



CANADIAN ASSOCIATION
of GENERAL SURGEONS

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Dynamic Practice Guidelines for Emergency General Surgery

Committee on Acute Care Surgery, Canadian Association of General Surgeons

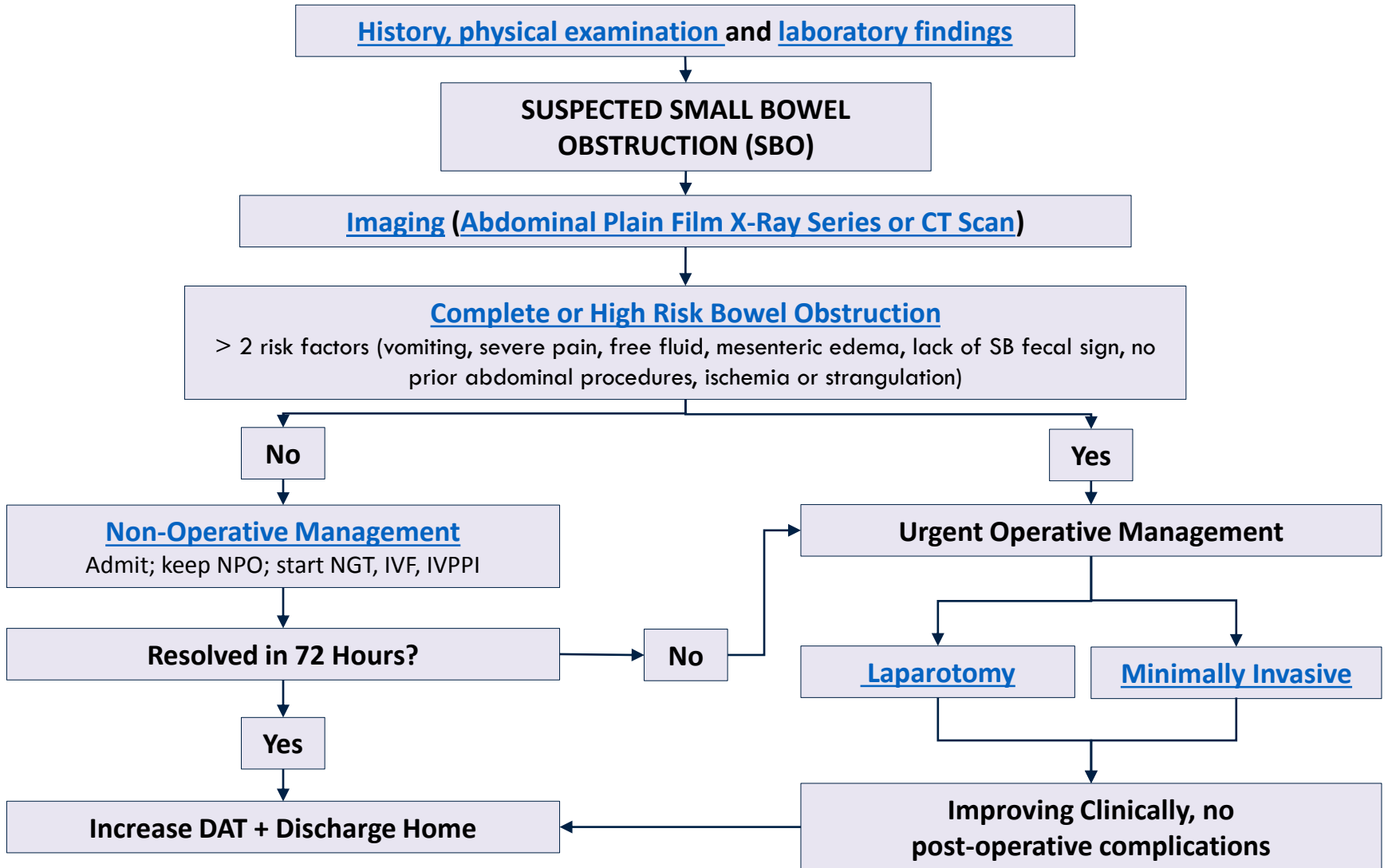
12

SMALL BOWEL OBSTRUCTIONS

Dynamic Practice Guidelines for Emergency General Surgery

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SMALL BOWEL OBSTRUCTIONS

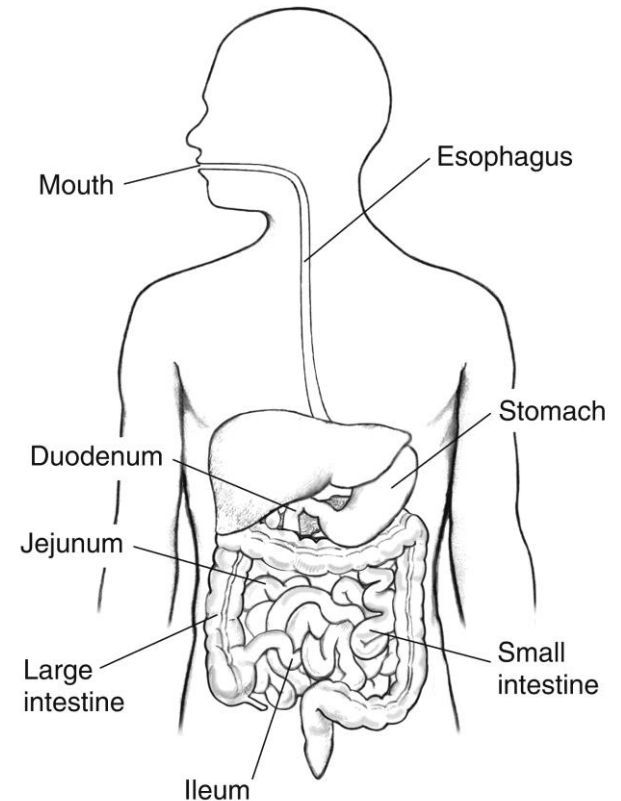


SMALL BOWEL OBSTRUCTIONS

[Return to CPG](#)

Definition:

- Failure of propulsion of intestinal contents aborally
- Due to either mechanical obstruction or a functional motility problem caused by neuromuscular failure or ischemia.
- Classification determines therapeutic approach and management



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[Return to CPG](#)

CLASSIFICATION

- Etiology (Intraluminal, intramural, extrinsic)
- Speed of Onset (Acute, Subacute, Chronic)
- Degree (Partial, Complete)
- Progression (Open v. Closed Loop; Simple v. Strangulated)

Extrinsic Lesion	Intrinsic Lesion	Intraluminal Obstruction
Adhesions Hernia Volvulus Extrinsic neoplasms Abdominal abscesses Aneurism Hematomas Endometriosis	Intussusception Congenital malformation Neoplasms Inflammatory strictures Crohn's disease	Gallstones Feces or meconium Bezoar Barium Ascaris infection

Gore, Silvers, Thakrar et al., 2015
Table adapted from Moore, Turner, and Todd, 2013

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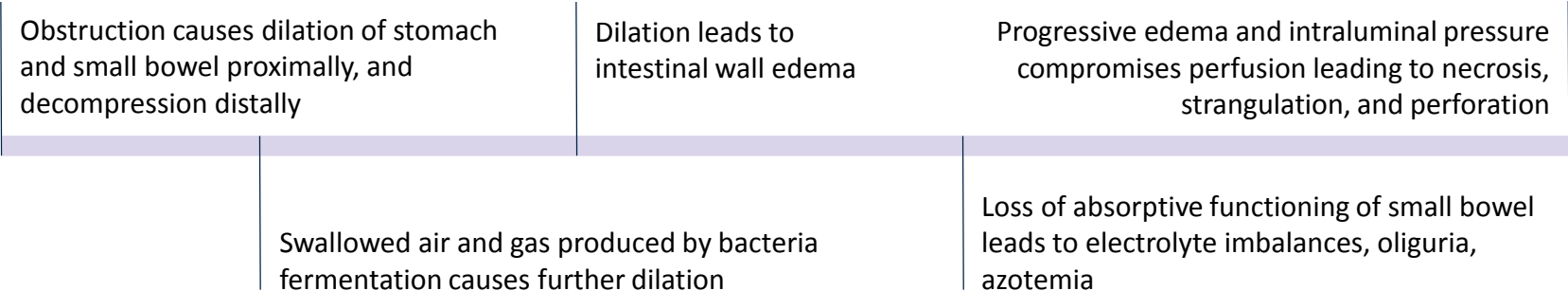
[Return to CPG](#)

ETIOLOGY

SBOs are > 80% of all bowel obstructions, while LBOs are less common.

Mechanical Causes of Small Bowel Obstructions – SBO

- Adhesions (56%)
- Hernias (25%)
- Neoplasms/ Malignancy (10%)
- Other: incl. Inflammatory Bowel Disease (9%)



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[Return to CPG](#)

HISTORY OF PRESENTING ILLNESS



- 4 Cardinal symptoms of bowel obstruction
 - Abdominal Pain (colicky pain due to hyperperistalsis against a fixed obstruction)
 - Note: Constant, severe pain is a possible manifestation of ischemia and, in the context of SBO, is a surgical emergency
 - Nausea and Vomiting
 - Abdominal dilation
 - Decrease/ Cessation of flatus and bowel movement (obstipation)
- Mechanical obstructions → severe cramping and localized
- Functional obstructions/ Ileus → mild pain and diffuse
- History of malignancy, cancers, radiation, and hernias

PHYSICAL EXAMINATION

- Vital signs (heart rate, blood pressure, temperature)
- Hydration status
- Abdominal exam (peritoneal signs, masses, pain)
- Examination of Groin (e.g. incarcerated inguinal hernia)
- Digital Rectal Exam (fecal impaction, gross blood)

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[Return to CPG](#)

LABORATORY INVESTIGATIONS



	Finding	Reason
Complete Blood Count	↑ Hgb, Hct ↑ WBC	Dehydration Bacterial Translocation/ SIRS
Kidney Function Tests	↑ Cr ↑ BUN ↓ eGFR	Dehydration
Electrolytes	↓ K ↓ Cl	Severe emesis
Arterial Blood Gases	↓ H+ ↑/↓ PCO ₃	Severe emesis Bowel Ischemia
Creatinine Kinase	↑ CK	Bowel Ischemia
Lactate	↑ Lactate	Bowel Ischemia (Sn: 90% Sp:87%) ¹

Table adapted from Jackson and Raiji, 2011

¹Atluri, Karakousis, Porrett and Kaiser, 2006

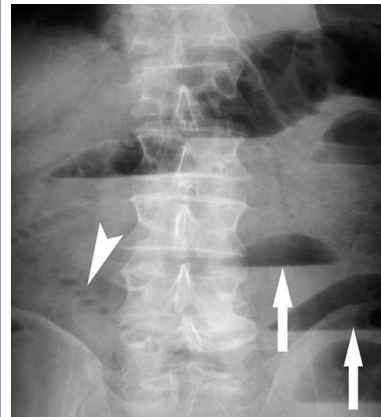
SMALL BOWEL OBSTRUCTIONS

Return to CPG

Plain radiographic and CT findings in bowel obstruction

Small Bowel Obstruction (SBO)

- Dilated gas or fluid filled small bowel (>3 cm on X-Ray, > 2.5 cm CT) [Image B – arrows]
- Air-fluid levels > 2.5 cm [Image A – arrows]
- Air-fluid levels at disparate levels within the same loop
- String of pearls sign [Image A – arrowhead]
- Gastric distension
- Small Bowel dilated out of proportion to the large bowel
- Paucity of colorectal gas
- Gasless abdomen



A



B

Adapted from Gore, Silvers, Thakrar et al., 2015

Resource for Pictorial Representation/ Explanation: [\(Link\)](#)

Nicolaou S, Kai B, Ho S, Su J, Ahamed K. Imaging of Acute Small-Bowel Obstruction. American Journal of Roentgenology. 2005;185(4):1036-1044.



IMAGING

EAST Practice Management Guidelines

- **CT Scan** of abdomen and pelvis considered in all patients because it provides incremental information over plain films in differentiating grade, severity, and etiology that can lead to changes in management (LOE 1)
 - Plain Film radiographs normally first imaging test and enough to start treatment but is not enough for diagnosis
- **Multi-detector CT and multi-planar reconstruction** should be used to aid in the diagnosis and localization of the bowel obstruction (LOE 3)
- CT scan should be considered to aid in the diagnosis of volvulus. Findings include multiple transition points, posterior location, and the ‘whirl’ sign (LOE 3)
- **Ultrasound and MRI** are potential alternatives
 - U/S accuracy comparable to X-Ray, and technician dependent
 - MRI has 95% sensitivity, and 100% specificity in diagnosis, and 73% accuracy at determining the level of obstruction; however it is a lengthy procedure

¹Maung, Johnson, Piper et al. 2012 ([EAST Guidelines](#))

²Taylor and Lalani, 2013 ([PubMed Link](#))

SMALL BOWEL OBSTRUCTIONS



OPERATIVE MANAGEMENT

Indicated when patients demonstrate

- Signs of ischemia, strangulation, closed loop obstruction
- **Presence of 3-4 risk factors** [70-90% predictive for need for operative intervention; 6-16 relative risk for operative intervention]¹
 - **Free intra-peritoneal fluid**
 - **Mesenteric edema**
 - **History of vomiting**
 - **Lack of small bowel feces sign**
- No prior abdominal procedures
- Increasing or recurrent/ persistent symptoms after 72 hour trial of conservative management, or onset of fever and leukocytosis > 15,000
- Recurrence risk is decreased by operation, and increased by longer duration of follow-up.²
- Most recurrences within 5 years, risk continues 10-20 years post-episode.³

URGENT



¹Zielinski, Eiken, Bannon, et al. 2010
²Landercasper, Cogbill, Merry, et al. 1993
³Fevang, Fevang, Lie, et al. 2004

OPERATIVE MANAGEMENT

General Recommendations



World Society of Emergency Surgery Management Guidelines ¹

- If ileus persists for more than 3 days and the drainage volume on day 3 is >500 ml, surgery is recommended (LOE 2b)
- Open surgery preferred for surgical treatment of strangulating bowel obstructions, and after failed conservative management (LOE 2c)
- A low threshold for open conversion should be maintained if extensive adhesions are found (LOE 2c)

¹Catena, Di Saverio, Kelly et al. 2010 ([World J Emerg Surg Guidelines](#))

OPERATIVE MANAGEMENT

Laparoscopic versus Open Approach



EAST Practice Management Guidelines ¹

- Laparoscopic surgery is a safe and acceptable alternative to open surgery, and can be used for complex SBO cases with dilated bowel and multiple previous abdominal operations
- Successful laparoscopic procedures are associated with early recovery and shorter length of stays
 - Shorter operative times (77.2 vs. 94.2 min), decreased length of stay (2.7 vs. 9.9 days).
 - After controlling for comorbidities and surgical factors – laparoscopic patients less likely to develop major complications (OR = 0.7) and incisional complications (OR = 0.22). 30 day mortality is lower in laparoscopic procedures for bowel obstructions (1.3% vs. 4.7%) ²
- Meta-Analyses report conversion rates of 29% and an enterotomy rates of 7%

¹Maung, Johnson, Piper et al. 2012 ([EAST Guidelines](#))

²Kelly, Iannuzzi, Rickles et al. 2014

SMALL BOWEL OBSTRUCTIONS

Return to CPG

OPERATIVE MANAGEMENT

Technical Considerations



LAPAROSCOPIC APPROACH

Video Resource: SAGES The Laparoscopic Approach to Small Bowel Obstructions - <https://www.youtube.com/watch?v=RidbehNIZZ8>

NONOPERATIVE MANAGEMENT



World Society of Emergency Surgery Guidelines ¹

- Use of either nasogastric tube or long tube decompression – no advantage of the latter (LOE 1b)
 - Early tube decompression beneficial (LOE 2b)
 - Use of Gastrografin in adhesive SBO reduces need for surgery, time to resolution and hospital stay, and is safe (LOE 1a)
 - Administer 50-150 mL PO/ via NGT immediately at admission or after initial attempt of conservative treatment of 48 hours (LOE 1b)
 - Oral therapy of magnesium oxide, L. Acidophilus, and simethicone may be useful for partial SBO (LOE 1b)
-
- A trial of expectant management may be indicated in patients with previous abdominal/ pelvic/ gynecological procedures, who have no pain and are stable, or who have a partial bowel obstruction and no signs of ischemia
 - Monitor closely w/ serial abdominal imaging, and laboratory findings. ²
 - Successful in 69-80% of patients, most resolving within in 48-72 hour. ^{2,3}

¹Catena, Di Saverio, Kelly et al. 2010 ([World J Emerg Surg Guidelines](#))

²Maung, Johnson, Piper et al. 2012 ([EAST Guidelines](#))

³Cox, Gunn, Eastman et al. 1993