



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1489568>Available online at: <http://www.iajps.com>

Research Article

**BOWEL OBSTRUCTION-INDICATION AND ADVANCES IN
SURGICAL MANAGEMENT**Doaa Hussain Alzaher¹, Zahra Ali M Al Saif², Zakeyah Adel Almubarak³¹Medical university of Warsaw, Poland²Jagiellonian University College of medicine, Krakow Poland³Medical University of Lublin, Poland**Abstract:**

Introduction: Small bowel obstruction (SBO) constitutes approximately 15% of the acute surgical gastrointestinal admissions as well as approximately 15% of emergency admissions for abdominal pain. The majority of SBO patients are managed with nasogastric tube decompression. But, the mortality of SBO is still high and significant ranging from 2% to 8% per year and might increase to as high as 25%. Management of SBO properly is critical to avoid unneeded surgical procedures for SBO that can be treated medically to improve patient morbidity and to prevent delays in cases in which surgery is necessary to decrease mortality.

Aim of work: This article reviews the clinical presentation, pathophysiology, diagnosis, management, and recent advancement in surgical procedure.

Methodology: We did a systematic search for bowel obstruction and advanced surgical management using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>).

Conclusions: The majority of SBO patients are managed with nasogastric tube decompression. Management of SBO properly is critical to avoid unneeded surgical procedures for SBO that can be treated medically to improve patient morbidity and to prevent delays in cases in which surgery is necessary to decrease mortality. Presentations of SBO include the followings: history of previous abdominal or pelvic surgery, radiation, history of cancer or mass; especially cancers of the ovaries and colon. Plain Radiography is usually the first step done, it is cheap and widely available in many settings. CT scanning is the study of choice. Initially in the emergency department, the management of SBO consists of aggressive fluid resuscitation and bowel decompression. If there are signs of strangulations, the case is considered for surgical emergency. A surgical option for SBO is indicated for several etiologies and conditions. SBO can be effectively managed with the laparoscopic approach.

Keywords: small bowel obstruction, acute abdomen, abdominal pain, abdominal surgery

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Please cite this article in press Doaa Hussain Alzaher *et al.*, **Bowel Obstruction-Indication and Advances in Surgical Management.**, *Indo Am. J. P. Sci.*, 2018; 05(11).

INTRODUCTION:

Small bowel obstruction (SBO) constitutes approximately 15% of the acute surgical gastrointestinal admissions as well as approximately 15% of emergency admissions for abdominal pain [1,2]. SBO is a major cause of morbidity, and mortality. It has a significant economic effect on the health care in the United States and account approximately for 300,000–350,000 hospital admissions yearly, with a cost of more than 3 billion dollars yearly [3,4].

The majority of SBO patients are managed with nasogastric tube decompression. But, the mortality of SBO is still high and significant ranging from 2% to 8% per year and might increase to as high as 25% if the case worsen and bowel ischemia is developed and there is a delay in surgical management [5]. The clinical findings are neither sensitive nor specific to confirm the diagnosis or the complications. SBO's complications include but not limited to strangulation or ischemia, septicemia and even death. Radiography is the first imaging option of choice in most patients and settings because it is available, cheap, and has a relatively high accuracy of 50–86% [6].

Management of SBO properly is critical to avoid unneeded surgical procedures for SBO that can be treated medically to improve patient morbidity and to prevent delays in cases in which surgery is necessary to decrease mortality. Surgery is usually performed in those patients who have a significant lesion causing complete obstruction. And for those patients who fail to respond to nasogastric tube decompression or those with complications such as strangulation, vascular compromise, or perforation.

This article reviews the clinical presentation, pathophysiology, diagnosis, management, and recent advancement in surgical procedure.

METHODOLOGY:

Data Sources and Search terms

We did a systematic search for bowel obstruction and advanced surgical management using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). Our search also looked for presentation, and treatment of appendicitis. All relevant studies were retrieved and discussed. We only included full articles.

The terms used in the search were: Small bowel obstruction, indications, diagnosis, management, and

advanced treatment.

Data Extraction

Two reviewers have independently reviewed the studies, abstracted data, and disagreements were resolved by consensus. Studies were evaluated for quality and a review protocol was followed throughout.

Pathophysiology and presentation of small bowel obstruction:

In the US, the most common cause of SBO is adhesions from previous surgical procedure.⁷ The next most important causes include but not limited to hernias and cancers.⁸ These three causes are responsible for more than 70% of SBO. Other possible causes are volvulus, Crohn disease, intussusception, foreign bodies, gallstone, and others. Adhesions are the major cause of SBO, it is estimated in a huge review of more than 87 studies that the incidence of adhesive small bowel obstruction was about 2.4% following abdominal surgeries [9].

The symptoms of SBO vary but frequently include vomiting in case there's proximal obstruction. Massive third spacing of fluid, electrolytes, and proteins occurs due to high intraluminal hydrostatic pressures. This results in dehydration which can be severe and increase morbidity and mortality.

Adhesions can lead to Strangulation of SBOs. The mechanism behind it is an intestinal loop of distended bowel can twist on its mesenteric pedicle. The ischemia results from arterial occlusion. If untreated properly in time, it can progress to perforation and consequently lead to peritonitis, and death. Gut's bacteria proliferate rapidly proximal to the obstruction. The Translocation of the bacteria is aggravated by the microvascular changes in the bowel to the mesenteric lymph nodes. This will lead to bacteria spread in blood i.e. bacteremia most commonly attributed to *Escherichia coli*.

Diagnosis of small bowel obstruction:

Presentations of SBO include the followings: history of previous abdominal or pelvic surgery, radiation, history of cancer or mass; especially cancers of the ovaries and colon. Nausea and vomiting occur in more than 60% of patients: The vomitus is usually bilious. Other symptoms include: constipation which occurs in more than 80% of patients. Abdominal distention usually a late finding. Fever may indicate strangulation. [10]. On examination, on palpation usually the patient has Abdominal distention Masses. Feverish or tachycardic patients with peritoneal signs

guarding, rigid abdomen, signs may indicate serious complications.

Lab findings are important for the diagnosis. There are many lab tests including Serum chemistries. However, they are usually normal or mildly elevated in most cases. Blood urea nitrogen (BUN)/creatinine levels can be elevated due to a decreased volume state (eg, dehydration). Complete blood cell (CBC) count, the white blood cell (WBC) count may be elevated with a left shift in simple in perforation or strangulated obstructions. Serum lactate levels if increased suggest dehydration or tissue or underperfusion.

Plain Radiography is usually the first step done; it is cheap and widely available in many settings. The sensitivity of plain radiography was reported to be more than 70% in a study, with a specificity of more than 50%. While computed tomography (CT) scanning has more than 90% sensitivity and higher than 70% specificity. The most important radiographic signs are air-fluid levels, air-fluid levels, or air fluid levels differing more than 5 mm in same bowel loop [11].

Enteroclysis is composed of using a contrast agent administered by a nasogastric tube., it is a valuable method in detecting obstruction and can differentiate partial from complete blockages. Studies showed that it is more accurate than conventional CT scanning.¹² CT scanning is the study of choice if the patient has serious signs such as fever, tachycardia, localized abdominal pain, and/or leukocytosis. Studies reported a sensitivity of more than 90%, a specificity of almost 100%.¹³ MRI is also accurate in the detection of obstructions.¹⁴ It is effective in defining the location and etiology of obstruction [15]. However, MRI has several limitations including lack of availability and poor visualization of masses and inflammation.¹⁶ Ultrasonography is less costly and invasive than CT scanning and may reliably exclude SBO in as many as 89% of patients [17].

Management:

Nonoperative management:

Initially in the emergency department, the management of SBO consists of aggressive fluid resuscitation and bowel decompression. Other steps include but not limited to administration of analgesia and antiemetic. If there are early signs of strangulation, surgical consultation should be involved, as well as administration of antibiotics. Decompression can be done by placement

of a nasogastric (NG) tube for suctioning GI contents. The patient should be monitored continuously for the airway, breathing, and circulation (ABCs).¹⁸

If there are signs of partial SBO such as CT findings. The patient can be safely managed with nonoperative management; tube decompression should be attempted.¹⁹ In the absence of signs of strangulation or peritonitis, the nonoperative management can be prolonged for up to 72 hours [20].

Surgical Care and advanced surgical modalities:

If there are signs of strangulations, the case is considered for surgical emergency. Studies have shown that laparoscopy is safe and effective.²¹ A retrospective review of clinical trials showed that laparoscopy results in less hospital stay and improved mortality with reduction versus open surgery [22].

A surgical option for SBO is indicated for several etiologies and conditions. In most cases, the operation is curative. Surgical management is highly effective if the cause is adhesive SBO, a curative operation is less likely as recurrence is not uncommon. Recurrence of adhesive SBO is an important and common problem, and accounts for about 19% to 53%.²³ In a long-term study of prognosis after adhesiolysis for SBO, Fevang and colleagues reported recurrence of SBO in 18% after 10 years and 29% at 30 years [24]. Other studies reported a recurrence of more than 20% for those treated with adhesiolysis compared to less than 40% in those treated nonoperatively.²⁵ Additionally, the risk of recurrence increases in one study reporting an 81% cumulative rate of recurrence for patients with four or more adhesive SBO admissions.

The newly reported postoperative mortality after surgical and nonsurgical management of adhesive SBO ranges between 2% to 10% and 3% to 8%.²⁶ exploratory laparotomy has been historically the main method of management for patients who need operative intervention for SBO. In the past decade, minimally invasive approaches have been employed with an increasing success and acceptance. Even though it is controversial, SBO can be effectively managed with the laparoscopic approach in selected patients, with the advantages of less postoperative pain, decreased wound complications, and shorter hospitalization.

A more favorable benefit of the laparoscopic approach in these patients is the decreased adhesion formation that occurs compared to laparotomy. While

laparoscopic access for intestinal resection reduces the incidence of SBO compared to laparotomy, this has not yet been demonstrated after laparoscopic adhesiolysis for SBO.

CONCLUSIONS:

Small bowel obstruction (SBO) constitutes approximately 15% of the acute surgical gastrointestinal admissions as well as approximately 15% of emergency admissions for abdominal pain. The majority of SBO patients are managed with nasogastric tube decompression. Management of SBO properly is critical to avoid unneeded surgical procedures for SBO that can be treated medically to improve patient morbidity and to prevent delays in cases in which surgery is necessary to decrease mortality. Presentations of SBO include the followings: history of previous abdominal or pelvic surgery, radiation, history of cancer or mass; especially cancers of the ovaries and colon. Plain Radiography is usually the first step done; it is cheap and widely available in many settings. CT scanning is the study of choice. Initially in the emergency department, the management of SBO consists of aggressive fluid resuscitation and bowel decompression. If there are signs of strangulations, the case is considered for surgical emergency. A surgical option for SBO is indicated for several etiologies and conditions. SBO can be effectively managed with the laparoscopic approach.

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