



Original research

CT scan findings do not predict outcome of nonoperative management in small bowel obstruction: Retrospective analysis of 108 consecutive patients



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HIGHLIGHTS

- Small bowel obstruction, likely secondary to adhesions from previous abdominal surgery, is a very common occurrence and a relevant acute care problem.
- Computed tomography is routinely used in the diagnostic evaluation of small bowel obstruction.
- Certain CT scan findings have been proposed as indicative of need for surgical intervention in adhesive small bowel obstruction.
- Our experience does not show that CT scan findings alone can reliably predict failure of nonoperative management in adhesive small bowel obstruction.

ARTICLE INFO

Article history:

Received 21 August 2015

Received in revised form

13 December 2015

Accepted 17 January 2016

Available online 22 January 2016

Keywords:

Bowel obstruction

Small bowel

Computed tomography

Surgical therapy

ABSTRACT

Objectives: The study purpose was to investigate the ability of Emergency Department CT scan to predict the need for operative intervention in patients hospitalized for small bowel obstruction (SBO) likely secondary to adhesions (ASBO) and initially managed nonoperatively.

Design: Retrospective case series. Statistical analysis was done with independent-samples t-test and chi-square to identify correlation between variables and outcome of nonoperative management.

Setting: Tertiary care academic medical center.

Patients and Methods: Of 200 consecutive patients hospitalized for SBO, 108 were included in the study with a diagnosis of ASBO and received initial nonoperative management. Exclusion criteria were need for emergency surgery (e.g. peritonitis) or other diagnoses (e.g. neoplasms, hernias, Crohn's disease). CT findings such as transition point, small bowel faeces, high grade obstruction, and abnormal vascular course were correlated with failure of nonoperative management.

Results: Only 18 patients (16.7%) required operative intervention, while the other 90 (83.3%) were successfully discharged after nonoperative care. There was no correlation between CT scan findings and treatment outcome.

Conclusions: Emergency Department CT scan findings do not significantly alter management decisions in patients admitted for ASBO and managed initially with nonoperative care.

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1. Introduction

Small bowel obstruction (SBO) remains a common clinical entity that accounts for over 300,000 hospital admissions and approximately \$3 billion in health care costs per year in the United States

Abbreviations and Acronyms: ASBO, adhesive small bowel obstruction; CT, computerized tomography; ED, emergency department; NOM, non-operative management; OM, operative management; SBO, small bowel obstruction; WBC, white blood cell.

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[1,2]. A certain percentage of these patients require emergency surgical intervention for findings indicative of peritonitis from perforation or bowel ischemia. The majority of patients with SBO likely secondary to peritoneal adhesions from previous abdominal surgery (adhesive small bowel obstruction – ASBO) are initially managed non-operatively with hospitalization, intravenous hydration, fasting, nasogastric tube drainage and observation. However, some of these patients develop worsening signs or symptoms, or simply fail to improve after a few days in the hospital, thus requiring operative intervention.

Over the last 10–15 years, computed tomography (CT) has

become the standard of care in the initial diagnostic assessment of SBO, and for virtually every patient presenting to an Emergency Department with abdominal pain [3]. While there are several informative elements associated with SBO on CT, radiologists tend to emphasize in their reports certain findings such as “a transition point”, the “small bowel faeces” sign, a “high-grade obstruction” and an “abnormal vascular course”. The implication of such “high-risk” findings is that they may correlate with a higher likelihood that the SBO will fail to improve with nonoperative management and may warrant early surgical intervention [4]. However, from a therapeutic decision making standpoint, whether or not such CT findings actually help risk stratify this group of patients remains a matter of controversy [5].

The purpose of our study was to determine whether or not “high-risk” radiologic findings were in fact associated with a greater need for operative management in patients hospitalized for observation with a presumptive diagnosis of ASBO at a tertiary care institution.

2. Materials and methods

The Hospital Institutional Review Board approved this study. The Department of Surgery billing database for a 12 month-period was used to generate a list of consecutive patients who were admitted with a diagnosis of SBO. Variables entered into the analysis were demographic data including age and gender, admission history and physical exam, admission laboratory data, radiology reports, operative notes if applicable, and discharge summaries. Additional historical data including past surgical history and presenting signs and symptoms were considered as well. In the review of radiology reports, attention was devoted to entering whether or not key words such as “transition point”, “small bowel feces sign”, “high grade obstruction”, and “abnormal vascular course” were used. Discharge summaries and, if present, operative reports were reviewed to determine if non-operative management of small bowel obstruction was successful. Patients who underwent surgical intervention within 24 h of admission were excluded from the study, as they did not represent patients who were admitted for the purposes of conservative management of small bowel obstruction.

Statistical analysis was done with independent samples t-test and chi-square to identify a correlation between patient characteristics, management groups, radiologic variables, and need for operative management (OM) versus success of nonoperative management (NOM).

3. Results

A total of 200 patients were admitted from the Emergency

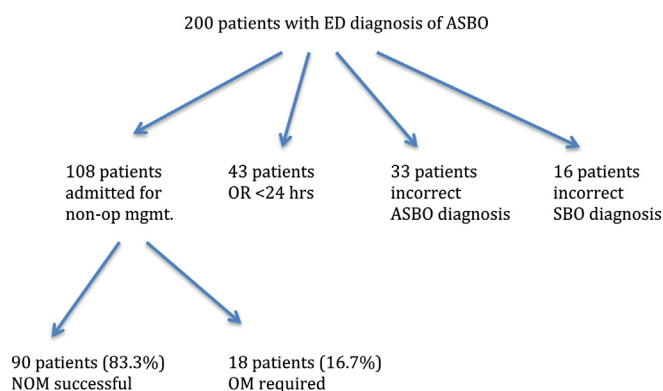


Fig. 1. Management allocation for patients admitted for ASBO.

Department with a diagnosis of small bowel obstruction during the one-year period. Their management allocation is reported in Fig. 1. Ninety-two patients were excluded from the study for a variety of reasons: 43 patients required prompt operative intervention (e.g. peritonitis, free intra-abdominal air or lack of history or previous abdominal surgery), 33 were found to have causes for SBO other than adhesions (e.g. hernia, Crohn's, diverticulitis, appendicitis, neoplasm) and 16 patients had other diagnoses upon review of the admission history and physical (e.g. large bowel obstruction, paralytic ileus).

The 108 patients that qualified for this study were 53 males and 55 females, ranging in age between 23 and 96 years. They all had a confirmed admitting diagnosis of ASBO and were initially treated nonoperatively. No patient in this group had findings of ascites by CT scan. The initial diagnosis of SBO was made by CT scan of the abdomen and pelvis, with intravenous contrast, obtained in the Emergency Department. No oral contrast was administered, in consideration of the risk of vomiting and aspiration pneumonia. Of this group, 18 patients (16.7%) underwent an operation during the same admission for small bowel obstruction that failed to improve with nonoperative management (operative management group = OM). Only 3 of these patients underwent a follow-up CT scan during the same hospitalization, showing persistent SBO. All these patients had intraoperative findings of peritoneal adhesions as the cause of SBO and were successfully treated without mortality. The remaining 90 patients (83.3%) were successfully managed conservatively and were discharged from the hospital without undergoing an operation (nonoperative management group = NOM). None of these patients required a follow-up CT scan during the same hospitalization. No patient in the NOM group was readmitted within 30 days for recurrent SBO after discharge. Patient characteristics between the operative and nonoperative groups were similar, as shown in Table 1.

The frequency of the four mentioned radiologic signs in the OM group and in the NOM group was compared and is reported in Table 2.

None of the above mentioned radiologic findings on admission CT scan had a statistically significant association with the success or failure of non-operative management in our study. No patient was managed differently, or had a different outcome, on the basis of the described “high-risk” radiographic findings.

4. Discussion

The goal of this study was to provide additional data to assess the value of the information obtained from a CT scan of the abdomen and pelvis in patients who present to an Emergency

Table 1
Patient demographics and characteristics.

	OM group	NOM group	p value
Age, years (mean)	58.35	60.23	0.49
Male gender, n (%)	11 (61.1)	42 (46.7)	0.10
Hx abdominal surgery, n (%)	18 (100)	90 (100)	
Race, n (%)			
White	13 (72.2)	68 (75.6)	0.84
Non-white	5 (27.8)	22 (24.4)	0.69
Ethnicity, n (%)			
Hispanic	4 (22.2)	25 (27.8)	0.53
Non-hispanic	14 (77.8)	65 (72.2)	0.082
Diabetes Mellitus, n (%)	3 (16.7)	14 (15.6)	0.58
COPD, n (%)	2 (11.1)	8 (8.9)	0.44
History of CHF, n (%)	1 (5.6)	4 (4.4)	0.34
Obesity, n (%)	3 (16.7)	12 (13.3)	0.52
Renal failure, n (%)	2 (11.1)	7 (7.8)	0.45
WBC count (cells/mcL), mean	9.5	8.9	0.91

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