bowel obstruction

bowel obstruction outline

Definition

Types

- mechanical
- Functional

Site

- Small bowel mechanical obstruction
- Large bowel obstruction

Definitions

Interruption in the normal flow of intestinal contents along the intestinal tract

Ileus= paralytic= adynamic; when obstruction is functional

Mechanical Small bowel obstruction

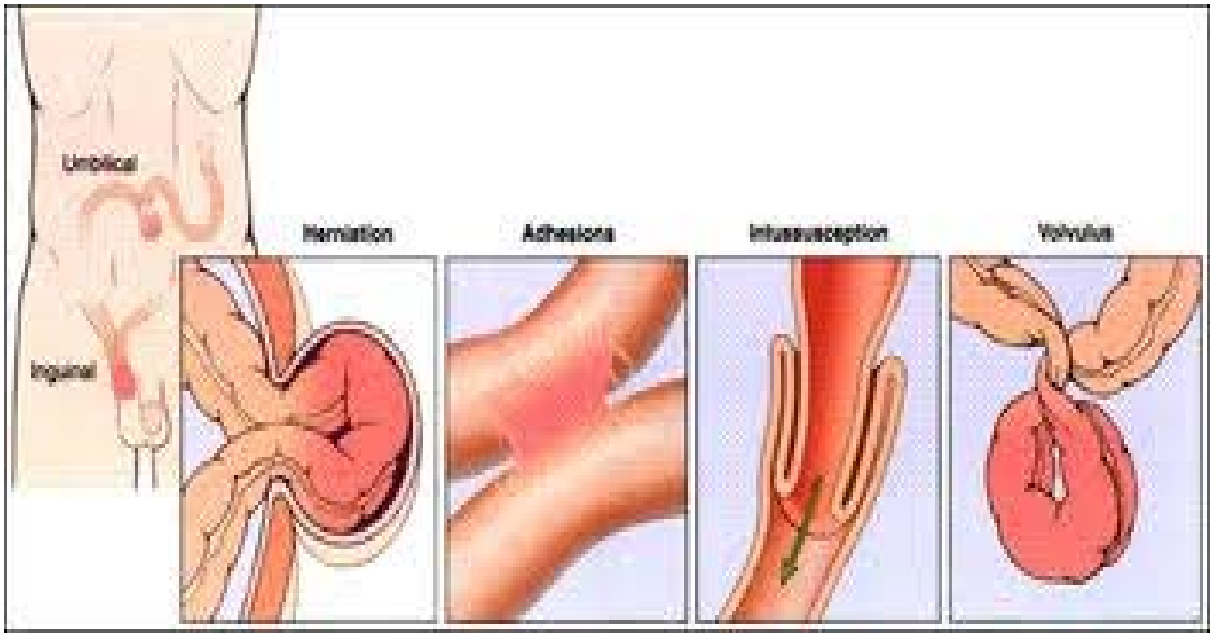
Etiology of Small bowel obstruction

- **Postoperative adhesions**; appendectomy, colorectal surgery, and gynecologic and upper gastrointestinal (GI) procedures
- **Hernias**
- Malignancy
- Inflammatory causes; Crohns' disease
- Volvulus
- Foreign bodies; bezoars
- In pediatric patients include congenital atresia, pyloric stenosis, and intussusception

Closed loop obstruction

1. Hernia
2. Volvulus
3. Colonic obstruction with a competent ileocecal valve
4. intussusception
5. Some adhesive obstructions

Small bowel obstruction



Pathophysiology

- Increased peristalsis → abdominal colic, exaggerated bowel sounds, and borborygmi
- Proximal bowel distension → third space losses , electrolyte imbalance, air-fluid levels
  - Increased secretion and decreases absorption → fluid accumulation
  - Swallowed air accumulation
- Bacterial overgrowth and translocation
- Proximal increased wall tension compromise of circulation

History

Abdominal pain

Crampy and intermittent, is more prevalent in simple obstruction.

Central

Changes in the character of the pain may indicate the development of a more serious complication (i.e., constant pain of a strangulated or ischemic bowel).

History

- Nausea
- Vomiting; reflex and reflux
- constipation or obstipation; more than 24 hours
- Diarrhea; in partial and intermittent obstruction like volvulus and gallstone ileus

History

- Fever and tachycardia - Occur late and may be associated with strangulation
- Previous abdominal or pelvic surgery, previous radiation therapy, or both
- History of malignancy - Particularly ovarian and colonic malignancy

Physical Examination

1. Abdominal distention; The proximal small bowel has less distention when obstructed than the distal bowel has when obstructed.
2. Hyperactive bowel sounds occur early as GI contents attempt to overcome the obstruction and typically related to the colic
3. Visible peristalsis
4. Borborygmi; audible peristalsis
5. Abdominal scars
6. Abdominal hernias

Rectal examination:

- Gross or occult blood, which suggests late strangulation or malignancy
- Masses, which suggest obturator hernia

Clinical types

- Partial vs complete
- Simple vs strangulated

SBO accounts for 20% of all acute surgical admissions

Strangulated SBOs

Check for findings commonly believed to be more diagnostic of intestinal ischemia, including the following:

- Fever
- Tachycardia
- Peritoneal signs

No reliable way exists to differentiate simple from early strangulated obstruction on physical examination.

Serial abdominal examinations are important and may detect changes early.

Terms

- **Bowel fatigue**; ileus complicating mechanical obstruction
- **Feculent vomiting**

Both are indicative of prolonged obstruction and the need for surgery

Labs

- Blood urea nitrogen (BUN) level
- Electrolytes
- Creatinine
- Complete blood count (CBC)
- Urinalysis
- Type and cross match

Imaging tests

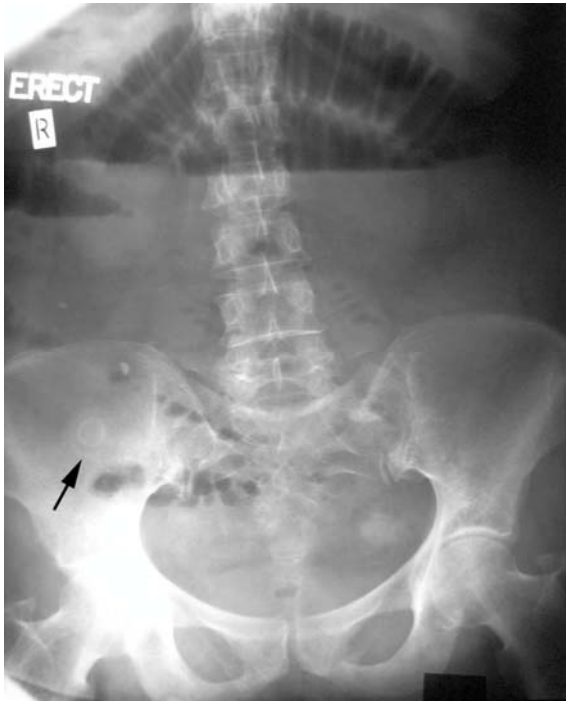
1. Plain radiographs first for patients in whom SBO is suspected. At least 2 views, supine or flat and upright, are required. Plain radiographs are diagnostically more accurate in cases of simple obstruction.
2. Enteroclysis is valuable in detecting the presence of obstruction and in differentiating partial from complete blockages. This study is useful when plain radiographic findings are normal in the presence of clinical signs of SBO or when plain radiographic findings are nonspecific.
3. Computed tomography (CT) scanning is the study of choice if the patient has fever, tachycardia, localized abdominal pain, and/or leukocytosis.
4. Ultrasonography is less costly and invasive than CT scanning and may reliably exclude SBO in as many as 89% of patients; specificity is reportedly 100%.

plain radiography recumbent obstructed inguinal hernia

plain radiography recumbent

plain radiography (Standing)
the step ladder appearance

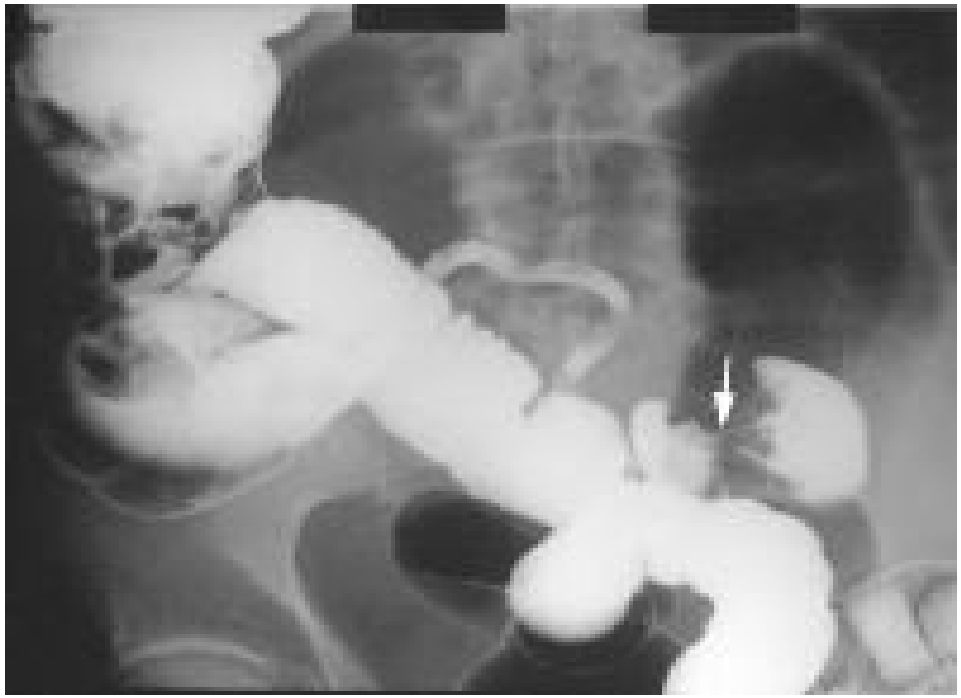
plain radiography (gallstone ileus)



Enteroclysis

- is valuable in detecting the presence of obstruction and in differentiating partial from complete blockages.
- This study is useful when plain radiographic findings are normal in the presence of clinical signs of small-bowel obstruction (SBO) or when plain radiographic findings are nonspecific
- Enteroclysis distinguishes adhesions from metastases, tumor recurrence, and radiation damage.

Enteroclysis



Computed tomography (CT)

- High sensitivity and specificity
- early diagnosis of strangulated obstruction
- delineating the myriad other causes of acute abdominal pain, particularly when clinical and radiographic findings are inconclusive.
- distinguishing the etiologies of small-bowel obstruction (SBO), that is, in distinguishing extrinsic causes (such as adhesions and hernia) from intrinsic causes (such as neoplasms and Crohn's disease) and intraluminal causes, such as bezoars.

Computed tomography (CT)

- CT scanning is capable of revealing abscess, inflammatory process, extraluminal pathology resulting in obstruction, and mesenteric ischemia
- enables the clinician to distinguish between ileus and mechanical small bowel obstruction in postoperative patients.
- The modality does not require oral contrast for the diagnosis of SBO, because the retained intraluminal fluid serves as a natural contrast agent.

Computed tomography (CT)

Computed tomography (CT) strangulated

Ultrasonography

Is less costly and invasive than CT scanning and may reliably exclude SBO in as many as 89% of patients; specificity is reportedly 100%.

Emergency physician–performed ultrasonography compared favorably with radiography.

Indications of Nonoperative treatment of SBO

- Adhesions
- Malignant tumor - Obstruction by tumor is usually caused by metastasis; initial treatment should be nonoperative (surgical resection is recommended when feasible)
- Pediatric obstructed hernia - Initially use manual reduction and observation; advise elective hernia repair as soon as possible after reduction
- Inflammatory bowel disease - high-dose steroids; consider parenteral treatment for prolonged periods of bowel rest, and undertake surgical treatment, bowel resection, and/or stricturoplasty if nonoperative treatment fails.

Indications of Nonoperative treatment of SBO (con…)

- Intra-abdominal abscess - CT scan–guided drainage is usually sufficient to relieve obstruction
- Radiation enteritis - acutely, nonoperative treatment accompanied by steroids is usually sufficient; if the obstruction is a chronic sequela of radiation therapy, surgical treatment is indicated
- Acute postoperative obstruction - This is difficult to diagnose due to postoperative ileus

Diagnosis and management of adhesive small bowel obstruction (ASBO)

- In the absence of signs of strangulation and a history of persistent vomiting or combined CT-scan signs, patients with partial ASBO can be safely managed with nonoperative management;
- tube decompression should be attempted
- Water-soluble contrast medium (WSCM) is recommended for both diagnostic and therapeutic purposes in patients undergoing nonoperative management

Diagnosis and management of adhesive small bowel obstruction (ASBO)

Nonoperative management can be prolonged for up to 72 hours in the absence of signs of strangulation or peritonitis

surgery is recommended after 72 hours of nonoperative management without resolution

Open surgery is frequently used for patients with

- strangulating ASBO and
- after failed conservative management
- in appropriate patients, a laparoscopic approach using an open access technique is recommended

Obstructed hernia

- Pediatric inguinal hernia; the obstruction is mostly due to muscle spasm

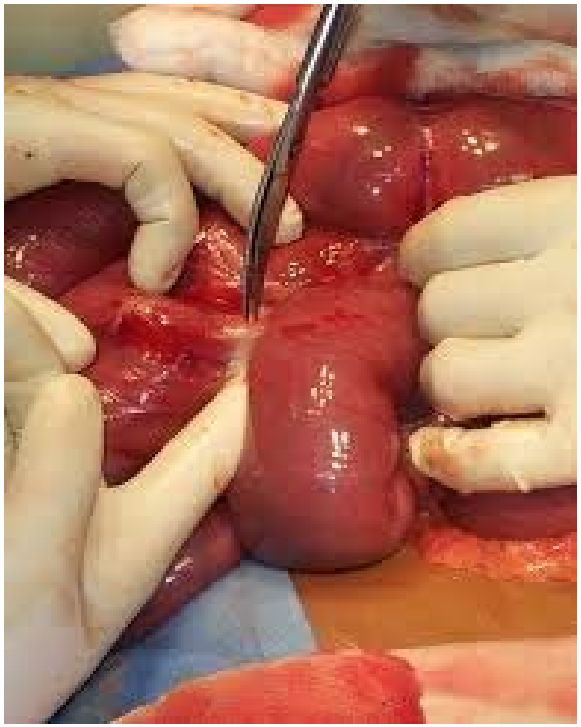
  manual reduction after sedation. Surgery on next list

- Adult obstructed hernia; obstruction id due to narrow neck of the sac or adhesions within it surgery after stabilization

Complications of SBO

- Sepsis; bacterial translocation or frank bowel gangrene
- Intra-abdominal abscess
- Wound dehiscence
- Aspiration
- Short-bowel syndrome (as a result of multiple surgeries)
- Death (secondary to delayed treatment)

Open adhesiolysis



strangulated obstruction

- A strangulated obstruction is a surgical emergency.
- In patients with closed loop obstruction and in patients with a complete small-bowel obstruction (SBO), the risk of strangulation is high and early surgical intervention is warranted.
- Patients with simple complete obstructions in whom nonoperative trials fail also need surgical treatment but experience no apparent disadvantage to delayed surgery.
- Laparoscopy has been shown to be safe and effective in selected cases of SBO

strangulated obstruction

strangulated obstruction mortality

- If untreated, strangulated obstructions cause death in 100% of patients.
- If surgery is performed within 36 hours, the mortality rate decreases to 8%.
- The mortality rate is 25% if the surgery is postponed beyond 36 hours in these patients.

Ileus

Definitions

- Interruption of the normal propagation of intestinal contents due to decreased motor activity
- Synonyms;
  1. functional
  2. Paralytic
  3. adynamic

Etiology

1. Peritonitis
2. Postoperative
3. Stress, sepsis, hypoperfusion, hypoxia
4. Trauma
5. Drugs, narcotics, anticholinergics, sedatives,… etc.
6. Metabolic, electrolyte disturbances, DKA, organ failures
7. Idiopathic

Distribution

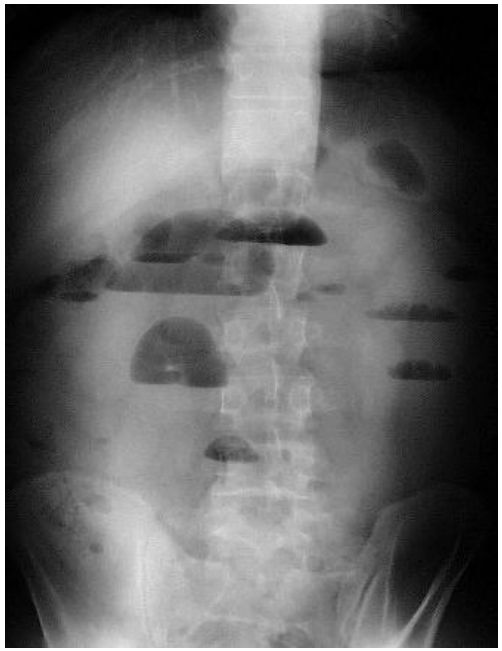
- ❑ Generalized
- ❑ Localized
  - Small bowel as in pancreatitis
  - Large bowel as acute appendicitis

Diagnosis
clinical

- The predisposing factor
- Constipation or obstipation
- Abdominal distention
- Vomiting or regurge
- Diminished bowel sounds
- Minimal or no abdominal pain

Diagnosis radiological

Erect abdomen, air-fluid levels



Postoperative ileus

- Affects small and large bowel
- Small bowel regains activity before the large (usually within hours)
- May last few days
- CT scan is the best modality to distinguish postop ileus from postop mechanical obstruction

General Management

1. NPO
2. Nasogastric intubation
3. Fluid and electrolyte resuscitation
4. Reverse the primary cause
5. Use of prokinetic drugs ? E.g. metoclopramide or neostigmine

Colonic Obstruction

Etiology

The most common causes of adult large-bowel obstruction

- Neoplasm (benign or malignant)
- Stricture (diverticular or ischemic)
- Volvulus (colonic, sigmoid, cecal)
- Intussusception, usually with an identifiable anatomic abnormality in adults but not in children
- Impaction

Pathophysiology

- Bowel dilatation above the obstruction causes
  - Dehydration and electrolyte abnormalities.
  - Bowel edema and ischemia increase the mucosal permeability of the bowel
  - Bacterial translocation and systemic toxicity
  - Bowel ischemia can lead to perforation and fecal soilage of the peritoneal cavity.
- In cases of closed loop obstructions, such as colonic obstruction in the presence of a closed ileocecal valve or incarcerated hernia, this process may be accelerated.
- The cecum is the area most likely to perforate (Laplace law)

Colonic obstruction

- It is important to distinguish colonic obstruction from ileus, and differentiate between a true mechanical obstruction and a pseudo-obstruction, as the treatment differs.
- Colonic obstruction is more common in elderly individuals, due to the higher incidence of neoplasms and other causative diseases in this population.
- In neonates, colonic obstruction may be caused by an imperforate anus or other congenital anatomic abnormalities

clinical

History

- Bowel movements, flatus, obstipation
- Attempt to distinguish complete bowel obstruction from partial obstruction, which is associated with passage of some gas or stool.
- Also inquire about the patient's current and past history

clinical

History

- abdominal pain
- abdominal distention
- nausea
- Vomiting

clinical

History

- An abrupt onset of symptoms makes an acute obstructive event (e.g., cecal or sigmoid volvulus) a more likely diagnosis.
- A history of chronic constipation, long-term cathartic use, and straining at stools implies diverticulosis or carcinoma.
- Changes in the patient's caliber of stools strongly suggest carcinoma. When associated with weight loss, the likelihood of neoplastic obstruction increase

clinical

Physical Examination

- Abdominal distention is prominent
- The bowel sounds may be normal early
- the abdomen is hyperresonant to percussion.
- Fever, severe tenderness, and abdominal rigidity are ominous signs that suggest peritonitis secondary to strangulation or perforation.

clinical

Physical Examination

- The presence of rigidity or peritoneal signs may be indicative of another intra-abdominal process, such as an abscess.
- Sigmoid diverticulitis and a perforated sigmoid secondary to carcinoma are clinically difficult to differentiate.
- A rectal or lower sigmoidal mass may be palpated on rectal examination.
- An abdominal mass or fullness may be palpated

clinical

Physical Examination

- Evaluation of the inguinal and femoral regions should be an integral part of the examination in a patient with suspected large-bowel obstruction.
- Incarcerated hernias represent a frequently missed cause of bowel obstruction. In particular, colonic obstruction is often caused by a left-sided inguinal hernia with the sigmoid colon incarcerated in the hernia

clinical

Physical Examination

Digital rectal examination

- Perform a digital rectal examination (DRE) to verify the patency of the anus in a neonate.
- The examination focuses on identifying rectal pathology that may be causing the obstruction and determining the contents of the rectal vault.
- Hard stools suggest impaction
- An empty vault suggests obstruction proximal to the level that the examining finger can reach.
- Fecal occult blood testing should be performed. A positive result may suggest the possibility of a more proximal neoplasm.

Plain radiographs

- An upright chest radiograph is useful to screen for free air which would suggest perforation.
- Flat and upright abdominal radiographs can help distinguish severe constipation from bowel obstruction.
- Plain films may also help localize the site of obstruction (large vs small bowel).
- Sigmoid or cecal volvulus may have a kidney-bean appearance on the abdominal films
- Intramural air is an ominous sign that suggests colonic ischemia.
- The absence of free air does not exclude perforation

Sigmoid volvulus

Cecal volvulus

Contrast studies

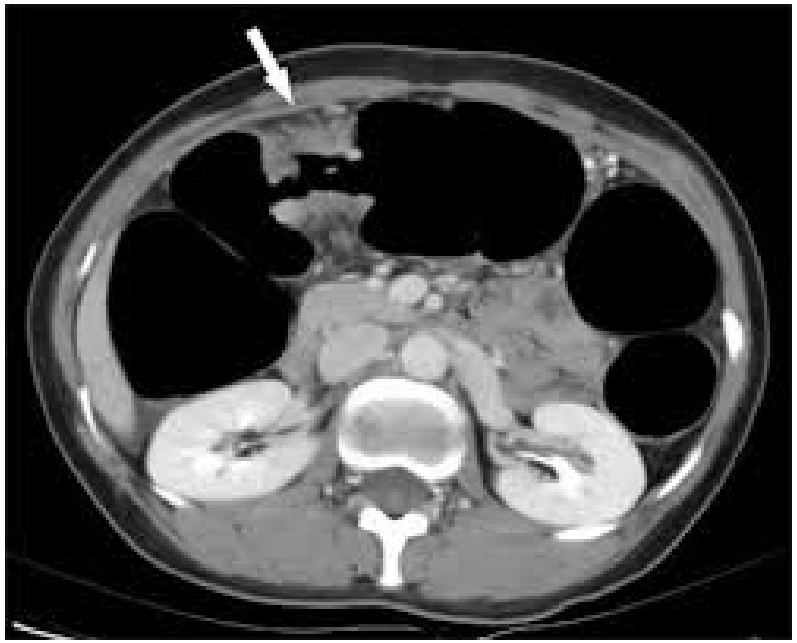
- include an enema with water-soluble contrast
- Contrast studies that reveal a column of contrast ending in a "bird's beak" are suggestive of colonic volvulus.

Contrast enema in sigmoid volvulus

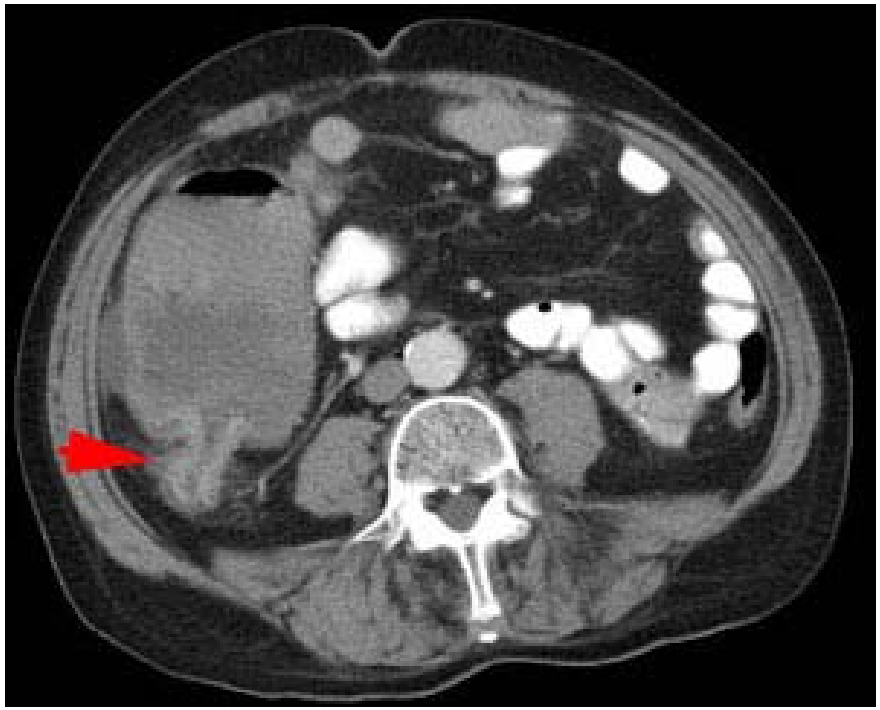
Computed tomography

- CT scanning is the imaging of choice if a colonic obstruction is clinically suspected.
- Contrast-enhanced CT (PO and IV) can help to delineate between partial and complete obstruction, ileus, and small-bowel obstruction.
- water-soluble contrast should be used preferentially

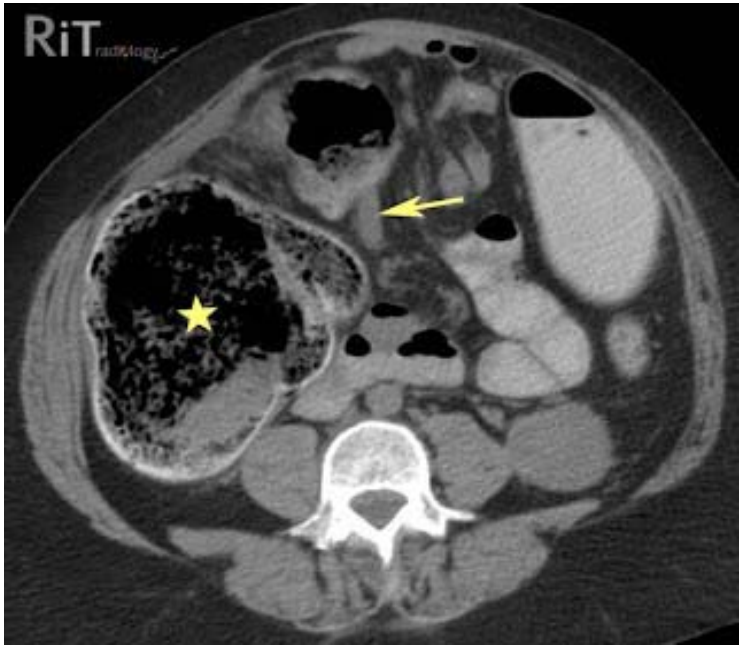
CA colon



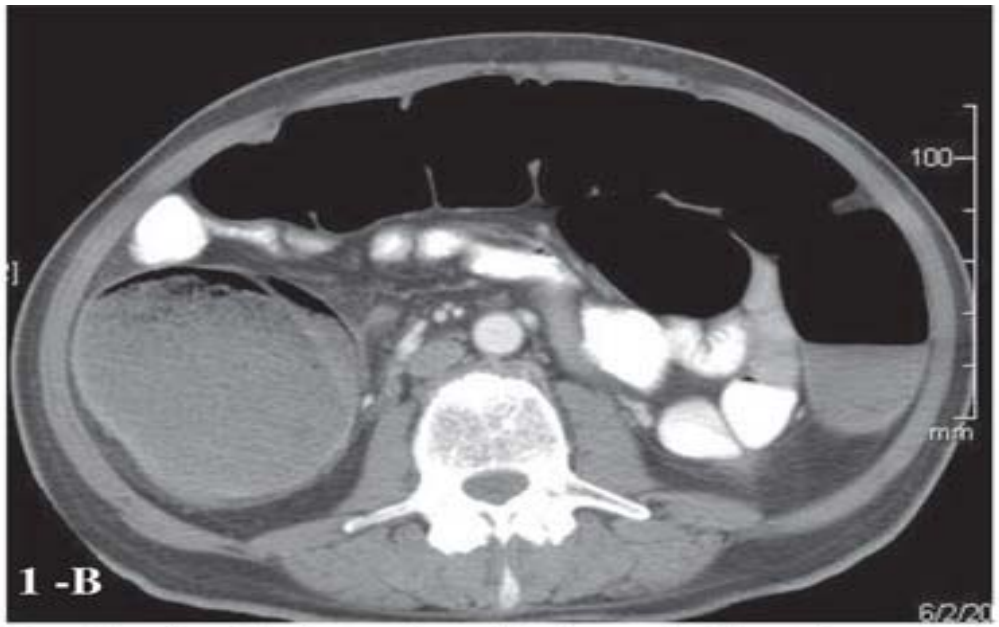
CA colon



Closed loop colonic obstruction



Ogilvie syndrome



Labs

- Routine complete blood cell count
- CBC
- serum chemistries
- urinalysis.
- type and crossmatch.

Management

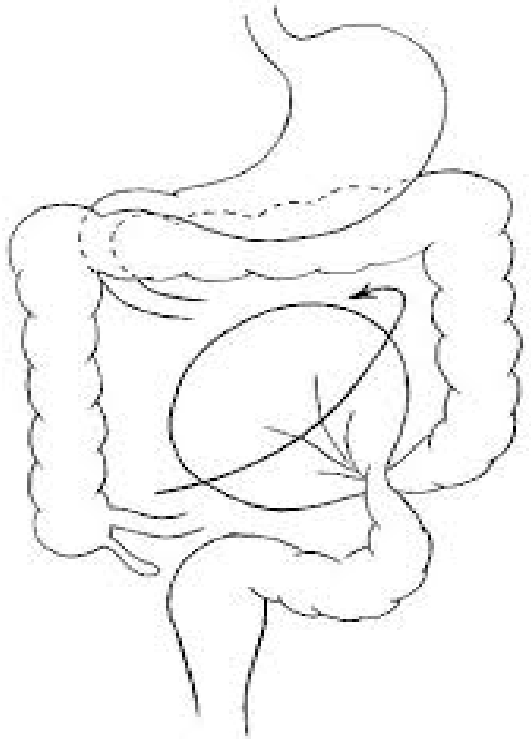
Initial therapy in patients with suspected large-bowel obstruction

- volume resuscitation
- appropriate preoperative broad-spectrum antibiotics
- A nasogastric tube should be considered for patients with severe colonic distention and vomiting.
- intravenous fluid (IVF) resuscitation with isotonic saline or Ringer
- Surgical intervention is frequently indicated, depending on the cause of the obstruction. Closed loop obstructions, bowel ischemia, and volvulus are surgical emergencies

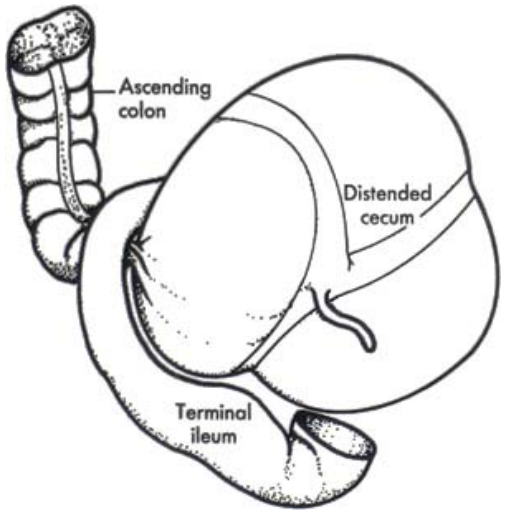
Volvulus

- when the colon twists on its mesentery, which impairs the venous drainage and arterial inflow. The cecum and sigmoid colon are most commonly affected.
- Volvulus typically occurs in elderly, debilitated individuals; patients living in an institutionalized setting; or patients with a history of chronic constipation (western type).
- African type is related to high fiber diet
- during pregnancy, most commonly occurring in the third trimester

Volvulus (sigmoid)



Volvulus (cecal)



Volvulus management

- Endoscopic reduction and decompression of a sigmoid volvulus can be performed in the absence of peritoneal signs. This procedure is also contraindicated when evidence of mucosal ischemia is present on endoscopy
- Recurrence after decompression is as high as 50%; thus, surgical resection is indicated.
- Emergency surgery is indicated in patients with evidence of perforated or ischemic bowel, or if attempts at endoscopic reduction and decompression are not successful.
- The preferred treatment for cecal or transverse colon volvulus is surgical resection and anastomosis.
- Endoscopic detorsion and decompression is an option when the patient is a poor surgical candidate.

Volvulus (sigmoid)

Intussusception

- Intussusception is primarily a pediatric disease
- between 5% and 16% of all intussusceptions in the Western world occur in adults.
- Two thirds of adult intussusception cases are caused by tumors.
- Two main types of intussusception affect the large bowel: enterocolic and colocolic.
- Enterocolic intussusceptions involve both the small bowel and the large bowel. These are composed of either ileocolic intussusceptions or ileocecal intussusceptions, depending on where the lead point is located.
- Colocolic intussusceptions involve only the colon. They are classified as either colocolic or sigmoidorectal intussusceptions

intussusception

- A contrast enema (barium or air) can successfully reduce 60-80% of intussusceptions. It is often successful in children in whom a pathologic leading point for the intussusception is unlikely.
- In adults, typically a pathologic leading point for the intussusception is present. Reduction with a contrast enema is far less likely, and patients are more likely to require surgery to deal with their pathology.
- Surgery is indicated if there are signs of peritonitis or bowel perforation, or if attempts at reduction by contrast enema are unsuccessful.
- Intussusception may recur in approximately 3% of patients after contrast enema reduction and 1% of patients after operative repair

Acute colonic pseudo-obstruction/Ogilvie syndrome

- Ogilvie syndrome, is thought to result from an autonomic imbalance, which results from decreased parasympathetic tone or excessive sympathetic output.

- is characterized by a loss of peristalsis and results in the accumulation of gas and fluid in the colon.

Acute colonic pseudo-obstruction/Ogilvie syndrome

- This condition usually occurs in the setting of a wide range of medical or surgical illnesses.
- If untreated, colonic ischemia or perforation can occur.
- The right colon and cecum are most commonly involved.
- The risk of perforation ranges from 3-15%

Ogilvie syndrome
Management

1. If no perforation is present, pseudo-obstruction is treated with conservative management for the first 24 hours. This includes bowel rest, hydration, and management of underlying disorders.
2. Pharmacologic treatment with neostigmine, tap water enemas, octreotide drip and rectal tube insertion
3. colonoscopic decompression may be effective in cases that do not resolve with conservative management
4. Colonoscopic decompression may be successful in as many as 80% of patients with acute colonic pseudo-obstruction.
5. Surgical intervention for acute colonic pseudo-obstruction is associated with a high mortality and morbidity. This treatment is reserved for refractory cases or cases complicated by perforation.

Left colon carcinoma

- Surgical treatment of left colon carcinoma includes
  1. resection without primary anastomosis
  2. resection with primary anastomosis and intraoperative lavage

- Endoscopically placed expandable metal stents can be used to relieve the large-bowel obstruction, thus allowing for a primary colorectal anastomosis

Stenting

Right colon cancer

- Right colectomy and a primary anastomosis between the ileum and the transverse colon.
- Patients with high-risk features for surgery (advanced age, complete obstruction, or severe comorbidities) may benefit from stent placement until the patient can be optimized for a surgical procedure
- Palliative colorectal stents are an option in patients who are poor surgical candidates or have advanced cancer.

Diverticular disease (stricture)

- Patients with persistent obstruction secondary to diverticular disease despite appropriate medical management are treated surgically.
- Surgical resection follows the same principles as the treatment of carcinomas.
- Elective colonic resection is offered to patients with recurrent disease.

Complications of colonic obstruction

- Perforation
- Peritonitis from bowel perforation secondary to rough attempts at reduction of a volvulus or intussusception, or injudicious attempts to dilate or stent an unsuitable colonic obstruction
- Sepsis; Seen more frequently in cases in which a delay in diagnosis or treatment occurred
- Intra-abdominal abscess from anastomotic leakage
- Dehydration and electrolyte disturbance
- Death

Prognosis

- In general, overall mortality rates for large bowel obstructions are 20%, which increases to 40% if there is colonic perforation.

- The mortality rate for acute colonic pseudo-obstruction is 15% with early care; mortality increases to 36% if colonic ischemia or perforation develops