department of General Surgery, Government Medical College, Gondia, Maharashtra — a rural tertiary care teaching hospital affiliated with Maharashtra University of Health Sciences (MUHS), Nashik. The study period was 18 months: 1st April 2024 to 31st October 2025.

Sample Size: The minimum sample size was calculated using the formula for estimation of a single proportion: $n = Z^2pq/d^2$, assuming a 95% confidence level (Z = 1.96), expected prevalence p = 0.40 (q = 0.60), and allowable error d = 0.10. This yielded a minimum of 93 patients; with a 10% contingency for dropouts, the final target was set at 100 patients.

Inclusion and Exclusion Criteria

Patients aged ≥18 years diagnosed clinically and/or radiologically with acute intestinal obstruction who underwent surgical intervention and provided informed written consent were enrolled. Patients were excluded if they were below 18 years of age, had paralytic ileus secondary to metabolic causes, presented with postoperative ileus within 72 hours of prior surgery, were managed conservatively without surgical intervention, or had incomplete records.

Data Collection: All enrolled patients underwent a structured evaluation: detailed clinical history (duration, prior surgeries, comorbidities), physical examination (vitals, abdominal findings, hernia orifices), laboratory investigations (complete blood count, serum electrolytes, renal function tests, serum albumin), and radiological assessment (plain erect abdominal X-ray, ultrasonography; CT abdomen where indicated). Intraoperative findings — site and cause of obstruction, bowel viability, procedure performed — and all resected specimens were submitted for histopathological examination. Postoperative morbidity, in-hospital mortality, and duration of hospital stay were recorded. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants.

Statistical Analysis: Descriptive statistics were used to summarise demographic and clinical data. Frequencies and percentages were computed for categorical variables. Case fatality rates were calculated for key mortality predictors. Data were analysed using Microsoft Excel and SPSS v26.

RESULTS

Demographic Profile: A total of 100 patients were enrolled. The mean age was 49.2 years (range 19–88 years), with peak incidence in the 51–60 year group (23%). Males constituted 68%, yielding a male-to-female ratio of 2.13:1.

Table 1: Age distribution of patients with acute intestinal obstruction (n=100)

Age Group (Years)	No. of Patients	Percentage (%)
< 20	5	5%
21–30	13	13%
31–40	16	16%
41–50	19	19%
51–60	23	23%
61–70	15	15%
71–80	7	7%
> 80	2	2%
Total	100	100%

Clinical Presentation: The classical tetrad was present in the vast majority: abdominal pain (98%), constipation/obstipation (98%), vomiting (96%), and abdominal distension (94%). Fever was present in only 10%, reflecting presentation before systemic sepsis was fully established. Absent bowel sounds were noted in 93% and dehydration in 63%, indicating advanced obstruction at presentation. The majority of patients (71%) presented within 2–3 days of symptom onset.

Comorbidities and Risk Factors: Pre-existing known hernia (33%) and history of prior abdominal surgery (31%) were the most prevalent surgical risk factors. Alcohol use was documented in 33% and

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smoking in 30%. Diabetes mellitus was present in 16% and systemic hypertension in 15%.

Etiology: Postoperative adhesions and obstructed or strangulated hernias were co-equal leading etiologies (32% each), together accounting for 64% of all cases. The complete etiological distribution is presented in [Table 2], along with a comparison with key published Indian series.

Table 2: Etiological distribution of acute intestinal obstruction — present study vs. published Indian series

Etiology	Present Study n (%)	Kulkarni 2016	Gupta 2013	Wani 2011	Ansari 2015
Adhesions	32 (32%)	34%	32%	26%	22%
Obstructed Hernia	32 (32%)	28%	30%	38%	42%
Malignancy	12 (12%)	8%	10%	6%	9%
Sigmoid Volvulus	11 (11%)	14%	8%	18%	7%
Intussusception	7 (7%)	—	—	—	—
Abdominal TB	5 (5%)	7%	12%	5%	16%
Others	1 (1%)	—	—	—	—

Site of Obstruction: Small bowel obstruction predominated (73%), consistent with adhesions and hernias as the leading etiologies. Large bowel obstruction was observed in 21%, associated primarily with sigmoid volvulus and colorectal malignancy.

Surgical Management: Emergency surgery was required in 80% of patients; 78% were taken directly to operation without an initial conservative trial. Bowel resection and anastomosis was performed in 36%. ICU admission was necessary in 54%. The most common procedures were adhesiolysis (~25 cases), inguinal hernia exploration with herniorrhaphy (~20), and sigmoidectomy with colostomy or Hartmann's procedure (~13).

Table 3: Surgical management profile (n=100)

Parameter	Category	n	%
Initial Management	Direct to Surgery	78	78%
	Conservative First	22	22%
Type of Surgery	Emergency	80	80%
	Elective	20	20%
Resection & Anastomosis	Performed	36	36%
ICU Admission	Yes	54	54%

Intraoperative Findings and Bowel Viability: Non-viable or gangrenous bowel was encountered in 18% of patients. Patients with viable bowel (n=82) had a mortality of 1.2% (1/82), while those with non-viable bowel (n=18) had a mortality of 22.2% (4/18) — an 18-fold difference in case fatality rate, establishing bowel non-viability as the single strongest predictor of in-hospital mortality.

Table 4: Bowel viability versus in-hospital outcome

Bowel Viability	Discharged	Expired	Case Fatality Rate
Viable (n=82)	81	1	1.2%
Non-viable/Gangrenous (n=18)	14	4	22.2%
Total (n=100)	95	5	5.0%

Postoperative Complications: The overall complication rate was 15%. Septicaemia occurred in 6 patients and was the most lethal complication, with 5 of 6 patients dying (case fatality rate 83.3%). Surgical site infection (SSI) occurred in 6% and anastomotic leak in 3%; all anastomotic leaks were managed successfully without mortality.

Table 5: Postoperative complications and associated mortality (n=100)

Complication	n (%)	Deaths	Case Fatality Rate
No complication	85 (85%)	0	—
Septicaemia	6 (6%)	5	83.3%
Surgical Site Infection	6 (6%)	0	0%
Anastomotic Leak	3 (3%)	0	0%
Total with complications	15 (15%)	5	—

Overall Outcome and Mortality Predictors: Overall in-hospital mortality was 5% (5/100). All deaths were associated with septicaemia following gangrenous bowel or peritoneal contamination. Key mortality predictors are summarised in Table 6. Mean hospital stay was approximately 6–7 days; 85% of patients were discharged within 5–8 days.

Table 6: Mortality predictors and case fatality rates

Mortality Predictor	Total Cases	Deaths	Case Fatality Rate
Non-viable bowel	18	4	22.2%
Septicaemia	6	5	83.3%

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ICU admission	54	4	7.4%
Emergency surgery	80	5	6.3%

DISCUSSION

This prospective observational study provides a comprehensive etio-clinico-pathological profile of AIO from a rural tertiary care hospital in Vidarbha — a demographic context characterised by late presentation, limited diagnostic infrastructure, and a distinct etiological mix, all of which have direct bearing on surgical outcomes.

Demographic Profile

The mean age of 49.2 years and male preponderance (68%; M:F 2.13:1) are consistent with published Indian series.[4,5,8,9] The male predominance is principally attributable to the high incidence of inguinal hernias — all 24 inguinal hernia cases in this series were male — combined with the greater prior surgical history in males in this population. Age distribution reflected the predominating etiologies: adhesive and hernial obstruction in middle-aged adults, volvulus and malignancy in the elderly, and intussusception in younger adults.

Etiological Distribution: The equal contribution of adhesions (32%) and obstructed hernias (32%) is a notable finding. Most rural Indian series document hernia predominance over adhesions,[9,10] but the rising rates of prior abdominal surgery in rural catchment populations — reflected by the 31% history of prior abdominal surgery in this cohort — has elevated the adhesion burden, consistent with national trends.[5] The 12% contribution of colorectal malignancy is at the upper end of reported Indian figures and likely reflects both changing disease epidemiology and prolonged delays in symptom presentation that allow colonic tumours to reach the obstructing stage.

Sigmoid volvulus (11%) and abdominal tuberculosis (5%) mirror data from comparable Maharashtra-based series.[4] The relatively lower TB proportion compared to North Indian and Madhya Pradesh series,[5,10] may reflect regional differences in TB prevalence and the catchment population's proximity to urban diagnostic facilities. Intussusception (7%) was exclusively seen in adults in this series (per the ≥18-year inclusion criterion), all presenting as secondary intussusception with an identifiable lead point.

Clinical Presentation: The near-universal expression of the classical tetrad (≥94% each symptom) reflects the predominantly complete, mechanically advanced obstruction at presentation. The 93% prevalence of absent bowel sounds — paradoxically high for mechanical obstruction, in which hyperactive bowel sounds are classically described — indicates a predominantly adynamic, late-stage presentation. A symptom-to-presentation interval of 2–3 days in most patients, while more favourable than the 62–78 hours reported from North Indian rural series,[5,8] represents a clinically meaningful delay that likely accounts for the 18% gangrenous bowel rate.

Surgical Outcomes: The 80% emergency surgery rate, 36% resection rate, and 18% gangrenous bowel rate collectively reflect the advanced disease stage at presentation in this rural population — consistent with, if slightly more favourable than, comparable Indian series.[4,5,8,9] The overall complication rate of 15% compares very favourably with published data (30–36%),[4,8,9] and likely reflects the standardised perioperative protocol, systematic bowel viability assessment, and judicious anastomosis/stoma decision-making employed at this institution.

The overall mortality of 5% compares favourably with the 8–14% reported by comparable Indian series,[4,5,8,9] and with the NELA-reported 11–15% 30-day mortality for emergency laparotomy in the UK.[11] This favourable mortality likely reflects a combination of early ICU admission for high-risk patients, systematic preoperative resuscitation, and appropriate escalation of antibiotic therapy. The critical finding, however, is the 18-fold difference in mortality between patients with viable (1.2%) and non-viable (22.2%) bowel — and the 83.3% case fatality rate among septicaemic patients — which identify the prevention of bowel gangrene and the aggressive management of sepsis as the two highest-priority interventions to further reduce mortality in this population.

Comparison with Published Series

Table 7: Comparative outcome metrics — present study vs. published Indian series on acute intestinal obstruction

Parameter	Present Study	Kulkarni 2016	Gupta 2013	Wani 2011	Singh 2008
n	100	100	120	96	87
Mean Age (yr)	49.2	46.8	44.5	47.3	45.1
Male (%)	68%	65%	70%	72%	68%
Gangrenous Bowel (%)	18%	22%	28%	22%	41% (rural)
Resection Rate (%)	36%	38%	34%	30%	32%
Mortality (%)	5%	8%	9%	10.4%	14% (rural)
SSI Rate (%)	6%	18%	22%	22%	20%

Implications for Rural Surgical Practice: The findings carry several direct implications for rural surgical policy and practice. First, the 32% burden of hernia-related obstruction represents the clearest preventive opportunity: elective inguinal hernia repair is a safe, cost-effective operation that eliminates the risk of acute obstruction and strangulation. Subsidised elective hernia surgery

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camps and training of primary care physicians to identify and refer symptomatic hernias are high-yield interventions. Second, the growing adhesion burden (32%) calls for adoption of minimally invasive surgical approaches across rural abdominal surgery to reduce lifelong adhesion formation risk. Third, improved CT availability at the rural tertiary care level would reduce diagnostic delays and enable earlier detection of strangulation before gangrene. Fourth, community-level health education to reduce symptom-to-presentation intervals remains the highest-leverage intervention to reduce gangrenous bowel rates and downstream mortality.

Strengths and Limitations: This study's strengths include its prospective design, consecutive enrolment eliminating selection bias, comprehensive multi-domain data capture, and systematic histopathological examination of all resected specimens. Limitations include the sample size of 100, which limits multivariate analysis of mortality predictors; the exclusion of conservatively managed cases, which may skew the etiological distribution toward more severe presentations; limited CT availability, which may have underestimated early strangulation rates; and the absence of medium- and long-term follow-up data. Future studies with larger samples and longer follow-up are needed to validate mortality predictors and assess quality of life outcomes.

CONCLUSION

Acute intestinal obstruction in this rural tertiary care setting predominantly affects middle-aged males, is most commonly caused by postoperative adhesions and obstructed hernias (32% each), and requires emergency surgical intervention in 80% of cases. The overall in-hospital mortality was 5% — a favourable result compared with comparable published series. Non-viable bowel and septicaemia are the two critical determinants of adverse outcomes. Preventive strategies — particularly community-level elective hernia repair programmes, adoption of minimally invasive surgical approaches to reduce adhesion burden, and improvement of CT imaging infrastructure at rural tertiary hospitals — offer the greatest potential to reduce preventable morbidity and mortality from this common and serious surgical emergency in resource-limited settings.

REFERENCES

1. Maglinte DDT, Kelvin FM, Sandrasegaran K, et al. Radiology of small bowel obstruction: contemporary approach and controversies. Abdom Imaging. 2005;30(2):160–178.
2. Moran BJ. Intestinal obstruction in the acute abdomen. In: Moran BJ, Saber A, eds. Intestinal Obstruction. Philadelphia: Lippincott; 2007:3–18.
3. Fevang BT, Fevang J, Stangeland L, et al. Complications and death after surgical treatment of small bowel obstruction: a 35-year institutional experience. Ann Surg. 2004;239(2):193–200.
4. Kulkarni RN, Doibale MK, Deshmukh AS. Prospective study of intestinal obstruction. Int J Recent Sci Res. 2016;7(8):13010–13015.
5. Gupta R, Sharma R, Saini S. A prospective study of acute intestinal obstruction. J Evol Med Dent Sci. 2013;2(42):8028–8035.
6. Singh G, Abhijith G, Chakarwarti A. A clinical study of intestinal obstruction. IJSR. 2008;5(3):1196–1201.
7. Menzies D, Ellis H. Intestinal obstruction from adhesions — how big is the problem? Ann R Coll Surg Engl. 1990;72(1):60–63.
8. Wani RA, Parray FQ, Bhat NA, et al. Nontraumatic perforation of the hollow viscus. World J Emerg Surg. 2011;6(1):12.
9. Ansari MA. Clinical study of intestinal obstruction. Int J Sci Res. 2015;4(10):1–3.
10. Bhansali SK. Abdominal tuberculosis: experiences with 300 cases. Am J Gastroenterol. 1977;67(4):324–337.
11. NELA Project Team. Fifth Patient Report of the National Emergency Laparotomy Audit. Royal College of Anaesthetists; 2019.
12. Abbas S, Bisset IP, Parry BR. Oral water-soluble contrast for the management of adhesive small bowel obstruction. Cochrane Database Syst Rev. 2007;(3):CD004651.
13. Catena F, Di Saverio S, Ansaloni L, et al. Water-soluble contrast medium (Gastrografin) value in adhesive small intestine obstruction (ASIO): a prospective, randomized, controlled, clinical trial. World J Surg. 2008;32(10):2293–2304.
14. Taourel PG, Fabre JM, Pradel JA, et al. Value of CT in the diagnosis and management of patients with suspected acute small bowel obstruction. Am J Roentgenol. 1995;165(5):1187–1192.
15. Hennessey DB, Burke JP, Ni-Dhonochu T, et al. Preoperative hypoalbuminaemia is an independent risk factor for the development of surgical site infection following gastrointestinal surgery: a multi-institutional study. Ann Surg. 2010;252(2):325–329.

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