Intestinal Obstruction

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Intestinal Obstruction

• Common medical problem accounts for large percentage of surgical admissions

• It develops when air and secretions are prevented from passing aborally as a result from either extrinsic or intrinsic compression (i.e. Mechanical Obstruction) or gastrointestinal paralysis (i.e. Nonmechanical Obstruction in the form of ileus or pseudo-obstruction)
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Classification

- **Dynamic** peristalsis working against a mechanical obstruction
- **Adynamic** peristalsis may be absent (e.g. paralytic ileus) or it may be present in none propulsive form (e.g. mesenteric vascular occlusion or pseudo-obstruction). In both types mechanical element is absent
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Epidemiology

• Small intestinal ileus is the most common form of intestinal obstruction
• Occurs after most abdominal operations
• In response to acute extra-abdominal medical conditions and intra-abdominal inflammatory conditions
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**Table 1 - Causes of Ileus**

**Intra-abdominal causes**
- Intraperitoneal problems
- Peritonitis or abscess
- Inflammatory condition
- Mechanical: operation, foreign body
- Chemical: gastric juice, bile, blood
- Autoimmune: serositis, vasculitis
- Intestinal ischemia: arterial or venous, sickle-cell disease
- Retroperitoneal problems
- Pancreatitis
- Retroperitoneal hematoma
- Spine fracture
- Aortic operation
- Renal colic
- Pyelonephritis
- Metastasis
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Causes of Ileus (continue)

Extra-abdominal causes
- Thoracic problems
- Myocardial infarction
- Pneumonia
- Congestive heart failure
- Rib fractures
- Metabolic abnormalities
- Electrolyte imbalance (e.g., hypokalemia)
- Sepsis
- Lead poisoning
- Porphyria
- Hypothyroidism
- Hypoparathyroidism
- Uremia
- Medicines
- Drugs: Anticholinergics, Alpha agonists, Antihistamines, Catecholamines, Opiates
- Spinal cord injury or operations
- Head, thoracic, or retroperitoneal trauma
- Chemotherapy, radiation therapy
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• Mechanical small bowel obstruction is somewhat less common
• Obstruction secondary to adhesions, hernias, or cancer is about 90% of cases
• Mechanical colonic obstruction accounts for only 10% to 15% of all cases of mechanical obstruction and most often develops in response to obstructing carcinoma, diverticulitis or volvulus
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Table 2 - Causes of Small Bowel Obstruction in Adults

- **Extrinsic causes**
  - Adhesions*
  - Hernias (external, internal [paraduodenal], incisional)*
  - Metastatic cancer*
  - Volvulus  Intra-abdominal abscess
  - Intra-abdominal hematoma
  - Pancreatic pseudocyst
  - Intra-abdominal drains
  - Tight fascial opening at stoma
- **Intraluminal causes**
  - Tumors*
  - Gallstones
  - Foreign body
  - Worms
  - Bezoars
  - **Intramural abnormalities**
  - Tumors
  - Strictures
  - Hematoma
  - Intussusception
  - Regional enteritis
  - Radiation enteritis

* Approximately 85% of all small bowel obstructions are secondary to adhesions, hernias, or tumors.
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## Table 3 - Causes of Colonic Obstruction

### Common causes
- Cancer (primary, anastomotic, metastatic)
- Volvulus
- Diverticulitis
- Pseudo-obstruction
- Hernia
- Anastomotic stricture

### Unusual causes
- Intussusception
- Fecal impaction
- Strictures (from one of the following)
  - Inflammatory bowel disease
  - Endometriosis
  - Radiation therapy
  - Ischemia
  - Foreign body
- Extrinsic compression by a mass
  - Pancreatic pseudocyst
  - Hematoma
  - Metastasis
- Primary tumors
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• **Methods of classifying Mechanical Intestinal Obstruction** (Things to be considered when dealing with patient with mechanical intestinal obstruction)
  - Acute vs Chronic
  - Partial vs Complete
  - Simple vs Closed loop
  - None Gangrenous (simple) vs Gangrenous (complicated / strangulated)

**WHY?**
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• Natural history of the condition
• Response to treatment
• Associated Morbidity and Mortality

All vary according to type of obstruction present
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Partial vs Complete

• When chyme and gas can traverse the point of obstruction, obstruction is partial only (i.e. portion of the intestinal lumen is occluded)
Simple vs Closed loop

- Simple obstruction results from occlusion of bowel at a single point along the intestinal tract leading to intestinal dilatation, hyper-secretion, and bacterial overgrowth proximal to obstruction and decompression distal to obstruction.
- Closed loop obstruction occurs when segment of bowel is occluded at two points along its course (at both proximal & distal points), while occlusion of segment of bowel at two points along its course by single constrictive lesion that occludes both proximal and distal end of the intestinal loop as well as traps the bowel mesentery called **Volvulus**.
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None Gangrenous (simple) vs
Gangrenous (Complicated / strangulated)

• When blood supply to closed loop segment of bowel becomes compromised, leading to ischemia and eventually to bowel wall necrosis and perforation, **strangulation** is present
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Pathophysiology

• Irrespective to etiology, in dynamic (mechanical obstruction)
• Proximal bowel dilates and develops altered motility
• Distal to obstruction, the bowel exhibits normal peristalsis and absorption until it becomes empty at which point it contracts and becomes immobile
• Initially proximal peristalsis is increased to overcome obstruction, if obstruction is not relieved, the bowel begins to dilate causing reduction in peristaltic strength ultimately resulting in flaccidity and paralysis
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Pathophysiology (continue)

• Distension proximal to obstruction is produced by
  (1) Gas
    - Swallowed
    - Bacterial overgrowth (both aerobic & anaerobic organisms)
  (2) Fluid
    - Digestive juices (obstruction simulates intestinal epithelial water secretion and retard absorption)
    - Swallowed liquids
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Pathophysiology (continue)

- **Strangulation bowel obstruction**
  - When ongoing gas and fluid accumulation, the bowel distends and the intraluminal pressures rise. If pressure becomes high enough, microvascular perfusion to the intestine is impaired, leading to intestinal ischemia, and ultimately necrosis.
  - The venous return is impaired before the arterial supply, once arterial supply is impaired, hemorrhagic infarction occurs.
  - As viability of the bowel is compromised there is marked translocation and systemic exposure to anaerobic organisms and associated toxins. The morbidity from intraperitoneal strangulation is far greater than with an external hernia, which has a smaller absorptive surface.
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Clinical Features / Dynamic Obstruction

• Classic Quartet (Cardinal Clinical Features) of:
  - Pain
  - Distension
  - Vomiting
  - Constipation

• The nature of presentation influenced by
  (1) Level (location) of obstruction
    - small bowel obstruction (high or low)
    - large bowel obstruction
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Clinical Features / Dynamic Obstruction

(2) Age of obstruction

- **Acute** usually occurs in small bowel obstruction, with sudden onset of severe colicky central abdominal pain
- **Chronic** usually seen in large bowel obstruction, with lower abdominal colic and absolute constipation
- **Acute on chronic** short history of distension and vomiting against background of pain and constipation
- **Sub-acute** implies an incomplete obstruction
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Clinical Features / Dynamic Obstruction

(3) Underlying pathology

(4) Presence or absence of intestinal ischemia

- Constant pain
- Tenderness and rigidity
- Shock
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Clinical Features / Dynamic Obstruction

History

- Cardinal quartet
- Previous episodes of bowel obstruction
- Previous abdominal or pelvic operations
- Hx of abdominal cancer / radiation
- Hx of intra-abdominal inflammations
- Medications e.g. anti-coagulant
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Clinical Features / Dynamic Obstruction

Physical Examination & Resuscitation

• Assessment of vital signs, hydration status & cardiopulmonary system
• N/G tube, Foley's catheter & I.V. line insertion
• Check volume and character of gastric aspirate
  - Clear gastric outlet obstruction
  - Bilious, none feculent medial to proximal small bowel obstruction
  - Feculent distal small bowel obstruction
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Clinical Features / Dynamic Obstruction

Physical Examination & Resuscitation

- Fever ? Abscess
- Abdominal examination
- Examine for inguinal, femoral, umbilical, and incisional hernias
- Rectal examination for masses, fecal impaction, and occult blood
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Laboratory Tests

• Serum Electrolytes
• Serum Creatinine
• Hematocrit
• Platelet count
• WBC count
• Coagulation profile
• Ileus check electrolytes including Ca, Mg
• Urine for hematuria
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Imaging
When evaluating Abdominal radiographs
• Are there abnormally dilated loops of bowel, signs of small bowel dilatation, or air-fluid levels?
• Are air-fluid levels and bowel loops in the same place on supine and upright films?
• Is there gas throughout the entire length of the colon (suggestive of ileus or partial mechanical obstruction)?
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Imaging
When evaluating Abdominal radiographs (continue)

• Is there a paucity of distal colonic gas or an abrupt cutoff of colonic gas with proximal colonic distention and air-fluid levels (suggestive of complete or near-complete colonic obstruction)?

• Is there evidence of strangulation (e.g., thickened small bowel loops, mucosal thumb printing, pneumatisos cystoides intestinalis, or free peritoneal air)?

• Is there massive distention of the colon, especially of the cecum or sigmoid (suggestive of either volvulus or pseudo-obstruction)?

• Are there any biliary or renal calculi, and is there any air in the biliary tree (suggestive of gallstone ileus or a renal stone that could be causing ileus)?
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Adjunct Tests for Equivocal Situations

• Sigmoidoscopy / Colonoscopy
• Water-soluble contrast study / enema
• Ultrasonography / Computed Tomography

Abdominal radiographs can be entirely normal in patients with complete, closed loop, or strangulation obstruction, therefore, other imaging studies has to be done e.g. U/S or CT scan
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Adjunct Tests for Equivocal Situations

U/S

- Simultaneous observation of distended and collapsed bowel segments
- Free peritoneal fluid
- Inspissated intestinal content
- Paradoxical pendulating peristalsis
- Highly reflective fluid within bowel lumen
- Bowel wall edema
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Adjunct Tests for Equivocal Situations

CT scan

- Ascertain the level of obstruction
- Assess the severity of obstruction and determine the cause of obstruction
- Detect closed loop obstruction and early strangulation
- Detect inflammatory processes
- Detect small amounts of pneumatosis cystoides intestinalis
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- CT scan: early closed-loop small bowel obstruction
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Treatment of Acute Mechanical Intestinal Obstruction

• Gastrointestinal Drainage
• Resuscitation / Fluid and Electrolytes replacement

THEN
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Treatment of Acute Mechanical Intestinal Obstruction (continue)

• Consider Relief of Obstruction and Surgical Treatment (if needed)
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Treatment of Acute Mechanical Intestinal Obstruction

- Immediate Operation
- Urgent Operation
- Delayed Operation
- No Operation
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Situations necessitating emergent operation

• Incarcerated, strangulated hernias
• Peritonitis
• Pneumatosis cystoides intestinalis
• Pneumoperitoneum
• Suspected or proven intestinal strangulation
• Closed-loop obstruction
• Nonsigmoid colonic volvulus
• Sigmoid volvulus associated with toxicity or peritoneal signs
• Complete bowel obstruction
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Situations necessitating urgent operation

• Progressive bowel obstruction at any time after nonoperative measures are started
• Failure to improve with conservative therapy within 24 – 48 hr
• Early postoperative technical complications
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Situations in which delayed operation is usually safe

- Immediate postoperative obstruction
- Sigmoid volvulus successfully decompressed by sigmoidoscopy
- Acute exacerbation of Crohn disease, diverticulitis, or radiation enteritis
- Chronic, recurrent partial obstruction
- Paraduodenal hernia
- Gastric outlet obstruction
- Postoperative adhesions
- Resolved partial colonic obstruction
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No operation

• Partial Obstruction secondary to intra-abdominal adhesions
• Immediate postoperative period
• Inflammatory conditions (IBD, Radiation enteritis, diverticulitis)
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Nonmechanical Obstruction
• **Ileus**: failure of transmission of peristaltic waves secondary to neuromuscular failure
• Varieties
  - Postoperative: usually self limiting 24 – 72 hours, prolonged if associated with hypoproteinemia or metabolic abnormality
  - Infection: intra-abdominal sepsis
  - Reflex: fractures spine, retroperitoneal hematoma
  - Metabolic: uremia and hypokalemia
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Nonmechanical Obstruction

• Ileus

• Management
  - N/G tube gastrointestinal decompression
  - Restrict oral intake
  - Maintain electrolyte balance
  - Remove underlying cause
  - If prolonged consider laparotomy to exclude hidden cause and facilitate bowel decompression
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Patient has ileus

Distinguish between postoperative ileus and ileus without antecedent abdominal operation.
If abdominal distention or pain, nausea, or vomiting develops, insert NG tube and Foley catheter and rehydrate patient.
Repeat physical examination and abdominal x-rays daily.

Postoperative ileus

Condition usually resolves spontaneously within a few days.

Ileus persists for > 3–4 days

Consider possibility of partial mechanical obstruction.
Obtain CT scan, abdominal ultrasonogram, or contrast study.

Condition resolves

Clinical picture changes to that of partial mechanical obstruction

Confirm diagnosis via CT, abdominal ultrasonography, or contrast study.

Ileus is confirmed

Continue medical therapy.
Consider NG administration of diatrizoate meglumine or diatrizoate sodium.

Partial mechanical obstruction is confirmed

[See main algorithm.]
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Nonmechanical Obstruction
Pseudo-obstruction

• Usually of colon
• Acute (Ogilvie’s syndrome) or chronic
• Radiograph show evidence of colonic obstruction
• Caecal distension is common feature
• Caecal perforation well known complication
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Nonmechanical Obstruction

Pseudo-obstruction

- Confirm by colonoscopy, water soluble contrast enema or CT scan
- Treatment Decompression with colonoscopy / flatus tube
- Tube caecostomy
- Subtotal colectomy
Patient has pseudo-obstruction

Distinguish between colonic pseudo-obstruction (more common) and small bowel pseudo-obstruction.
(At any point in this algorithm, if signs or symptoms of strangulation or acute deterioration develop, urgent operation is indicated.)

Small bowel pseudo-obstruction

Pseudo-obstruction is diffuse, with no mechanical component
- Treat with NPO regimen, home TPN, and octreotide.

Segmental disease is present
- Consider surgical resection.

Pseudo-obstruction does not resolve
- Give neostigmine, 2.5 mg i.v. over 2-3 min.

Colonic pseudo-obstruction

Correct electrolyte abnormalities and metabolic abnormalities.
- Perform NG decompression.
- Place rectal tube, and give tap-water enema.
- Start octreotide drip.

Pseudo-obstruction does not resolve
- Perform colonoscopic decompression.

Pseudo-obstruction does not resolve
- Operate.