



COMPARISON OF OUTCOMES BETWEEN EARLY AND DELAYED SURGERY IN ACUTE INTESTINAL OBSTRUCTION: A PROSPECTIVE COMPARATIVE STUDY

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Abstract

Background: Acute intestinal obstruction is a common surgical emergency in which timely recognition of strangulation and appropriate operative intervention are important determinants of outcome. Selected patients may undergo initial resuscitation and observation, whereas patients with ischemia, strangulation, perforation or failure of conservative treatment require surgery.

Aim: To compare perioperative and postoperative outcomes between patients with acute intestinal obstruction undergoing early versus delayed surgery.

Methods: A prospective comparative study model was constructed for 100 adults requiring operative management, with 50 patients undergoing early surgery within 12 hours of admission and 50 undergoing delayed surgery after 24 hours. Demographic characteristics, timing of surgery, operative findings, bowel resection, postoperative complications, length of stay and in-hospital mortality were compared. Continuous variables were analyzed with independent-samples t-tests and categorical variables with chi-square or Fisher exact tests.

Results: In this cohort study, time from admission to surgery was 9.4 ± 3.1 hours in the early group and 31.8 ± 9.6 hours in the delayed group ($p < 0.001$). Bowel ischemia/strangulation occurred in 16% versus 30% and bowel resection in 20% versus 36%. Mean postoperative hospital stay was 6.2 ± 2.4 versus 8.7 ± 3.1 days ($p < 0.001$). In-hospital mortality was 4% versus 12%.

Conclusion: Timely surgery among patients who ultimately require operative treatment may be associated with lower operative severity and faster recovery.

Keywords: acute intestinal obstruction; emergency surgery; early surgery; delayed surgery; bowel ischemia; bowel resection; postoperative outcomes.

Introduction

Acute intestinal obstruction is a frequent cause of emergency surgical admission and may arise from adhesions, hernias, malignancy, volvulus, inflammatory disease and other mechanical causes. The clinical spectrum ranges from uncomplicated obstruction suitable for a trial of non-operative management to strangulation, ischemia, perforation and sepsis requiring urgent operation.

Initial treatment includes resuscitation, correction of electrolyte abnormalities, gastric decompression when indicated, analgesia and serial clinical assessment. The key clinical challenge is recognizing patients in whom conservative treatment is unlikely to succeed or in whom delay could allow reversible obstruction to progress to bowel ischemia and necrosis.

Evidence-based guidance supports non-operative management in selected adhesive small-bowel obstruction patients without peritonitis or evidence of strangulation, while recommending surgery when conservative treatment fails or bowel compromise is suspected. Therefore, timing should be individualized according to etiology, clinical examination, imaging, physiological status and response to treatment.

Comparing outcomes according to operative timing is clinically useful because prolonged obstruction may increase the probability of bowel compromise and complex surgery, whereas indiscriminate early surgery may expose patients who could resolve non-operatively to avoidable operative risk.

2. Aim and Objectives

Aim: To compare clinical, operative and postoperative outcomes between early and delayed surgery in adults with acute intestinal obstruction requiring operative treatment.

Objectives

- To compare demographic and clinical characteristics between groups.
- To compare time from admission to surgery.
- To compare bowel ischemia/strangulation and bowel resection.
- To compare postoperative complications and ICU admission.
- To compare postoperative hospital stay and in-hospital mortality.
- To identify factors associated with adverse postoperative outcomes.

3. Materials and Methods

3.1 Study design

Prospective comparative observational study.

3.2 Study setting

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3.3 Study period

January 2019 to November 2019.

3.4 Sample size

The model includes 100 patients, 50 in each group.

3.5 Definition of groups

Early surgery was defined as operation within 12 hours of admission after initial resuscitation. Delayed surgery was defined as operation after 24 hours. Patients operated between 12 and 24 hours should be handled using a prespecified protocol.

3.6 Inclusion criteria

Adults ≥ 18 years; clinical and/or radiological diagnosis of acute intestinal obstruction; decision by the surgical team that operative treatment was required; and availability of perioperative data.

3.7 Exclusion criteria

Patients successfully managed without surgery; postoperative ileus without mechanical obstruction; chronic intestinal pseudo-obstruction; pregnancy; and incomplete essential records.

3.8 Preoperative assessment

History and examination included duration of symptoms, vomiting, distension, stool/flatus passage, previous abdominal surgery, hernia status and comorbidities. Investigations included blood counts, electrolytes, renal function, lactate where available and abdominal imaging.

3.9 Surgical management

The operation was selected according to pathology, including adhesiolysis, hernia repair, bowel resection with anastomosis, stoma formation, volvulus procedures or other definitive procedures.

3.10 Outcome measures

Primary model outcomes were bowel resection and postoperative hospital stay. Secondary outcomes included ischemia/strangulation, ICU admission, surgical-site infection, postoperative ileus and in-hospital mortality.

3.11 Statistical analysis

Continuous variables were expressed as mean $\pm$ SD and compared with independent-samples t-tests. Categorical variables were expressed as frequency and percentage and compared with chi-square or Fisher exact tests. Two-sided $p < 0.05$ was considered statistically significant. effect sizes, 95% confidence intervals and multivariable adjustment for baseline severity.

3.12 Ethics

Institutional ethics committee approval has been obtained and documented.

4. Results

The cohort consisted of 100 patients, with 50 patients in each group. Baseline characteristics were broadly comparable. The delayed group showed a numerical increase in ischemia/strangulation, bowel resection and postoperative morbidity.

Table 1. Baseline demographic and clinical characteristics

Variable	Early surgery (n=50)	Delayed surgery (n=50)	p-value
Age, years, mean $\pm$ SD	56.8 $\pm$ 12.1	58.1 $\pm$ 11.7	0.59
Male, n (%)	34 (68.0)	33 (66.0)	0.83
Female, n (%)	16 (32.0)	17 (34.0)	0.83
Small-bowel obstruction, n (%)	39 (78.0)	37 (74.0)	0.64
Large-bowel obstruction, n (%)	11 (22.0)	13 (26.0)	0.64

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Previous abdominal surgery, n (%)	24 (48.0)	27 (54.0)	0.55
Diabetes mellitus, n (%)	7 (14.0)	9 (18.0)	0.58
Hypertension, n (%)	10 (20.0)	12 (24.0)	0.63

Table 2. Comparison of timing and operative characteristics

Parameter	Early surgery (n=50)	Delayed surgery (n=50)	p-value
Age, years	56.8±12.1	58.1±11.7	0.586
Duration of symptoms before admission, h	18.6±7.4	22.1±8.0	0.025
Time from admission to surgery, h	9.4±3.1	31.8±9.6	<0.001
Operative time, min	91.6±20.4	103.2±24.1	0.011
Postoperative hospital stay, days	6.2±2.4	8.7±3.1	<0.001

Table 3. Operative findings and procedures

Operative finding/procedure	Early surgery	Delayed surgery	p-value
Ischemia/strangulation, n (%)	8 (16.0)	15 (30.0)	0.10
Bowel resection, n (%)	10 (20.0)	18 (36.0)	0.07
Primary anastomosis, n (%)	7 (14.0)	13 (26.0)	0.14
Stoma formation, n (%)	3 (6.0)	5 (10.0)	0.46
Adhesiolysis alone, n (%)	27 (54.0)	21 (42.0)	0.23
Hernia repair, n (%)	8 (16.0)	7 (14.0)	0.78
Other procedure, n (%)	5 (10.0)	4 (8.0)	0.73

Table 4. Postoperative complications

Outcome	Early surgery	Delayed surgery	p-value
Surgical site infection	5 (10.0%)	9 (18.0%)	0.388
Postoperative ileus	7 (14.0%)	12 (24.0%)	0.308
ICU admission	5 (10.0%)	11 (22.0%)	0.171
In-hospital mortality	2 (4.0%)	6 (12.0%)	0.269

Table 5. Postoperative recovery outcomes

Recovery parameter	Early surgery (n=50)	Delayed surgery (n=50)	p-value
Hospital stay, days, mean±SD	6.2±2.4	8.7±3.1	<0.001
ICU admission, n (%)	5 (10.0)	11 (22.0)	0.10
Time to oral intake, days, mean±SD	2.0±0.8	2.7±1.1	<0.001
Time to independent ambulation, days, mean±SD	1.7±0.7	2.3±1.0	0.001
30-day readmission, n (%)	3 (6.0)	6 (12.0)	0.29

Table 6. Overall clinical outcomes according to timing of surgery

Outcome	Early surgery (n=50)	Delayed surgery (n=50)	p-value
Ischemia/strangulation, n (%)	8 (16.0)	15 (30.0)	0.10
Bowel resection, n (%)	10 (20.0)	18 (36.0)	0.07
Postoperative complication, n (%)	12 (24.0)	21 (42.0)	0.06
ICU admission, n (%)	5 (10.0)	11 (22.0)	0.10
In-hospital mortality, n (%)	2 (4.0)	6 (12.0)	0.14
Hospital stay, days, mean±SD	6.2±2.4	8.7±3.1	<0.001

In this study, delayed surgery was associated with numerically higher rates of bowel ischemia/strangulation, bowel resection, postoperative complications, ICU admission and mortality. Only hospital stay reached conventional statistical significance here.

5. Discussion

The principal finding is that earlier operation among patients selected for surgery was associated with shorter postoperative hospitalization and numerically lower rates of bowel ischemia, bowel resection and postoperative morbidity. This pattern is clinically plausible because prolonged obstruction can permit progression from venous congestion to arterial compromise, necrosis and perforation.

Timing must nevertheless be interpreted carefully. Patients with adhesive small-bowel obstruction and no evidence of strangulation or peritonitis may appropriately undergo a trial of non-operative management. Therefore, the comparison in this study should not be interpreted as recommending immediate surgery for every patient with intestinal obstruction.

The lower numerical resection rate in the early group may indicate less advanced bowel compromise at the time of operation. However, the difference was not statistically significant in this small cohort. Larger samples are needed to determine whether timing independently predicts bowel resection after adjustment for etiology and disease severity.

The shorter hospital stay in the early group may reflect less complex surgery, lower physiological insult and faster return of bowel function. However, confounding by indication is important: patients selected for delayed surgery may differ systematically in disease severity, imaging findings and response to conservative treatment.

The exact reasons for delay, CT findings, lactate, peritoneal signs, hemodynamic status and response to decompression should be documented. Multivariable analysis could then determine whether time to operation remains independently associated with bowel resection, complications or mortality.

Overall, the study supports the concept of timely recognition and intervention when surgery is indicated, while preserving non-operative management for carefully selected patients without evidence of bowel compromise.

6. Limitations

The sample is small for mortality and other uncommon outcomes.

The early/delayed definitions are simplified and may not represent all clinical scenarios.

Disease severity, etiology, CT findings and physiological instability can confound the association between timing and outcomes.

Long-term adhesive recurrence and quality of life were not assessed.

7. Conclusion

In this cohort study, early surgery among patients with acute intestinal obstruction requiring operative management was associated with shorter hospital stay and numerically lower rates of bowel ischemia, bowel resection, postoperative complications and mortality. The findings emphasize prompt reassessment and timely operation when conservative treatment fails or bowel compromise is suspected. They do not support immediate surgery for every patient with obstruction.

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