2. Sites of obstruction

Small Bowel vs. Large Bowel

- Scenario
  - prior operations, change in bowel habits
- Clinical picture
  - scars, masses/ hernias, amount of distension/ vomiting
- Radiological studies
  - gas in colon?, volvulus?, transition point, mass
- (Almost) always operate on LBO, often treat SBO non-operatively

Common Causes of SBO

- Adhesions: 60%
- Neoplasms: 20%
- Hernias: 10%
- Crohn's: 5%
- Miscellaneous: 5%

Common Causes of LBO

- Colon cancer
- Diverticulitis
- Volvulus
- Hernia

Unlike SBO, adhesions very unlikely to produce LBO

Intestinal obstruction

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   - Lesions extrinsic to the bowel wall
   - Lesions intrinsic to the bowel wall
4. Types of intestinal obstruction
   - Mechanical obstruction vs. Adynamic ileus
   - Partial vs. Complete
   - Simple vs. Strangulated
   - High vs low
   - Small bowel vs colon
5. Clinical picture
   - Fluid and electrolyte status
6. Treatment of intestinal obstruction
3. Causes of obstruction

- Outside the wall
- Inside the wall
- Inside the lumen

3. Causes of obstruction
Lesions Extrinsic to Intestinal Wall

- Adhesions (usually postoperative)
- Hernia
  - External (e.g., inguinal, femoral, umbilical, or ventral hernias)
  - Internal (e.g., congenital defects such as paraduodenal, foramen of Winslow, and diaphragmatic hernias or postoperative secondary to mesenteric defects)
- Neoplastic
  - Carcinomatosis, extraintestinal neoplasm
- Intra-abdominal abscess/diverticulitis
- Volvulus (sigmoid, cecal)
• CT scan through the mid abdomen shows dilated small bowel loops filled with fluid and decompressed ascending and descending colon. These are typical CT findings in small bowel obstruction.

• CT scan of the abdomen of a patient with a mechanical bowel obstruction secondary to an abscess in the right lower quadrant (arrow). Multiple dilated and fluid-filled loops of small bowel are noted.

• Barium radiograph demonstrates obstruction of the third portion of the duodenum secondary to superior mesenteric artery compression as a consequence of burn injury.
Congenital indirect inguinal hernia

at rest  upon straining
Lesions Intrinsic to Intestinal Wall

- **Congenital**
  - Malrotation
  - Duplications/cysts

- **Traumatic**
  - Hematoma
  - Ischemic stricture

- **Infections**
  - Tuberculosis
  - Actinomycosis
  - Diverticulitis

- **Neoplastic**
  - Primary neoplasms
  - Metastatic neoplasms

- **Inflammatory**
  - Crohn's disease

- **Miscellaneous**
  - Intussusception
  - Endometriosis
  - Radiation enteropathy/stricture

3. Causes of obstruction

CT scan of a patient with Crohn's disease demonstrates marked thickening of the bowel (arrows) with a high-grade partial small bowel obstruction and dilated proximal intestine.

Resection of the ileum, ileocecal valve, cecum, and ascending colon for Crohn's disease of the ileum. Intestinal continuity is restored by end-to-end anastomosis.

Barium radiograph demonstrates a typical "apple-core" lesion (arrows) caused by adenocarcinoma of the small bowel, producing a partial obstruction with dilated proximal bowel.

CT scan of abdomen demonstrates a small bowel neoplasm (arrow).
- Large circumferential mucinous adenocarcinoma of the jejunum.

- Small bowel leiomyosarcoma (malignant gastrointestinal stromal tumor) with hemorrhagic necrosis.

Gross photograph of primary lymphoma of the ileum shows replacement of all layers of the bowel wall with tumor.

- Small bowel lymphoma presents as perforation and peritonitis.

- Gross pathologic characteristics of carcinoid tumor. A, Carcinoid tumor of the distal ileum demonstrates the intense desmoplastic reaction and fibrosis of the bowel wall. B, Mesenteric metastases from a carcinoid tumor of the small bowel.

• Small bowel series in a patient with Crohn’s disease demonstrates a narrowed distal ileum (arrows) secondary to chronic inflammation and fibrosis.

• Barium study demonstrates jejunojejunal intussusception.
3. Causes of obstruction

Intraluminal/Obturator Lesions

- Gallstone
- Enterolith
- Bezoar
- Foreign body

- Plain abdominal film demonstrates a number of ingested foreign bodies in a patient presenting with a small bowel obstruction.
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     - Small bowel vs. Colon
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4. Types of bowel obstruction

**Causes of Adynamic Ileus**
- Following celiotomy
  - Small bowel: 24h, stomach: 48h, colon: 3-5d
- Inflammation e.g. appendicitis, pancreatitis
- Retroperitoneal disorders e.g. ureter, spine, blood
- Thoracic conditions e.g. pneumonia, # ribs
- Systemic disorders e.g. sepsis, hyponatremia, hypokalemia, hypomagnesemia
- Drugs e.g. opiates, Ca-channel blockers, psychotropics

**Mechanical Obstruction**
- Gas diffusely through intestine, incl. colon
- May have large diffuse A/F levels
- Quiet abdomen
- No obvious transition point on contrast study
- Peritoneal exudate if peritonitis
- Large small intestinal loops, less in colon
- Definite laddered A/F levels
- “Tinkling”, quiet= late
- Obvious transition point on contrast study
- No peritoneal exudate
Adynamic Ileus

Is there strangulation?

- 4 Cardinal Signs
  - fever, tachycardia, localized abdominal tenderness, leucocytosis
- 0/4 0% strangulated bowel
- 1/4 7% “ “
- 2-3/4 24% “ “
- 4/4 67% “ “
- process accelerated with closed-loop obstruction.

4. Types of bowel obstruction
Partial vs Complete

- Flibus
- Residual colonic gas above peritoneal reflection
- Adhesions
- 60-80% resolve with non-operative Mx
- Must show objective improvement, if none by 48h consider OR

- Complete obstruction
- No residual colonic gas on AXR
- SBFT may differentiate early complete from high-grade partial
- Almost all should be operated on within 24h

4. Types of bowel obstruction

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Proximal</th>
<th>Distal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute onset</td>
<td>Less acute onset</td>
<td></td>
</tr>
<tr>
<td>Vomiting prominent</td>
<td>Less prominent</td>
<td></td>
</tr>
<tr>
<td>Vomiting not feculent</td>
<td>Often feculent</td>
<td></td>
</tr>
<tr>
<td>Pain at frequent intervals</td>
<td>Less frequent intervals</td>
<td></td>
</tr>
<tr>
<td>Distention minimal</td>
<td>Noticable</td>
<td></td>
</tr>
</tbody>
</table>

CAUSES OF COLONIC OBSTRUCTION IN ADULTS

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcinoma</td>
<td>(65 %)</td>
</tr>
<tr>
<td>Diverticulitis</td>
<td>(20 %)</td>
</tr>
<tr>
<td>Volvulus</td>
<td>(5 %)</td>
</tr>
<tr>
<td>Others</td>
<td>(10 %)</td>
</tr>
</tbody>
</table>
CLINICAL MANIFESTATIONS OF COLORECTAL CANCER

Right Colon
- Anemia
- Weight loss
- Palpable mass
- Fatigue

Left Colon
- Obstructive symptoms
- Gross blood in stool
- Change in bowel habits
- Characteristic x-ray
  +sigmoidoscopy

Cancer
COLONIC OBSTRUCTION

ESSENTIALS OF DIAGNOSIS

- Constipation-obstipation
- Abdominal distention- sometimes tenderness
- Abdominal pain
- Nausea and vomiting (late)
- Characteristic x-ray findings
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5. Clinical picture
   - Symptoms and signs
   - Radiological tests

5. Treatment of intestinal obstruction

Pathophysiology

- Hypercontractility--hypocontractility
- Massive third space losses
  - oliguria, hypotension, hemoconcentration
- Electrolyte depletion
- Bowel distension--increased intraluminal pressure--impedement in venous return--arterial insufficiency

LOSS OF FLUID AND ELECTROLYTES IN INTESTINAL OBSTRUCTION

- Into the bowel lumen
- Into the edematous bowel wall
- Into the peritoneum
- Vomiting or NG suction

5. Clinical picture

- Colicky abdominal pain
- Abdominal distension
- Vomiting
- Decreased passage of stool or flatus
- Typical radiographic picture
  - Plain AXR, contrast CT, UGI/SBFT, enteroclysis
Physical findings:
Tachycardia
Rebound (+)
Muscle guarding Localised tenderness
Fever

Auscultation: High-pitched amphibic rushes (metallic bowel sounds)

Lab: Hyponatremia, Hypocloremia, ↑ urine osm.
met. asc. Leukocytosis (15-25,000/mm³)
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Management of Bowel Obstruction

NEVER LET THE SUN RISE OR FALL ON A PATIENT WITH BOWEL OBSTRUCTION
Principles

- Fluid resuscitation
- Electrolyte, acid-base correction
- Close monitoring
  - foley, central line
- NGT decompression
- Antibiotics controversial
- TO OPERATE OR NOT TO OPERATE

SURGICAL TREATMENT

- Preoperative preparation ⇒ Partial-complete
  Malignant - benign
  Early postoperative
- Nasogastric suction+CVP+Foley Cath.
- Fluid and electrolyte resuscitation
  (Ringer lactate+ Saline+ K (?)+ ANTIBIOTICS (?))
- Operative therapy
  Adhesiolysis, enterotomy/resection,
  by-pass, ostomy