Intestinal Obstruction
Clinical Presentation & Causes

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Epidemiology

- Intestinal Obstruction
  - One of the common causes of hospital admission
    - True incidence not known.
      - 5-20% emergency general surgical admission
      - US 12-16% surgical admission
    - Early prompt diagnosis and treatment has excellent outcomes
    - Mortality
      - Untreated strangulated obstruction 100%
      - Strangulated small bowel obstruction treated > 36 h- 25%, <36 h - 8%
      - Mechanical Large Bowel obstruction 20%, if perforated 40%
      - Non Mechanical (Pseudo) obstruction 15%-30%

- Table 1. Causes of intestinal obstruction (n = 208).

<table>
<thead>
<tr>
<th>Etiology</th>
<th>No. of patients</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Adhesions</td>
<td>71</td>
<td>34.0</td>
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<tr>
<td>Hernias</td>
<td>34</td>
<td>16.0</td>
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<tr>
<td>Malignancy</td>
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<td>13.5</td>
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<td>Tuberculous stricture</td>
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<tr>
<td>Volvulus</td>
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<td>Ischemic stricture</td>
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<td>3.5</td>
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<td>Diverticular disease</td>
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<td>3.0</td>
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<tr>
<td>Fecal impaction</td>
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<td>3.0</td>
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<tr>
<td>Ascarisis</td>
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<td>2.0</td>
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<td>Gall stone ileus</td>
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<td>1.5</td>
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<td>Crohn disease</td>
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<td>1.0</td>
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<tr>
<td>Unknown cause</td>
<td>18</td>
<td>9.0</td>
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<tr>
<td>Total</td>
<td>208</td>
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</table>
Anatomical considerations

• Gastrointestinal tract
  – Occupies /courses thro head, neck, thorax and abdomen
  – Very long tubular organ (musculo membraneous)
  – Solid organs to aid its function
  – Gut has anchored segment and free segments
  – Areas of transition of calibre

• Embryological
  – Foregut, midgut, hindgut
  – Vascular pedicle - axis
  – Innervation – pain localisation and mobility
  – Atresia / hypertrophy
Physiological Characteristic

• Distensibility
• Motility
  – Segmented
  – Peristalsis
• Physiological sphincters
• Secretion
• Faeces
  – 75% of water and 25% of solid substance (composed for bacteria deceased – 30%, fat – 10 to 20%, inorganic substance – 10 to 20%, proteins – 2 to 3%, remaining portions not digested – 30%).
Definition

Gut = mouth to anus
Intestinal Obstruction = Blockage to the lumen of gut
   Intestinal Obstruction commonly refers
to blockage of intra-abdominal part of the intestine

Simplistic definition:
Arrest / blockage of onward propulsion of intestinal contents

A Volvus = a twist / rotation of segment of bowel
Adhesions = Sticking together
   abdominal structures to one another,
bowel loops or omentum,
other solid organs, abdominal wall

Intesussuption = telescoping
   one hollow structure into its distal hollow structure
Atresia - absence of opening or failure of development of hollow structure
Classification of Obstruction

• According to site
  – Large bowel / Small bowel / Gastric

• Extent of luminal obstruction
  – Partial / complete

• According to mechanism
  – Mechanical / True (intraluminal / extraluminal)
  – Paralytic (Pseudo obstruction)

• According to pathology
  – Simple
  – Closed loop
  – Strangulation
  – Intussusception
Pathophysiology Mechanical Obstruction

• Small Bowel - Obstruction
  – Proximal dilatation
    • Increased secretions + swallowed air (small bowel) or bacterial fermentation (large bowel)
    • More dilatation - decreased absorption – mucosal wall oedema
    • Increased pressure – intramural vessels compressed - Ischaemia- perforation
  – Increased secretions and distension
    • Anorexia, nausea, vomiting / distension with pain
    • Fluid and electrolyte imbalance - hypovolemia
    • Bacterial overgrowth faeculent vomiting
  – Untreated obstruction leads
    – Ischaemia
    – Necrosis
    – Perforation

• Large Bowel Obstruction
• Similar to SBO with difference
  – The colon proximal to obstruction dilates
  – Increased colonic pressure decreased mesenteric blood flow
  – Mucosal oedema - transudation of fluid and electrolytes - lumen.
  – The arterial blood supply compromised - mucosal ulceration - full thickness necrosis - perforation.
  – Bacterial translocation – sepsis

• If ileocaecal valve competent –
  • The caecum - usual site of perforation

• If ileocaecal valve incompetent –
  • Faeculent vomiting

• Colonic volvulus
  – Axial rotation - at mesenteric attachments:
  – A 360° twist - a closed loop obstruction is produced.
  – Fluid and electrolyte shifts into the closed loop
  – Increase in pressure and tension - impaired colonic blood flow
  – Ischaemia, necrosis, and perforation of the loop of bowel
Small Bowel Obstruction (SBO) - Epidemiology

- 60 to 75% of Intestinal Obstruction
- Incidence
  - 0.1 to 5% - No previous surgery
  - 60% - previous surgery
  - Inflammatory bowel disease – Crohn's -25%
  - Children 1 in 5000
  - 0.5% in first 2 year of life
Causes -SBO

• Adults
  – Adhesions (developed world)- previous surgery
  – Hernia (developing world)
  – Crohns
  – Malignancy

• Children
  – Appendicitis
  – Intesussuption
  – Volvulus
  – Atresia
  – Hypertrophic pyloric stenosis

• Uncommon Causes
  – Radiation
  – Gall stones
  – Diverticulitis, appendicitis
  – Sealed small perforation, intra abdominal collection / abscess
  – Foreign Bodies (Bezoars)
Large Bowel Obstruction (LBO)

- Less common - 25% Intestinal obstruction
- Obstruction
  - functional (due to abnormal intestinal physiology)
  - Mechanical obstruction
    - partial or complete.
    - Acute presentation - abdominal pain and obstipation,
    - Chronic - a progressive change in bowel habits.

- Acute presentation - an average of five days of symptoms
  - Abdominal distension and discomfort - tolerated better
  - Pain and vomiting late.
Causes of LBO

• **Age and Race dependent**
  - **US/Europe** — 90% colorectal malignancy
    - Age 70y; Men and women equal
      » Only 30% colorectal malignancy present as Obstruction
      » 5% Volvulus
      » 3% strictures Ischaemic, radiation, inflammatory, gynaecological other malignancy
      » 2% rare causes — FB, hernia, abscess
      » Functional obstruction - faecal impaction
  - **African countries** — 50% Volvulus

• **Paediatric**
  - Anatomical development
    » Imperforate anus
    » Hirshsprung disease (congenital absence of ganglion cells in bowel wall)
Adhesive Obstruction

- Nearly 60% of SBO
- Usually secondary to previous abdominal surgery
  - Elective / Emergency
- Increased incidence
  - Pelvic surgery
  - Gynaec surgery
  - Colorectal surgery
- Can occur
  - as early as 3-4 weeks
  - Usually few years
Hernia Causing SB0

• Definition hernia
  – Abnormal protrusion of viscus through normal or abnormal defects of body cavity

• Hernia- obstruction
  • Untreated – strangulation
  • smaller hernias greater risk

• Incidence of strangulation groin hernia
  • Inguinal – 2.5 to 4.5% in 3 to 24 m
  • Femoral -22 to 45% - 3 to 22m

• Usually presents as
  – Lump
  – Pain
Volvulus

- Always occurs at the part of bowel with mesentery
- Type of closed loop bowel obstruction
- Uncommon cause of SBO
  - Caused by Caecal rotation, congenital or Adhesional band
- Caused narrow base and wide apex
- Caused by rotation by 360° proximal limb around distal
- Cuts of blood supply

Colonic Volvulus
- Sigmoid (76%), Caecum (22%)
- Axial rotation –at mesenteric attachments:
  - A 360° twist - a closed loop obstruction is produced.
- Fluid and electrolyte shifts into the closed loop
- Increase in pressure and tension - impaired colonic blood flow
- Ischaemia, necrosis, and perforation of the loop of bowel
Intesussuption

- Telescoping of intestine into one another
  - 2 types:
    - idiopathic
    - enteroenteral intussusception (jejunojejunal, jejunoileal, ileoileal),
    - Associated with special medical situations HSP, cystic fibrosis, hematologic dyscrasias
  - Mechanism
    - an imbalance in the longitudinal forces along the intestinal wall.
    - a mass acting as a lead point or disorganized pattern of peristalsis
    - The invaginating portion - the intussusceptum)
    - the receiving portion - the intussuscipiens.
  - If the mesentery of the intussusceptum is lax
    - The progression is rapid
    - The intussusceptum - prolapse out the anus.
    - Invagination causes the classic pathophysiologic process of any bowel obstruction.
Symptoms - Mechanical

Pain
- Colicky – poorly localised

Vomiting
- Early – proximal bowel obstruction
- Late – in large bowel obstruction

Constipation
- Early in distal large bowel obstruction
- Late in small bowel obstruction
- Absolute constipation = Obstipation

Abdominal distension
- The more distal the obstruction the greater the distension
Presentation of Small bowel Obstruction

• Vomiting
  – Projectile
  – Faeculent

• Pain
  – Colicky to constant- diffuse

• Constipation
  • Late (one of more motion after onset of pain not uncommon)
  • Obstipation – absence of faeces or flatus

• Distension

• Tenderness
Presentation Large Bowel Obstruction

• Common Symptoms – malignancy, strictures
  – Abdominal discomfort
  – Fullness / Bloating / Nausea
  – Altered bowel habit
    – Increasing difficulty to open bowels - tenesmus
    – Blood in stools
    – Constipation - obstipation
  – Abdominal pain
    • Colicky, tenderness, constant
  – Vomiting
    • late
  – Weight loss

• Volvulus
  – Sudden
  – Pain
  – Localised tenderness and distension