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Original Research

Clinical Presentation, Management Patterns, and Short-Term Outcomes of Intestinal Obstruction: A Prospective Observational Study.

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Abstract

Background: Intestinal obstruction is a frequent surgical emergency with substantial morbidity when bowel ischaemia, strangulation, or delayed presentation occurs. Local evidence describing the spectrum of causes and short-term outcomes remains limited. **Objectives:** To assess the clinical presentation, aetiological profile, management patterns, and short-term outcomes of patients with intestinal obstruction and to identify factors associated with in-hospital complications. **Methods:** This prospective observational study included 80 consecutive adults with clinical and radiological evidence of intestinal obstruction admitted to Government Medical College, Mahabubnagar, Telangana, India, from August 2024 to March 2025. Demographic, clinical, laboratory, radiological, treatment, and 30-day outcome data were recorded. Associations with complications were evaluated using Fisher's exact test; a p-value <0.05 was considered significant. **Results:** The mean age was 49.1 ± 17.0 years, and 52 (65.0%) patients were male. Abdominal pain (95.0%), vomiting (80.0%), and distension (76.3%) were the leading symptoms. Small-bowel obstruction occurred in 56 (70.0%) patients. Adhesions (27.5%), obstructed hernia (22.5%), malignancy (16.3%), and volvulus (11.3%) were the principal causes. Conservative treatment succeeded in 28 (35.0%) patients, while 52 (65.0%) required surgery. Complications occurred in 17 (21.3%), intensive care was required in 11 (13.8%), and four patients died (5.0%). Delayed presentation, peritonitis, strangulation, and operative management were significantly associated with complications. **Conclusion:** Adhesions and obstructed hernias were the predominant causes of intestinal obstruction. Most patients required operative treatment. Early recognition of peritonitis and strangulation, prompt resuscitation, and timely surgery are central to reducing morbidity and mortality.

Keywords: intestinal obstruction; small-bowel obstruction; adhesions; obstructed hernia; emergency surgery; short-term outcomes.

Introduction

Intestinal obstruction is a common acute surgical condition caused by interruption of the normal passage of gastrointestinal contents. The obstruction can involve the small or large bowel and can be partial or complete. Its clinical course ranges from uncomplicated luminal blockage to closed-loop obstruction, strangulation, bowel ischaemia, necrosis, perforation, and sepsis. Abdominal pain, vomiting, abdominal distension, and failure to pass stools or flatus are the classical presenting features, although their timing and intensity vary with the anatomical level, duration, and underlying cause. Despite advances in imaging, perioperative care, and critical care, intestinal obstruction continues to produce substantial morbidity, prolonged hospitalization, and avoidable mortality, particularly when presentation or operative intervention is delayed.^[1,2]

The aetiological pattern is influenced by previous surgery, age, geographic setting, hernia prevalence, malignancy burden, and access to timely surgical care. Postoperative adhesions are now the leading cause of small-bowel obstruction in many settings, whereas obstructed external hernias remain important where elective hernia repair is delayed. Malignancy is a major cause of large-bowel obstruction, and volvulus contributes a variable proportion, particularly among older adults and populations with predisposing anatomical or dietary factors. Tuberculous and other benign intestinal strictures retain clinical relevance in endemic regions. Therefore, institutional data are necessary because management pathways based solely on evidence from different healthcare environments can overlook local disease patterns.^[3-5]

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Initial management focuses on rapid assessment, fluid and electrolyte correction, bowel rest, nasogastric decompression when indicated, analgesia, and close serial examination. Computed tomography supports confirmation of the site and cause of obstruction and helps detect transition points, closed-loop configuration, free fluid, reduced bowel-wall enhancement, and other features associated with ischaemia. Patients without peritonitis, strangulation, perforation, or haemodynamic instability can undergo a carefully monitored trial of conservative treatment, particularly when partial adhesive obstruction is suspected. In contrast, obstructed hernia, clinical deterioration, complete obstruction with failure to resolve, or evidence of compromised bowel requires timely surgery. Operative procedures range from adhesiolysis and hernia repair to bowel resection, anastomosis, stoma formation, and definitive treatment of volvulus or malignancy.^[6,7]

Prospective evaluation of presentation, management, and early outcomes can clarify where delays occur and which bedside features identify patients at increased risk. Such evidence also supports clinical audit, resource allocation, and standardization of emergency surgical care. The present study was undertaken to describe the demographic and clinical profile, laboratory and radiological findings, anatomical distribution, and aetiology of intestinal obstruction among patients treated at a tertiary government medical college hospital. The objectives were to document conservative and operative management patterns, measure in-hospital and 30-day outcomes, and examine the association of delayed presentation, peritonitis, bowel strangulation, and treatment approach with in-hospital complications.

Materials and Methods

Study design and setting

A hospital-based prospective observational study was conducted in the Department of General Surgery at Government Medical College, Mahabubnagar, Telangana, India, from August 2024 to March 2025. The study was prepared and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology principles.^[8] The institution functions as a tertiary referral centre for urban and surrounding rural populations and provides round-the-clock emergency surgical, radiological, anaesthesia, operating theatre, intensive care, and inpatient services.

Participants

Consecutive patients aged 18 years or older who presented with symptoms and signs suggestive of mechanical intestinal obstruction and had radiological confirmation were eligible. Diagnosis was based on the clinical presentation together with plain abdominal radiography, ultrasonography, or contrast-enhanced computed tomography, as clinically appropriate. Patients with postoperative paralytic ileus without a mechanical transition point, isolated gastric outlet obstruction, congenital obstruction, primary mesenteric vascular occlusion without mechanical obstruction, or incomplete essential records were excluded. Patients who declined participation were also excluded.

Sample size and sampling

The minimum sample size was estimated using the single-proportion formula, $n = Z^2pq/d^2$. With a 95% confidence level, an expected proportion of 50% to provide the maximum sample requirement, and an absolute precision of 11%, the calculated sample was approximately 79; it was rounded to 80. Consecutive sampling was used until the required sample was achieved.

Data collection and definitions

After initial stabilization, demographic characteristics, comorbidities, previous abdominal or pelvic surgery, symptom duration, clinical findings, laboratory values, and imaging results were recorded using a structured case record form. Obstruction was classified as small- or large-bowel and as partial or complete using clinical and radiological findings. Strangulation was recorded when radiological, operative, or pathological evidence indicated impaired bowel perfusion or non-viability. Delayed presentation was defined as arrival more than 48 hours after symptom onset. Management details included resuscitation, nasogastric decompression, antibiotics, conservative treatment, time to surgery, operative procedure, and bowel resection. Conservative success was defined as sustained resolution of symptoms with passage of stools or flatus and tolerance of oral intake without surgery during the index admission.^[3,6,7]

Outcome assessment

The primary outcomes were management pattern and the occurrence of one or more in-hospital complications. Secondary outcomes included return of bowel function, hospital stay, intensive care admission, reoperation, in-hospital mortality, discharge status, and readmission or death within 30 days. Patients were followed through inpatient records and a scheduled clinical or telephone assessment after discharge.

Ethical considerations

Necessary Permissions were obtained before starting the study. Written informed consent was obtained from each participant or an authorized representative. Clinical decisions were made by the treating surgical team and were not altered for the study.

Statistical analysis

Data were analysed using [statistical software and version to be inserted]. Continuous variables were summarized as mean $\pm$ standard deviation, and categorical variables as frequencies and percentages. Hospital stay between conservative and operative groups was compared using an independent-samples t-test. Fisher's exact test was used to assess associations between selected clinical factors and complications because of small expected cell counts. A two-sided p-value <0.05 was considered statistically significant.

Results

Participant recruitment

During the study period, 85 patients presenting with clinical and radiological features of intestinal obstruction were assessed for eligibility. Five patients were excluded: three did not meet the eligibility criteria and two declined participation. The remaining 80 patients were enrolled and included in the final analysis. Complete clinical, management, in-hospital outcome, and 30-day follow-up data were available for all participants.

Demographic and clinical characteristics

The mean age of the study population was 49.1 ± 17.0 years, with a range of 18-82 years. Twenty-three (28.8%) patients were older than 60 years. There were 52 (65.0%) males and 28 (35.0%) females, giving a male-to-female ratio of 1.9:1. Previous abdominal or pelvic surgery was documented in 24 (30.0%) patients. Hypertension was present in 22 (27.5%), diabetes mellitus in 15 (18.8%), and previously diagnosed malignancy in 8 (10.0%) patients.

Abdominal pain was the most frequent presenting symptom, reported by 76 (95.0%) patients. Vomiting occurred in 64 (80.0%), abdominal distension in 61 (76.3%), and failure to pass stools or flatus in 55 (68.8%) patients. Fourteen (17.5%) presented with fever. Twenty-four (30.0%) patients presented within 24 hours of symptom onset, 33 (41.3%) between 24 and 48 hours, and 23 (28.8%) after 48 hours. Clinical dehydration was observed in 29 (36.3%), tachycardia in 31 (38.8%), hypotension in 10 (12.5%), and signs of peritonitis in 15 (18.8%). The demographic and clinical characteristics are summarized in Table 1.

Table 1. Demographic and clinical characteristics of the study participants

Characteristic	Value
Age, years, mean $\pm$ SD	49.1 $\pm$ 17.0
Age >60 years	23 (28.8%)
Male sex	52 (65.0%)
Female sex	28 (35.0%)
Previous abdominal or pelvic surgery	24 (30.0%)
Hypertension	22 (27.5%)
Diabetes mellitus	15 (18.8%)
Known malignancy	8 (10.0%)
Abdominal pain	76 (95.0%)
Vomiting	64 (80.0%)
Abdominal distension	61 (76.3%)
Obstipation	55 (68.8%)
Fever	14 (17.5%)
Tachycardia	31 (38.8%)
Clinical dehydration	29 (36.3%)
Hypotension	10 (12.5%)
Signs of peritonitis	15 (18.8%)

Laboratory and radiological findings

The mean haemoglobin concentration was 11.8 ± 2.1 g/dL, and the mean total leucocyte count was $13.4 \pm 5.2 \times 10^3$ cells/mm³. Leucocytosis was identified in 49 (61.3%) patients. Electrolyte abnormalities were observed in 26 (32.5%), with hypokalaemia being the most frequent abnormality. Plain abdominal radiography demonstrated multiple air-fluid levels or dilated bowel loops in 60 (75.0%) patients. Ultrasonography was performed in 46 (57.5%), while contrast-enhanced computed tomography was undertaken in 62 (77.5%). Radiological features suggestive of bowel ischaemia or strangulation were present in 14 (17.5%) patients. Small-bowel obstruction was identified in 56 (70.0%) patients, whereas 24 (30.0%) had large-bowel obstruction. Partial obstruction was present in 49 (61.3%), and complete obstruction in 31 (38.8%) patients (Table 2).

Table 2. Laboratory, imaging, and anatomical findings

Finding	Value
Haemoglobin, g/dL, mean $\pm$ SD	11.8 $\pm$ 2.1
Total leucocyte count, $\times 10^3$ cells/mm ³ , mean $\pm$ SD	13.4 $\pm$ 5.2
Leucocytosis	49 (61.3%)
Electrolyte abnormality	26 (32.5%)
Multiple air-fluid levels/dilated loops on radiograph	60 (75.0%)
Ultrasonography performed	46 (57.5%)
Contrast-enhanced computed tomography performed	62 (77.5%)
Radiological ischaemia/strangulation features	14 (17.5%)
Small-bowel obstruction	56 (70.0%)
Large-bowel obstruction	24 (30.0%)
Partial obstruction	49 (61.3%)
Complete obstruction	31 (38.8%)

Aetiological distribution

Postoperative adhesions were the most frequent cause of intestinal obstruction, accounting for 22 (27.5%) cases. Obstructed or incarcerated abdominal wall hernias were identified in 18 (22.5%) patients. Malignancy was responsible for obstruction in 13 (16.3%), followed by volvulus in 9 (11.3%) and intestinal tuberculosis-related strictures in 6 (7.5%). Among the 56 patients with small-bowel obstruction, adhesions and obstructed hernias were the predominant causes. Malignancy and volvulus were more frequently observed among patients with large-bowel obstruction. The complete aetiological distribution is shown in Table 3.

Table 3. Aetiology of intestinal obstruction

Aetiology	n (%)
Postoperative adhesions	22 (27.5)
Obstructed or incarcerated hernia	18 (22.5)
Gastrointestinal malignancy	13 (16.3)
Volvulus	9 (11.3)
Tuberculous intestinal stricture	6 (7.5)
Benign non-tuberculous stricture	5 (6.3)
Intussusception	4 (5.0)
Faecal impaction	3 (3.8)
Total	80 (100.0)

Management patterns

All patients received initial fluid resuscitation, correction of electrolyte abnormalities, bowel rest, and clinical monitoring. Nasogastric decompression was performed in 72 (90.0%) patients. Intravenous antibiotics were administered to 57 (71.3%), particularly in suspected strangulation, perforation, peritonitis, or anticipated surgery. Twenty-eight (35.0%) patients improved with conservative management. Operative management was required in 52 (65.0%); 21 underwent surgery within 6 hours of admission, 23 between 6 and 24 hours, and 8 after 24 hours. The main indications were peritonitis, suspected strangulation or bowel ischaemia, obstructed hernia, and failure of conservative treatment.

Resection of a non-viable or obstructed bowel segment was performed in 20 patients. Fourteen underwent resection with primary anastomosis and six required resection with stoma formation. Adhesiolysis was performed in 13 patients and hernia reduction with definitive repair in 11. Management patterns and operative procedures are presented in Table 4.

Table 4. Management patterns and operative procedures

Management/procedure	n (%)	Denominator
Nasogastric decompression	72 (90.0)	All patients
Intravenous antibiotics	57 (71.3)	All patients
Successful conservative management	28 (35.0)	All patients
Operative management	52 (65.0)	All patients
Surgery within 6 hours	21 (26.3)	All patients
Surgery between 6 and 24 hours	23 (28.8)	All patients
Surgery after 24 hours	8 (10.0)	All patients
Resection with primary anastomosis	14 (26.9)	Operated patients
Adhesiolysis	13 (25.0)	Operated patients
Hernia reduction and repair	11 (21.2)	Operated patients
Resection with stoma formation	6 (11.5)	Operated patients
Derotation with fixation or pexy	4 (7.7)	Operated patients
Reduction of intussusception	2 (3.8)	Operated patients
Strictureplasty	2 (3.8)	Operated patients

Short-term clinical outcomes

Clinical resolution without surgery was achieved in all 28 conservatively managed patients. The mean time to resolution of obstructive symptoms in this group was 2.1 ± 0.8 days. The mean time to return of bowel function among surgically managed patients was 4.0 ± 1.5 days. The overall mean duration of hospital stay was 8.4 ± 4.9 days. Patients treated conservatively had a significantly shorter hospital stay than those undergoing surgery (4.8 ± 1.9 versus 10.4 ± 4.6 days; $p < 0.001$).

Seventeen (21.3%) patients developed one or more in-hospital complications. Postoperative wound infection occurred in 7 (8.8%), prolonged postoperative ileus in 6 (7.5%), pulmonary complications in 4 (5.0%), sepsis in 4 (5.0%), acute kidney injury in 3 (3.8%), and wound dehiscence in 3 (3.8%). Individual patients could experience more than one complication. Eleven (13.8%) required intensive care unit admission, and 3 (3.8%) underwent reoperation because of anastomotic leakage, persistent intra-abdominal sepsis, or stoma-related complications.

Four patients died during hospitalization, producing an in-hospital mortality rate of 5.0%. Three deaths were attributed to sepsis with multiorgan dysfunction following bowel gangrene, while one resulted from a cardiopulmonary complication. All four patients who died had undergone emergency surgery. Among the 76 patients discharged alive, 5 (6.6%) were readmitted within 30 days: two for recurrent adhesive obstruction, two for surgical-site infection, and one for a stoma-related complication. No additional deaths occurred during the 30-day follow-up period. Short-term outcomes are summarized in Table 5.

Table 5. Short-term outcomes of intestinal obstruction

Outcome	Value
Resolution time after conservative treatment, days, mean $\pm$ SD	2.1 ± 0.8
Return of bowel function after surgery, days, mean $\pm$ SD	4.0 ± 1.5
Overall hospital stay, days, mean $\pm$ SD	8.4 ± 4.9
Hospital stay after conservative treatment, days	4.8 ± 1.9
Hospital stay after operative treatment, days	10.4 ± 4.6
One or more in-hospital complications	17 (21.3%)
Intensive care unit admission	11 (13.8%)
Reoperation	3 (3.8%)
In-hospital mortality	4 (5.0%)
Discharged alive	76 (95.0%)
Thirty-day readmission among survivors	5/76 (6.6%)

Factors associated with in-hospital complications

Complications were significantly more frequent among patients presenting more than 48 hours after symptom onset than among those presenting within 48 hours (39.1% versus 14.0%; $p = 0.031$). Patients with clinical signs of peritonitis had a markedly higher complication rate than those without peritonitis (60.0% versus 12.3%; $p < 0.001$). Similarly, radiological or intraoperative evidence of strangulation was associated with increased morbidity (56.3% versus 12.5%; $p < 0.001$). Complications were more frequent among surgically managed patients than among conservatively managed patients (30.8% versus 3.6%; $p = 0.004$), reflecting greater disease severity and a higher prevalence of bowel compromise among patients selected for surgery (Table 6).

Table 6. Factors associated with in-hospital complications

Clinical factor	Complication present	Complication absent	p-value
Presentation >48 hours (n=23)	9 (39.1%)	14 (60.9%)	0.031
Presentation within 48 hours (n=57)	8 (14.0%)	49 (86.0%)	
Peritonitis present (n=15)	9 (60.0%)	6 (40.0%)	<0.001
Peritonitis absent (n=65)	8 (12.3%)	57 (87.7%)	
Strangulation present (n=16)	9 (56.3%)	7 (43.8%)	<0.001
Strangulation absent (n=64)	8 (12.5%)	56 (87.5%)	
Operative management (n=52)	16 (30.8%)	36 (69.2%)	0.004
Conservative management (n=28)	1 (3.6%)	27 (96.4%)	

Fisher's exact test was used. The p-value is displayed on the first row of each two-category comparison.

Discussion

This prospective study demonstrates that intestinal obstruction affected a broad adult age range, with a clear male predominance and a substantial burden of delayed presentation. Abdominal pain, vomiting, distension, and obstipation formed the dominant symptom complex, consistent with the established clinical spectrum of mechanical obstruction. Small-bowel obstruction accounted for 70% of cases. This distribution resembles large clinical series in which small-bowel disease predominated, although the precise balance between small- and large-bowel obstruction differs according to referral patterns and population characteristics.[1,2]

Postoperative adhesions were the leading aetiology, followed by obstructed or incarcerated hernia. The prominence of adhesions reflects the expanding lifetime exposure to abdominal and pelvic surgery. International guidance identifies adhesions as the principal cause of small-bowel

obstruction and supports initial non-operative care when peritonitis, strangulation, and ischaemia are absent. However, the relatively high contribution of obstructed hernia in this cohort indicates that preventable delays in elective hernia evaluation and repair remain relevant. Malignancy was the third most frequent cause and was concentrated in large-bowel obstruction, while volvulus and tuberculous strictures added locally important diagnostic complexity.[3-5]

Computed tomography was performed in over three-quarters of patients and showed possible ischaemia or strangulation in 17.5%. CT assessment is valuable not only for confirming obstruction and its transition point but also for identifying reduced bowel-wall enhancement, mesenteric fluid, closed-loop configuration, and other high-risk findings. In the present study, clinically or radiologically suspected compromised bowel appropriately prompted early operative management. Peritonitis and strangulation were strongly associated with complications, supporting their role as decisive indicators for urgent exploration rather than prolonged conservative observation.[6,9]

Conservative treatment succeeded in 35% of participants, whereas 65% required surgery. The operative proportion was higher than in cohorts restricted to uncomplicated adhesive obstruction because this study included hernias, malignancy, volvulus, complete obstruction, and peritonitis. Resection was required in 20 operated patients, indicating a considerable burden of non-viable or structurally diseased bowel. Patients undergoing surgery had a longer hospital stay and accounted for nearly all complications. This association should not be interpreted as harm caused by surgery because operative patients had greater baseline severity and more complex aetiology.[3,7]

Overall morbidity was 21.3%, and in-hospital mortality was 5.0%. Delayed presentation beyond 48 hours was associated with a higher complication rate. Earlier research has linked increasing time before necessary surgery with bowel resection, postoperative morbidity, longer hospitalization, and greater resource use.[10,11] The observed mortality was confined to emergency surgical patients and was mainly related to sepsis and multiorgan dysfunction after bowel gangrene. These findings emphasize repeated examination, early CT where indicated, rapid resuscitation, and timely source control. The 30-day readmission rate of 6.6% among survivors also confirms that obstruction has consequences beyond the index admission, particularly in adhesive disease, where recurrence remains an important long-term concern.[12,13] For colonic volvulus, guideline-directed endoscopic or surgical treatment according to bowel viability remains important to prevent recurrence and bowel loss.[14]

LIMITATIONS

This study was conducted at a single tertiary hospital with a modest sample size, limiting external generalizability. Aetiological subgroups were small, preventing adjusted multivariable analysis. Management decisions reflected treating-surgeon judgement and clinical severity, creating confounding by indication when conservative and operative outcomes were compared. Follow-up was restricted to 30 days; therefore, long-term recurrence, incisional complications, stoma outcomes, and quality of life were not assessed.

Conclusion

Intestinal obstruction in this cohort predominantly involved the small bowel, with postoperative adhesions and obstructed hernias as the leading causes. Abdominal pain, vomiting, and distension were the principal presenting features. Nearly two-thirds of patients required operative management, and one-quarter of operated patients underwent bowel resection with primary anastomosis. In-hospital complications affected approximately one-fifth of participants, while mortality was 5.0%. Presentation after 48 hours, peritonitis, and bowel strangulation were strongly associated with adverse outcomes. Prompt clinical assessment, appropriate imaging, vigorous resuscitation, close monitoring during conservative treatment, and timely surgery for suspected bowel compromise are essential to improve short-term outcomes in intestinal obstruction. Standardized emergency pathways can further reduce avoidable treatment delays.

References

1. Markogiannakis H, Messaris E, Dardamanis D, Pararas N, Tzertzemelis D, Giannopoulos P, et al. Acute mechanical bowel obstruction: clinical presentation, etiology, management and outcome. *World J Gastroenterol*. 2007;13(3):432-437. doi:10.3748/wjg.v13.i3.432.
2. Foster NM, McGory ML, Zingmond DS, Ko CY. Small bowel obstruction: a population-based appraisal. *J Am Coll Surg*. 2006;203(2):170-176. doi:10.1016/j.jamcollsurg.2006.04.020.
3. ten Broek RPG, Krielen P, Di Saverio S, Coccolini F, Biffi WL, Ansaloni L, et al. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2017 update of the evidence-based guidelines from the World Society of Emergency Surgery ASBO Working Group. *World J Emerg Surg*. 2018;13:24. doi:10.1186/s13017-018-0185-2.
4. Pisano M, Zorcolo L, Merli C, Cimbanassi S, Poiasina E, Ceresoli M, et al. 2017 WSES guidelines on colon and rectal cancer emergencies: obstruction and perforation. *World J Emerg Surg*. 2018;13:36. doi:10.1186/s13017-018-0192-3.
5. Tian BWCA, Vigutto G, Tan E, van Goor H, Bendinelli C, Abu-Zidan F, et al. WSES consensus guidelines on sigmoid volvulus management. *World J Emerg Surg*. 2023;18(1):34. doi:10.1186/s13017-023-00502-x.
6. Millet I, Taourel P, Ruyer A, Molinari N. Value of CT findings to predict surgical ischemia in small bowel obstruction: a systematic review and meta-analysis. *Eur Radiol*. 2015;25(6):1823-1835. doi:10.1007/s00330-014-3440-2.
7. Maung AA, Johnson DC, Piper GL, Barbosa RR, Rowell SE, Bokhari F, et al. Evaluation and management of small-bowel obstruction: an Eastern Association for the Surgery of Trauma practice management guideline. *J Trauma Acute Care Surg*. 2012;73(5 Suppl 4):S362-S369. doi:10.1097/TA.0b013e31827019de.
8. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*. 2007;370(9596):1453-1457. doi:10.1016/S0140-6736(07)61602-X.
9. Zielinski MD, Eiken PW, Bannon MP, Heller SF, Lohse CM, Huebner M, et al. Small bowel obstruction—who needs an operation? A multivariate prediction model. *World J Surg*. 2010;34(5):910-919. doi:10.1007/s00268-010-0479-3.
10. Bickel NA, Federman AD, Aufses AH Jr. Influence of time on risk of bowel resection in complete small bowel obstruction. *J Am Coll Surg*. 2005;201(6):847-854. doi:10.1016/j.jamcollsurg.2005.07.005.
11. Richardson S, Chervu NL, Mabeza RM, Cho NY, Ng A, Verma A, et al. Impact of delayed intervention following admission for small bowel obstruction: a contemporary analysis. *Surg Open Sci*. 2023;16:8-13. doi:10.1016/j.sopen.2023.09.002.
12. Fevang BTS, Fevang J, Lie SA, Søreide O, Svanes K, Viste A. Long-term prognosis after operation for adhesive small bowel obstruction. *Ann Surg*. 2004;240(2):193-201. doi:10.1097/01.sla.0000132988.50122.de.
13. Behman R, Nathens AB, Mason S, Byrne JP, Hong NL, Pechlivanoglou P, et al. Association of surgical intervention for adhesive small-bowel obstruction with the risk of recurrence. *JAMA Surg*. 2019;154(5):413-420. doi:10.1001/jamasurg.2018.5248.
14. Alavi K, Poylin V, Davids JS, Patel SV, Felder S, Valente MA, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of colonic volvulus and acute colonic pseudo-obstruction. *Dis Colon Rectum*. 2021;64(9):1046-1057. doi:10.1097/DCR.0000000000002159.