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Relationship between duration of preoperative symptoms and postoperative ileus for small bowel obstruction

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ABSTRACT

Background: Factors associated with postoperative ileus and increased resource utilization for patients who undergo operative intervention for small-bowel obstruction are not extensively studied. We evaluated the association between total duration of preoperative symptoms and postoperative outcomes in this population.

Materials and methods: We performed a retrospective review of patients who underwent surgery for small-bowel obstruction (2013-2016). Clinical data were recorded. Total duration of preoperative symptoms included all symptoms before operation, including those before presentation. Primary endpoint was time to tolerance of diet. Secondary endpoints included length of stay, total parenteral nutrition use, and intensive care unit admission. Association between variables and outcomes was analyzed using univariable analysis, multivariable Poisson modeling, and *t*-test to compare groups.

Results: Sixty-seven patients were included. On presentation, the median duration of symptoms before hospitalization was 2 d (range 0-18 d). Total duration of preoperative symptoms was associated with time to tolerance of diet on univariable analysis (Pearson's moment correlation: 0.28, 95% confidence interval: 0.028-0.5, $P = 0.03$). On multivariable analysis, ascites was correlated with time to tolerance of diet ($P < 0.01$), but total duration of preoperative symptoms ($P = 0.07$) was not. Length of stay (Pearson's correlation: 0.24, 95% confidence interval: −0.02 to 0.47, $P = 0.07$) was not statistically different in patients with longer preoperative symptoms. Symptom duration was not statistically associated with intensive care unit ($P = 0.18$) or total parenteral nutrition ($P = 0.3$) utilization.

Conclusions: Our findings demonstrate that preoperative ascites correlated with increased time to tolerance of diet, and duration of preoperative symptoms may be related to postoperative ileus.

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Introduction

Small-bowel obstructions (SBO) account for almost 300,000 hospital admissions per year.[1-4] Previous studies have demonstrated that the average cost per admission for SBO ranges from $30,000-$38,000, which given the approximate number of admissions per year, is estimated to cost 9-11.4 billion dollars per year.[5] Current guidelines recommend initial nonoperative management for patients without generalized peritonitis or evidence of clinical deterioration.[6] Only 30% of patients who present with SBO require immediate operative intervention. However, of the 70% of patients who undergo initial nonoperative management, 23%-36% do not resolve and eventually require operative intervention.[5] Given the large amount of patients who undergo operative intervention for SBO, factors associated with longer postoperative ileus and higher utilization of resources would be helpful to define high-risk populations.

Surprisingly, few studies have been performed which evaluate factors associated with prolonged ileus and increased resource utilization in patients who undergo operative intervention for SBO. One simple factor which may be associated with poor outcomes in this population is total duration of preoperative symptoms. In our study, we aim to evaluate the association between the total duration of preoperative symptoms, including symptoms before hospitalization on postoperative ileus, length of stay (LOS), intensive care unit (ICU) admission, and total parenteral nutrition (TPN) use.

Methods

After approval by the Institutional Review Board, we performed a retrospective review of consecutive patients older than 18 y who underwent operative intervention for mechanical bowel obstruction (i.e., adhesive, intussusception, hernia, malignancy, and so forth) between January 2013 and June 2016. Patients with isolated large-bowel obstruction, no bowel obstruction at the time of surgery, or large-bowel involvement with SBO were excluded from the study. Patients with two operative interventions for SBO were only included once for analysis.

Patient demographics, duration of symptoms, nasogastric tube (NGT) output in the 24 h before surgery, operative details, radiographic findings, and postoperative clinical data were collected by chart review. Total duration of preoperative symptoms was defined as duration of prehospitalization symptoms plus duration of symptoms after admission before operation in days. Nasogastric tube output in the 24 h before operation was recorded for patients with nasogastric tubes.

The time to tolerance of diet was defined as the time after surgery to tolerance of input without further nausea or vomiting. Length of stay (LOS) was time from admission to discharge in days. Operative time was defined as start of incision to time of closing incision (minutes; continuous). Emergent operative intervention was defined as the decision to operate based on clinical signs of decompensation (i.e., peritonitis, unstable vitals) and/or radiographic signs of bowel ischemia. All other cases were classified as planned operative intervention, including any non-emergent surgery without signs of bowel ischemia or clinical decompensation. The decision to operate electively was based on surgeon discretion.

Statistical analysis

Variables were analyzed via bivariate and multivariable techniques. Pearson's product–moment correlation was used

Table 1 – Patient demographics.

Characteristic ($n = 67$)	Median or N	Range or %
Age (y)	68	20-95
Sex		
Male	31	46%
Female	36	54%
Comorbidities		
Diabetes mellitus	11	17%
Hypertension	19	29%
Coronary artery disease	5	7.6%
Chronic kidney disease	8	12%
Previous malignancy	5	7.6%
Previous cerebrovascular accident	6	9.1%
Thyroid disease	5	7.6%
Liver disease	1	1.5%
Timing of operation		
Emergent	40	60%
Non-emergent	27	40%
Operative duration (min)	146	53-354
Cause of bowel obstruction		
Adhesions	50	74%
Internal hernia	11	16%
Abdominal wall hernia	8	12%
Closed loop obstruction	13	19%
Volvulus	4	6%
Small-bowel mass	3	4%
Other	4	6%
Bowel ischemia in operating room	18	27%
Ascites in operating room	22	33%
Operative approach		
Laparoscopy	14	21%
Laparotomy	53	79%
Time to tolerance of diet (d) ($n = 60$)	5	0-21
Length of stay (d)		
Total length of stay	9	3-75
Postoperative length of stay	7	1-74
Postoperative resource utilization		
Total parenteral nutrition	15	22%
Intensive care unit admission	23	34%
Disposition		
Death	6	9.0%
Home without services	29	43%
Services, rehabilitation, or hospice	16	24%