

Intestinal obstruction

الاستاذ الدكتور عادل الركابي

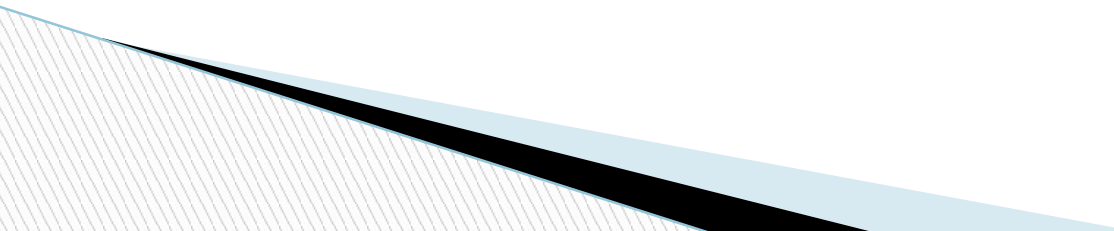
:To understand

The pathophysiology of dynamic and adynamic •
intestinal obstruction

The cardinal features on history and examination •

The causes of small and large bowel obstruction •

•



CLASSIFICATION

:Intestinal obstruction may be classified into two types

Dynamic, in which peristalsis is working against a •
mechanical obstruction. It may occur in an acute or a chronic
form

;Adynamic, in which there is no mechanical obstruction •
peristalsis is absent or inadequate (e.g. paralytic ileus or
.pseudo-obstruction)

Causes of intestinal obstruction

Dynamic

Intraluminal

Faecal impaction-1

Foreign bodies – round worms-2

Bezoars-3

Gallstones – gall stone ileus-4

Intramural

Stricture-1

Malignancy-2

Intussusception-3

Volvulus-4

Extramural

Bands/adhesions-1

Hernia-2

Adynamic

paralytic ileus-1

Pseudo-obstruction-2

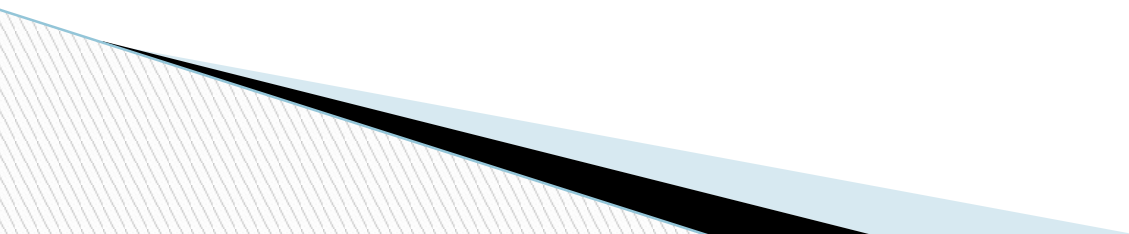
Classification II: Depending on Type of Obstruction

.Acute: Common in small bowel .1

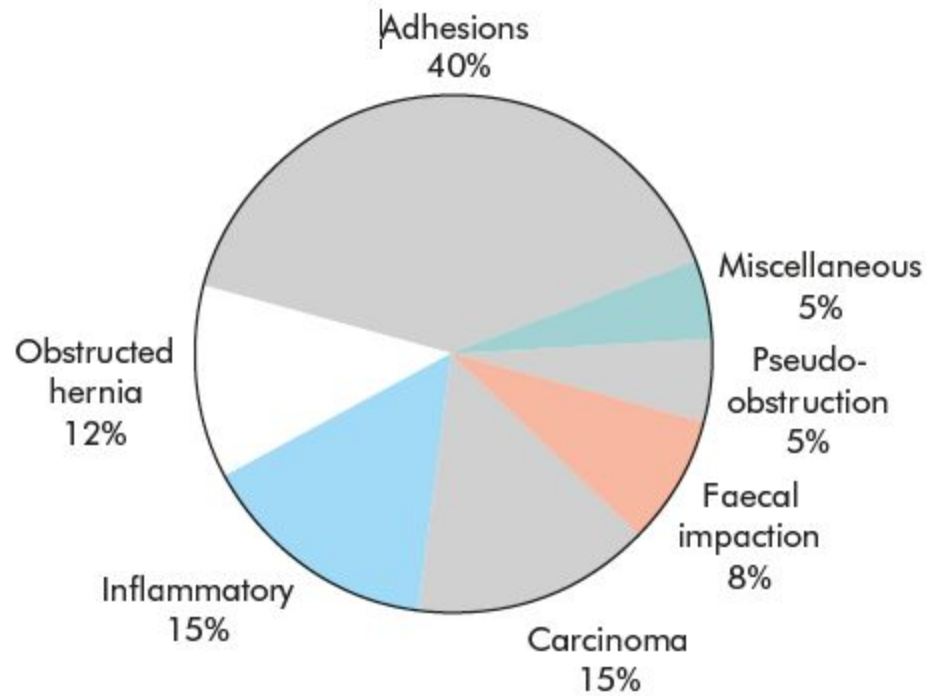
.Chronic .2

.Acute on chronic: Common in large bowel .3

Closed loop obstruction .4



	<i>Dynamic</i>		<i>Adynamic</i>
<i>Outside the wall</i>	<i>In the wall</i>	<i>In the lumen</i>	
Hernia—25% Adhesions—40% Volvulus Intussusception	Tuberculous stricture Crohn's disease Malignancy	Gallstones Roundworm Inspissated faeces Meconium ileus	Cessation of peristalsis Postoperative period Electrolyte imbalance Spinal injuries Uraemia Diabetes mellitus Retroperitoneal—haematomas and surgeries Renal surgeries Mesenteric ischaemia Pseudo-obstruction



PATHOPHYSIOLOGY

in dynamic (mechanical) obstruction the bowel proximal to the obstruction dilates and the bowel below the obstruction exhibits normal peristalsis and absorption until it becomes empty and collapses. Initially, proximal peristalsis is increased in an attempt to overcome the obstruction. If the obstruction is not relieved, the bowel continues to dilate, ultimately there is a reduction in

.peristaltic strength, resulting in flaccidity and paralysis

:The distension proximal to an obstruction is caused by two factors

Gas: there is a significant overgrowth of both aerobic and anaerobic organisms, resulting in • considerable gas production. Following the reabsorption of oxygen and carbon dioxide, the • majority is made up of nitrogen (90 per cent) and hydrogen sulphide

Fluid: this is made up of the various digestive juices (saliva 500 mL, bile 500 mL, pancreatic • secretions 500 mL, gastric secretions 1 liter – all per 24 hours). This accumulates in the gut lumen • as absorption by the obstructed gut is retarded

:Dehydration and electrolyte loss are therefore due to

;defective intestinal absorption –

;losses as a result of vomiting –

;sequestration in the bowel lumen –

.transudation of fluid into the peritoneal cavity –

reduced oral intake –

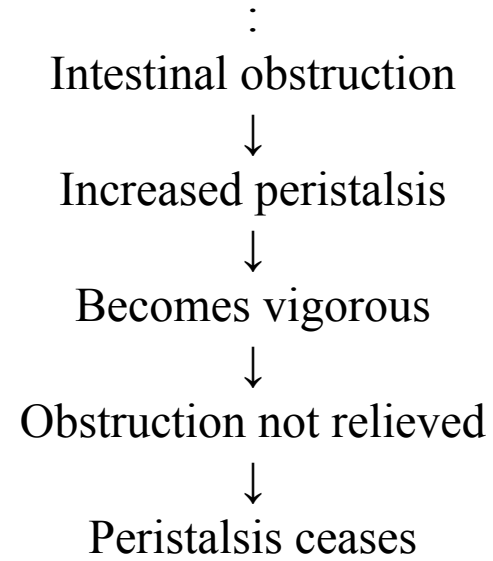
STRANGULATION

It is important to appreciate that the consequences of intestinal obstruction are not immediately life-threatening unless there is superimposed strangulation. When strangulation occurs, the blood supply is compromised and the bowel becomes ischaemic

Causes of strangulation

- Direct pressure on the bowel wall
 - Hernial orifices
 - Adhesions/bands
- Interrupted mesenteric blood flow
 - Volvulus
 - Intussusception
- Increased intraluminal pressure
 - Closed-loop obstruction

Changes proximal to the bowel obstruction



:Changes at the site of the obstruction

.Initially venous return is impaired



Congestion, oedema of bowel wall occurs

which turns

.purple



.Later this jeopardizes the arterial supply



Loss of shininess, blackish discolouration, loss

.of peristalsis



.Gangrene



.Perforation occurs



Bacteria and toxins migrate into the

.peritoneum



.Peritonitis

Closed-loop obstruction

This occurs when the bowel is obstructed at both the proximal and distal points

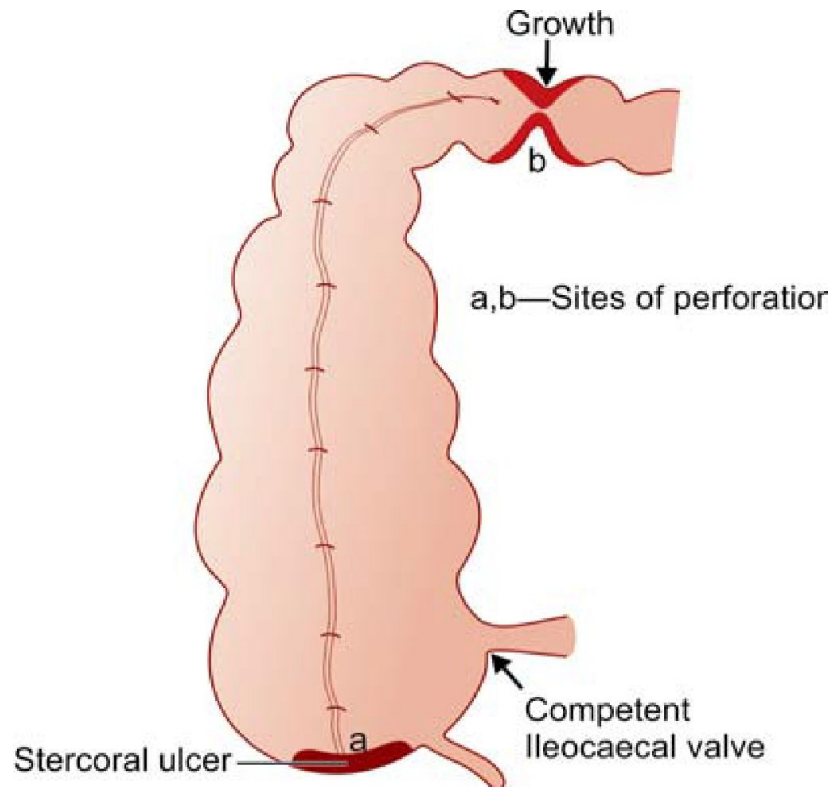
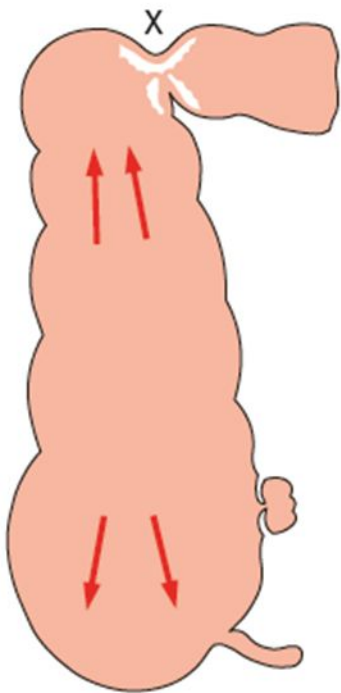
The distention is principally confined to the closed loop, distention proximal to the obstructed segment is not typically marked

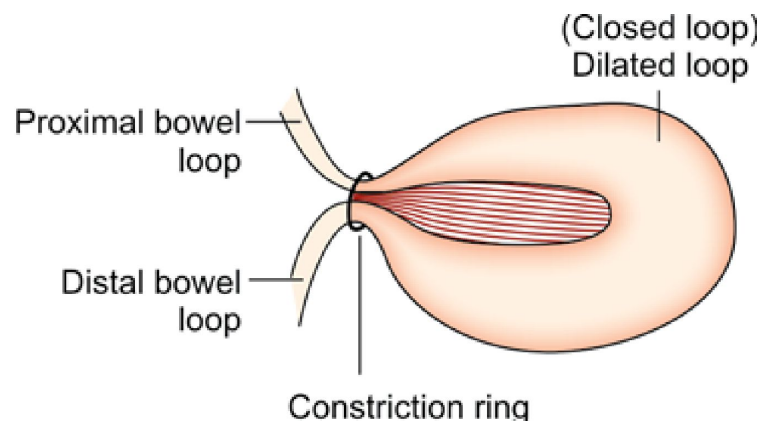
A classic form of closed-loop obstruction is seen in the presence of a malignant stricture of the colon with a **competent ileocaecal valve**.
(present in up to one-third of individuals)

.This can occur with lesions as far distally as the rectum

The inability of the distended colon to decompress itself into the small bowel results in an increase in luminal pressure, which is greatest at the caecum, with subsequent impairment of blood flow in the wall.

Unrelieved, this results in necrosis and perforation







Internal hernia

Internal herniation occurs when a portion of the small intestine becomes entrapped in one of the **retroperitoneal fossae or in a congenital mesenteric defect**

The following are potential sites of internal herniation (all

:(are rare

;the foramen of Winslow •

;a defect in the mesentery •

;a defect in the transverse mesocolon •

;defects in the broad ligament •

;congenital or acquired diaphragmatic hernia •

duodenal retroperitoneal fossae—left paraduodenal and right •

Duodenojejunal

caecal/appendiceal retroperitoneal fossae – superior, inferior and •

;retrocaecal

intersigmoid fossa •

Clinical features of dynamic intestinal obstruction

:Abdominal pain

.Initially colicky and intermittent: later continuous and severe

Pain is the first symptom to develop which is sudden and severe. Initial colicky pain suggests

.obstruction and eventual diffuse persistent pain suggests strangulation

.Pain begins usually around umbilicus in small bowel obstruction

In small bowel obstruction, it is crampy, recurrent paroxysms occurring as short

.crescendo/decrecendo episodes (of 30 seconds)

In large bowel obstruction, it is of longer episodes of minutes

.(In paralytic/adynamic ileus, pain is diffuse and mild)

:Vomiting

.In jejunal obstruction, it is early and persistent

In ileal obstruction, it is recurrent occurring at an interval; initially bilious later faeculent

In large bowel obstruction, vomiting is a **late feature**

:Distension

It is absent or minimal in case of jejunal obstruction Obvious with visible intestinal peristalsis (VIP) and borborygmi sounds in case of ileal obstruction—Step ladder peristalsis

.It is enormous in case of large bowel obstruction



:Constipation

.It is absolute, i.e. neither faeces nor flatus is passed

Exceptions

- ❖ Richter's hernia obstruction
- ❖ Gallstone obstruction
- ❖ Mesenteric vascular occlusion
- ❖ Intestinal obstruction with a pelvic abscess

:Dehydration

.Leads to oliguria → renal failure

:Features of toxemia and septicemia

.Tachycardia, tachypnoea, fever, sunken eyes, cold periphery

:Abdominal tenderness

It is initially localised but later becomes diffuse—is a feature of intestinal obstruction. Rebound tenderness and guarding will not be present in simple obstructions which are features of strangulation

:Features of strangulation

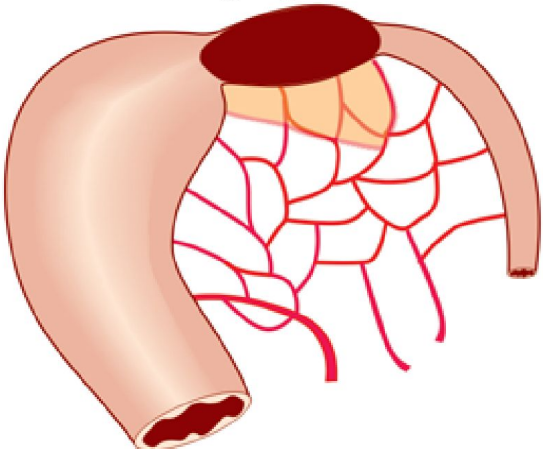
Continuous severe pain, shock, tenderness, rebound-1
.tenderness (Blumberg's sign)

.Guarding and rigidity, **absence of bowel sounds**-2

In case of strangulated hernia, a swelling which is tense,-3
tender, rigid, irreducible, no expansile impulse on coughing
.and history of recent increase in size is seen

Obstructed gangrenous bowel

Proximal dilated bowel

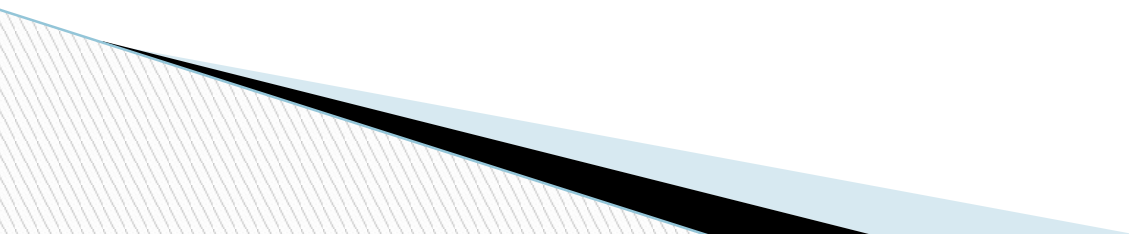


Distal collapsed bowel

Temperature

.Fever signifies inflammation in the bowel wall/ischaemia/perforation

Hypothermia can occur when septicemia develops due to lack of pyrogenic response. It suggests poor prognosis



:Bowel sounds

They are **increased—high pitched metallic (rushes and groans) sounds followed by metallic tinkling sounds of .dilated bowel**

Eventually once fatigue occurs or gangrene develops, bowel sounds are not heard—silent abdomen of peritonitis develops (In paralytic ileus, .there are only continuous metallic sounds of dilated bowel)

Per-rectal examination

.Shows empty, dilated rectum, often with tenderness
If rectal growth is the cause for obstruction, it may be palpable

-:Investigations

Plain X-ray abdomen: (initially supine abdominal X-ray-1

.(is taken; later if needed X-ray in erect posture is taken if perforation is suspected

.Multiple air-fluid levels

.Proximal the obstruction → Lesser the air fluid level

.Distal the obstruction → More the air fluid level

**Normally, three fluid levels can be seen in plain X-ray film—at fundus of stomach,
.at duodenum and often at caecum**

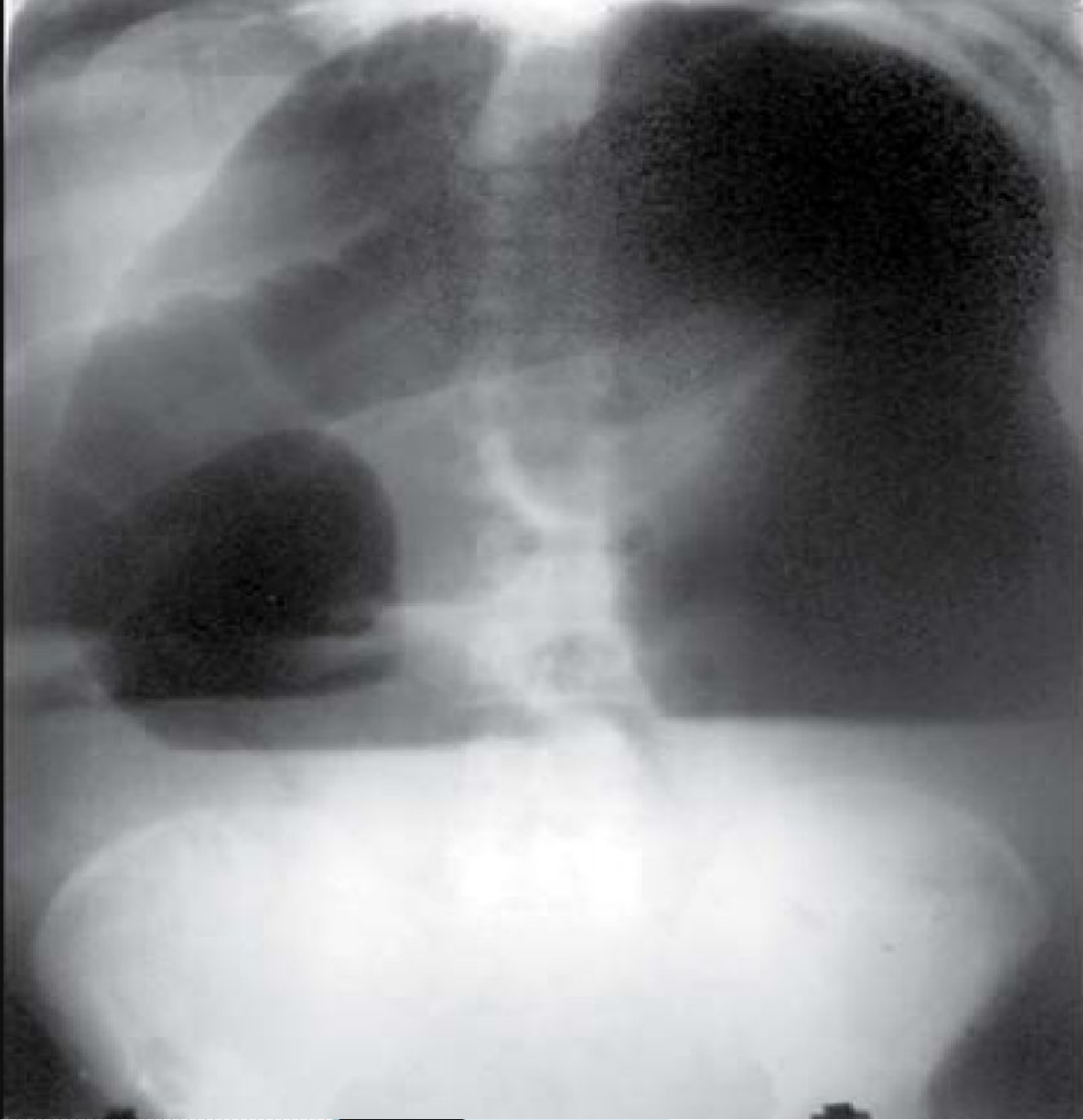
Jejunum shows concertina effect due to **valvulae conniventes**

.Ileum is smooth and characterless (by Wangens teen)

.Large bowel shows **haustration**

In small bowel obstruction the air fluid level multiple central with step ladder arrangement with presence of valvulae conniventes

In large bowel obstruction the air fluid level scanty at the peripheral with the presence of
.haustration





Triad of small bowel obstruction in plain X-ray

1. Dilated small bowel loops > 3 cm
2. Multiple air fluid levels in erect X-ray
3. Paucity of air in the colon

Barium (micro bar solution) enema or gastrografi n contrast-2
.enema X-ray is useful in intussusception

**Barium meal is usually contraindicated in acute intestinal
.obstruction**

However dilute (micro bar) barium meal/gastrografi n meal
follow through X-ray may be done with caution in suspected
subacute/partial intestinal obstruction under
fluoroscopy, otherwise it may precipitate complete obstruction or may
.[cause perforation and barium peritonitis which is very dangerous

Haematocrit, blood urea and serum creatinine; arterial blood gas-3
analysis (acidosis is common), LFT, platelet count (In severe sepsis there
.will be altered LFT with thrombocytopenia)
.Serum electrolytes estimation. Hypokalaemia is common -4
Total count is increased. But can be significantly low in
.severe stage of sepsis

US abdomen is useful to see dilated bowel and fluid in the peritoneal-5
cavity. It is better than X-ray but not as good as CT scan. Doppler US is
.useful in detecting strangulation
.CT scan is very reliable investigation for intestinal obstruction-6

Treatment

Nasogastric aspiration: To reduce toxic effects, to reduce-1
bowel distension which indirectly improves pulmonary
.ventilation and to reduce possibility of aspiration pneumonia

.Replacement of fluid and electrolytes-2

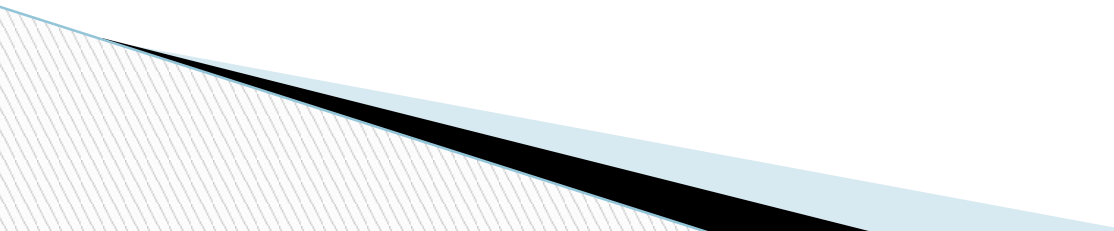
.Antibiotics: Ampicillin, gentamycin, metronidazole, cephalosporins -3

Blood transfusion: FFP or platelet transfusions are often-4
needed in critical patient

ICU critical care: Systemic management of complications-5
.like ARDS, DIC, SIRS are important. If there is hypotension
.dopamine/dobutamine are also needed

CVP for fluid and monitoring: PCWP (pulmonary capillary-6
wedge pressure) monitoring are often needed in haemodynamically
.unstable patient

.

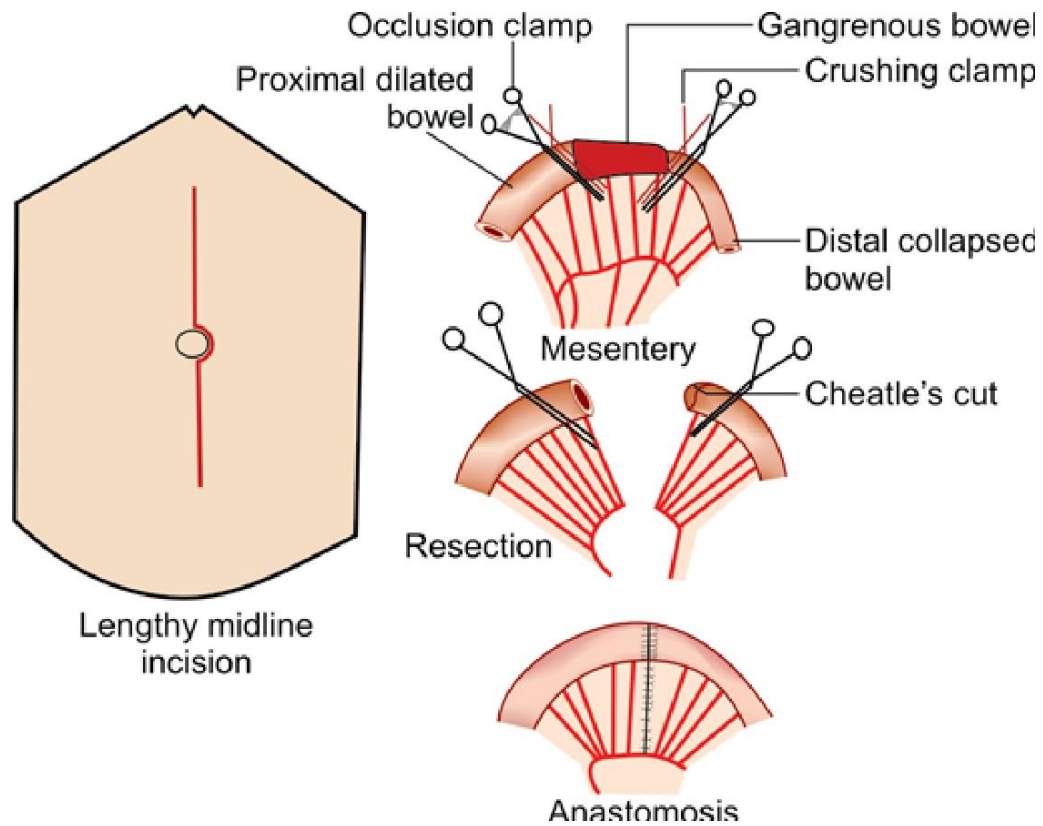


:Surgery

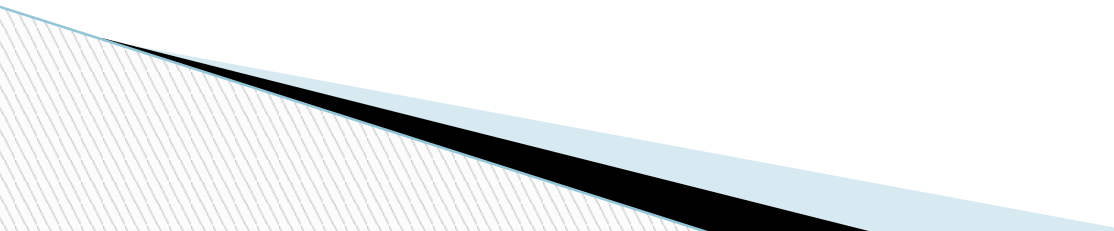
Immediate laparotomy is done and the site (by finding the junction of dilated proximal and collapsed distal bowel) and cause of the obstruction is identified. The obstruction is relieved

To check for viability of bowel, look for

- ❖ Peristalsis
- ❖ Pulsations
- ❖ Bleeding in mesentery and bowel wall
- ❖ Friability—friable, flabby muscle is seen in ischaemia
- ❖ Colour (black/pink)—dull and lusterless serosa is seen in ischaemia
- ❖ Serosal shining # On table Doppler

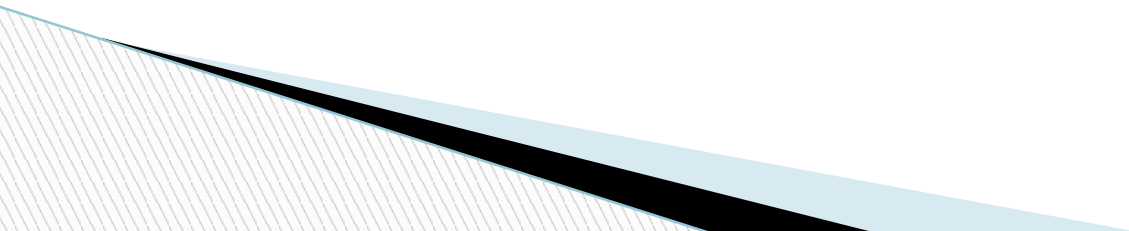


Warm saline soaked mop is placed over the doubtful area
with 100% oxygen inhalation for 20 minutes; if colour
.becomes normal with peristalsis then bowel is viable
.On table Doppler study may be useful
Fluorescein fluorescence study may be helpful on table
.to check the viability
.If bowel is not viable resection and anastomosis is done
A good peritoneal wash is given and the abdominal
.cavity is drained
Abdomen is closed in layers using nonabsorbable sutures
Often tension .(polyethylene, polypropylene, nylon)
.sutures are required
Small bowel can be decompressed using Savage's
.decompressor

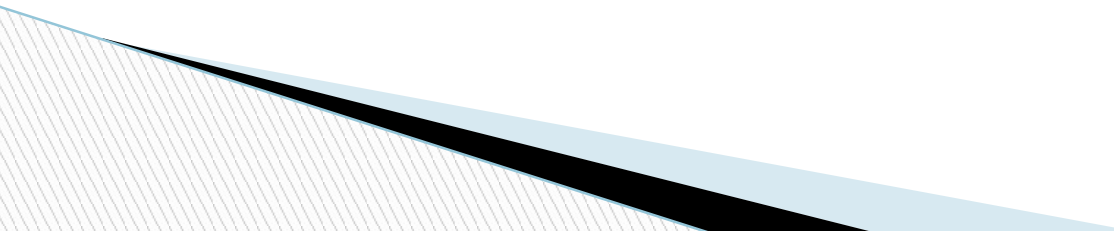


Obstruction due to rectosigmoid growth with patient being severely ill—Hartmann's operation can be done to save the life of the patient wherein distal stump after removal of the growth is closed, proximal colon is brought out as end colostomy

Laparoscopic approach may be useful in partial obstruction, proximal obstruction, obstruction due to band.
.Conversion when needed should be done without hesitation



-:Post-surgery Complications

- .Pelvic abscess-1
 - .Subphrenic abscess-2
 - .Biliary or faecal fistulas-3
 - .Burst abdomen-4
 - .Bands and adhesions-5
 - Incisional hernias-6
- 

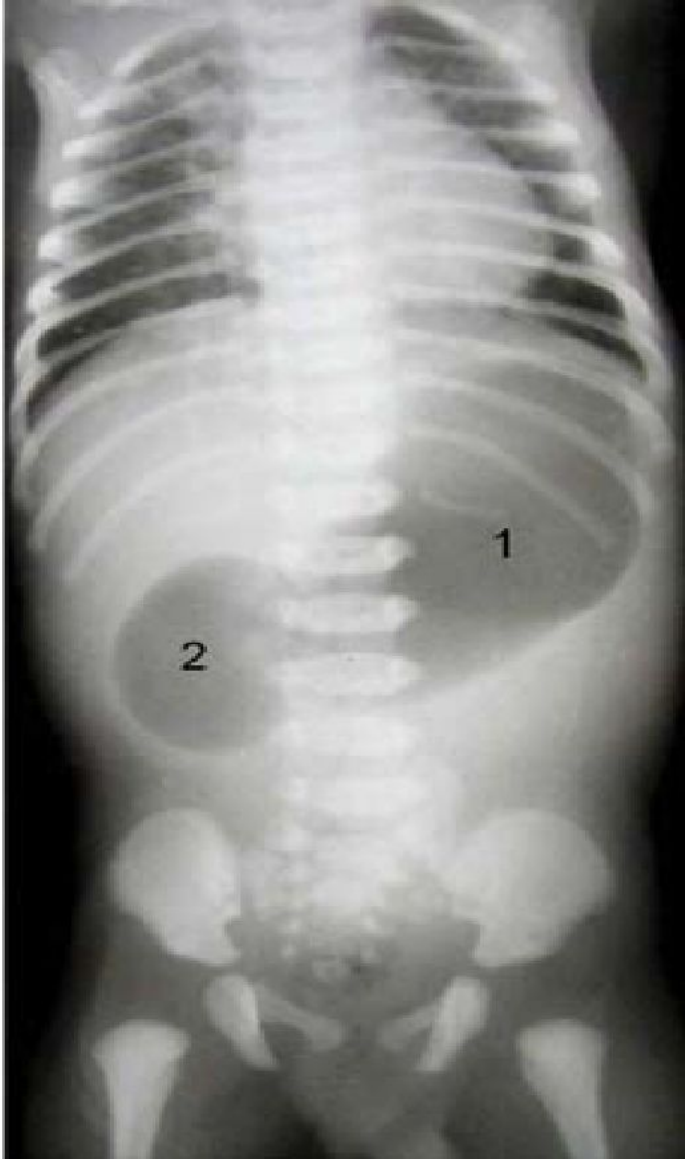
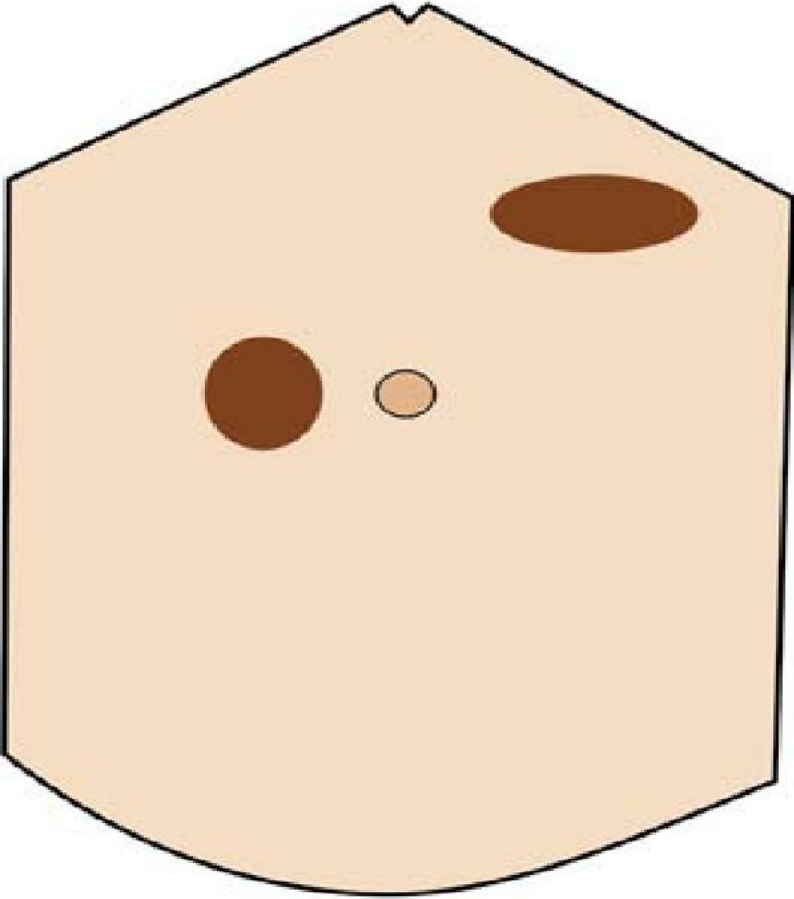
DUODENAL ATRESIA

.It is the commonest site of intestinal atresia

It is usually a complete stenosis of the second part of duodenum at the level of ampulla of Vater

It is defective fusion of foregut and midgut with failure of recanalisation. Incidence is one in 10,000 live births

Double-bubble sign in duodenal atresia



INTUSSUSCEPTION (ISS)

Definition

It is telescoping or invagination of one portion (segment) of .bowel into the adjacent segment

Types

.Antegrade: Most common .1

Retrograde: Rare (jejunogastric in gastrojejunostomy) .2

Stoma

,It can be ileo-colic (most common type, 75%)

.colocolic, ileoileocolic, colocolic

It is common in weaning period of a child (common in male), between .the period of 6-9 months

It is the commonest cause of intestinal obstruction in children of 6-18 months age

Clinical Features

.Common in males (3:2)-1

Common in 6-9 months. But can also occur at later age-2

.grouped children

Common in spring and winter, coinciding with the-3

.gastroenteritis and respiratory infections in respective periods

Commonest cause of intestinal obstruction in infancy-4

,On examination

a mass is felt either on the left or right of the umbilicus which is-1
sausage shaped with concavity towards umbilicus, smooth, firm,
resonant, not moving with respiration, mobile, contracts under the
.palpating fingers

.Often mass appears and disappears

.Right iliac fossa is empty (Sign of Dance)-2

After 24-48 hours, abdominal distension appears and-3
increases progressively with Features of intestinal obstruction with
.step-ladder peristalsis

Blood stained stool is often obvious on digital-4

.examination(current Jelly stool) of the rectum

Occasionally intussusceptum can be seen per anally and felt with a long-5
.mesentery

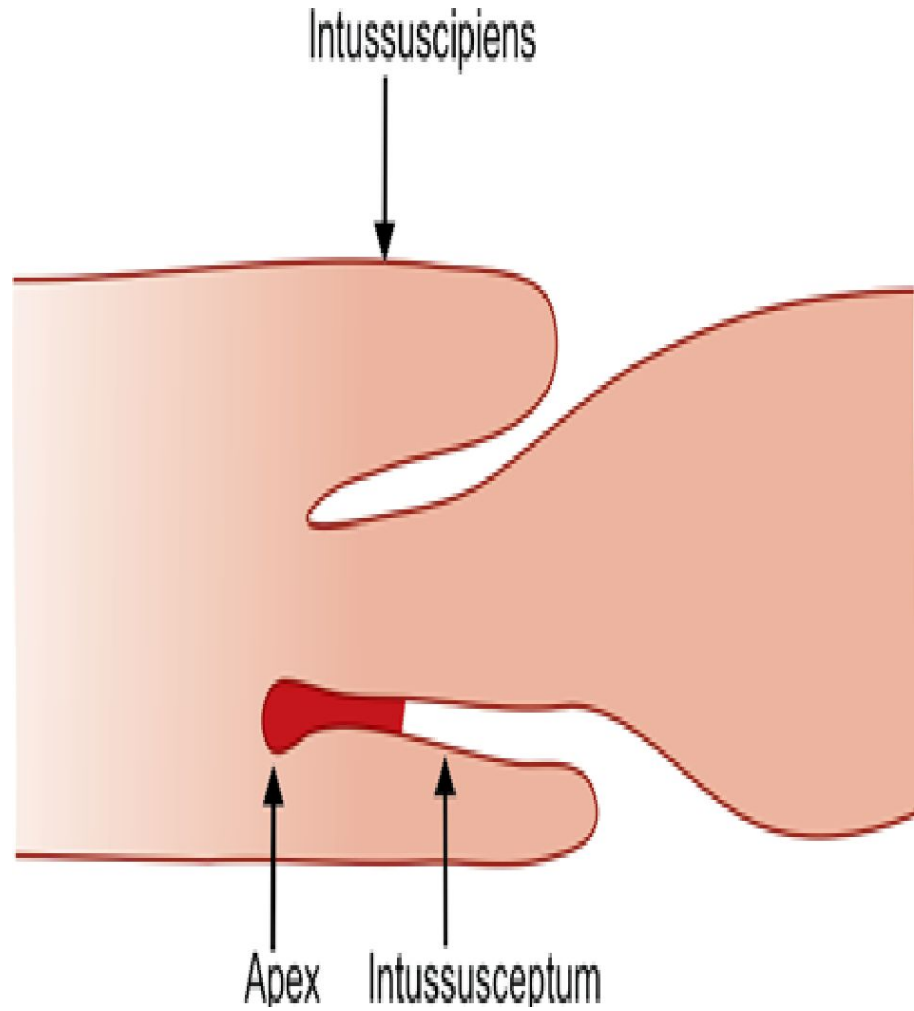
Eventually, gangrene and perforation occurs with features
of the peritonitis

Sausage-shaped
mass



Abdominal finding in patient with intussusception

- ❖ Palpable mass (85%)
 - Sausage shaped smooth, firm mass
 - Mass does not move with respiration
 - Mobile in all directions
 - Resonant
 - Mass contracts under the palpating fingers
 - Mass appears and disappears
- ❖ Empty right iliac fossa
- ❖ Features of intestinal obstruction/peritonitis—later



Barium enema showing the typical **'Claw sign'** of intussusception



VOLVULUS

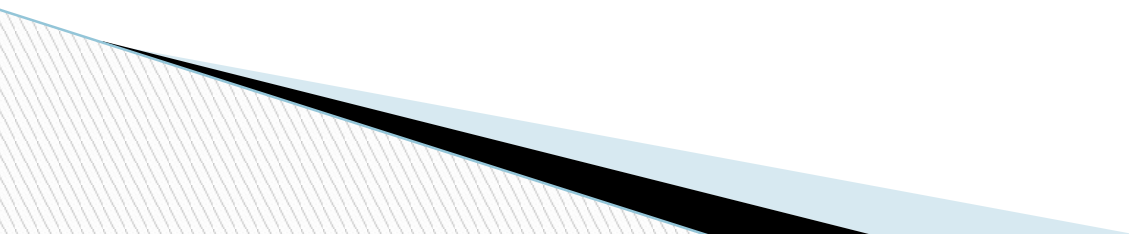
Definition

It is the twist (rotation) in the axis of the loop of the bowel

.either clockwise or anticlockwise

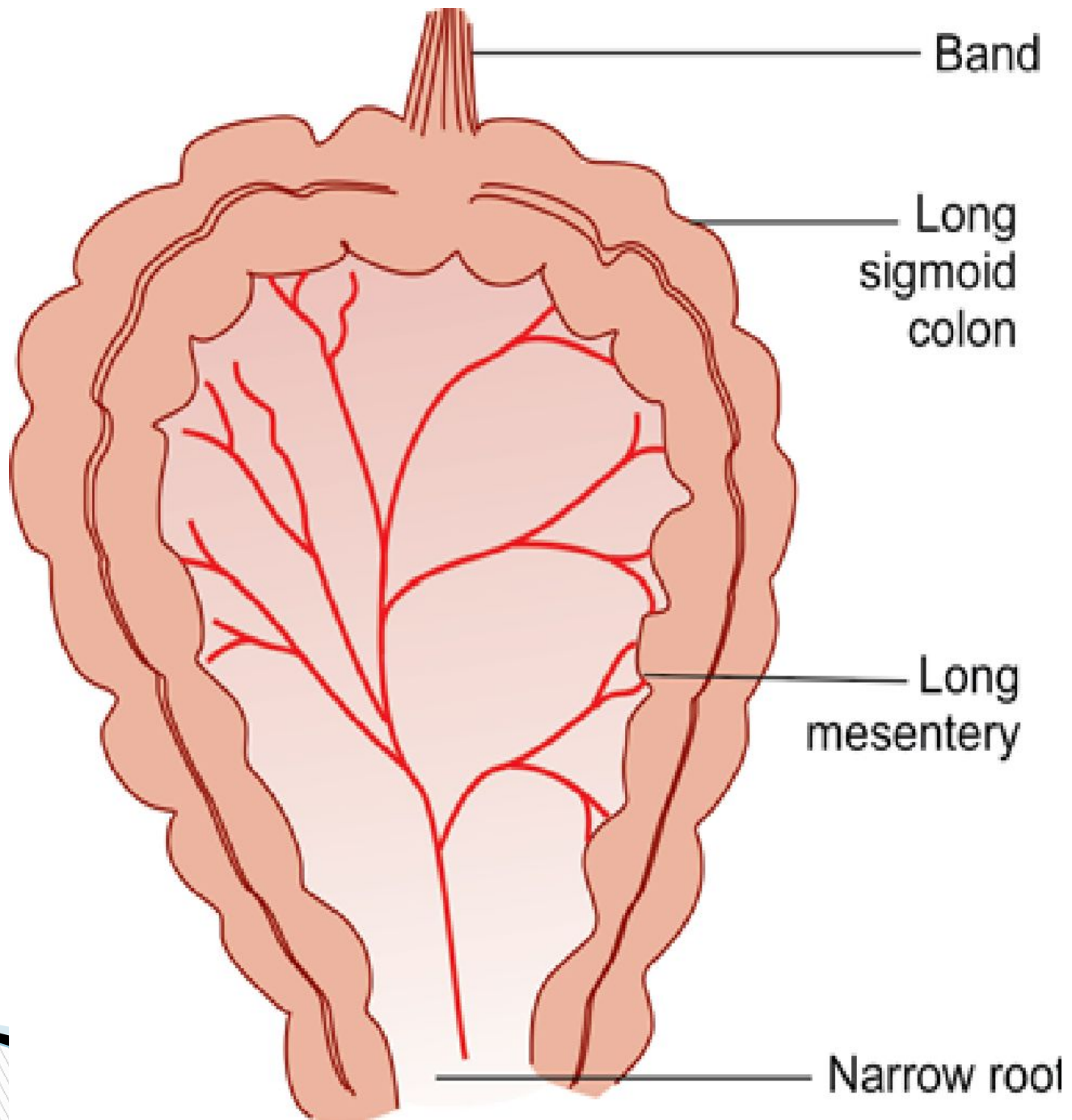
.of large bowel obstruction is due to volvulus 15%

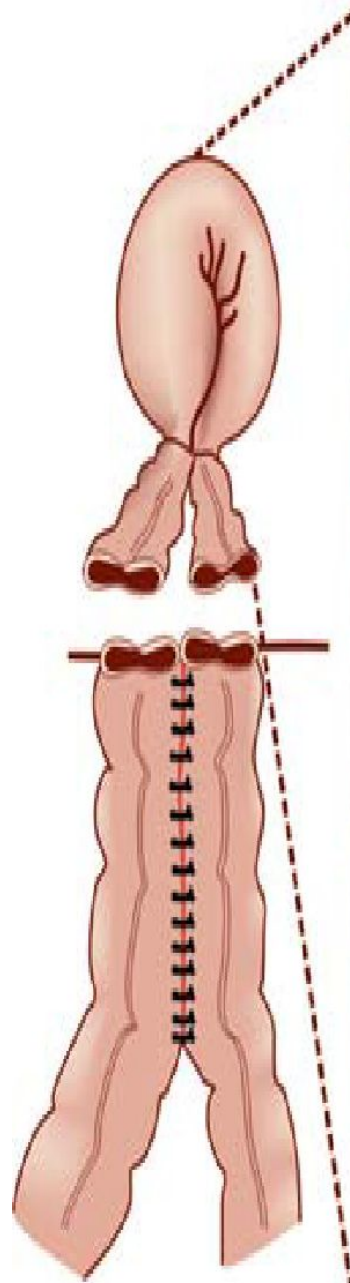
.Sigmoid colon is the commonest site (anticlock wise)—65%

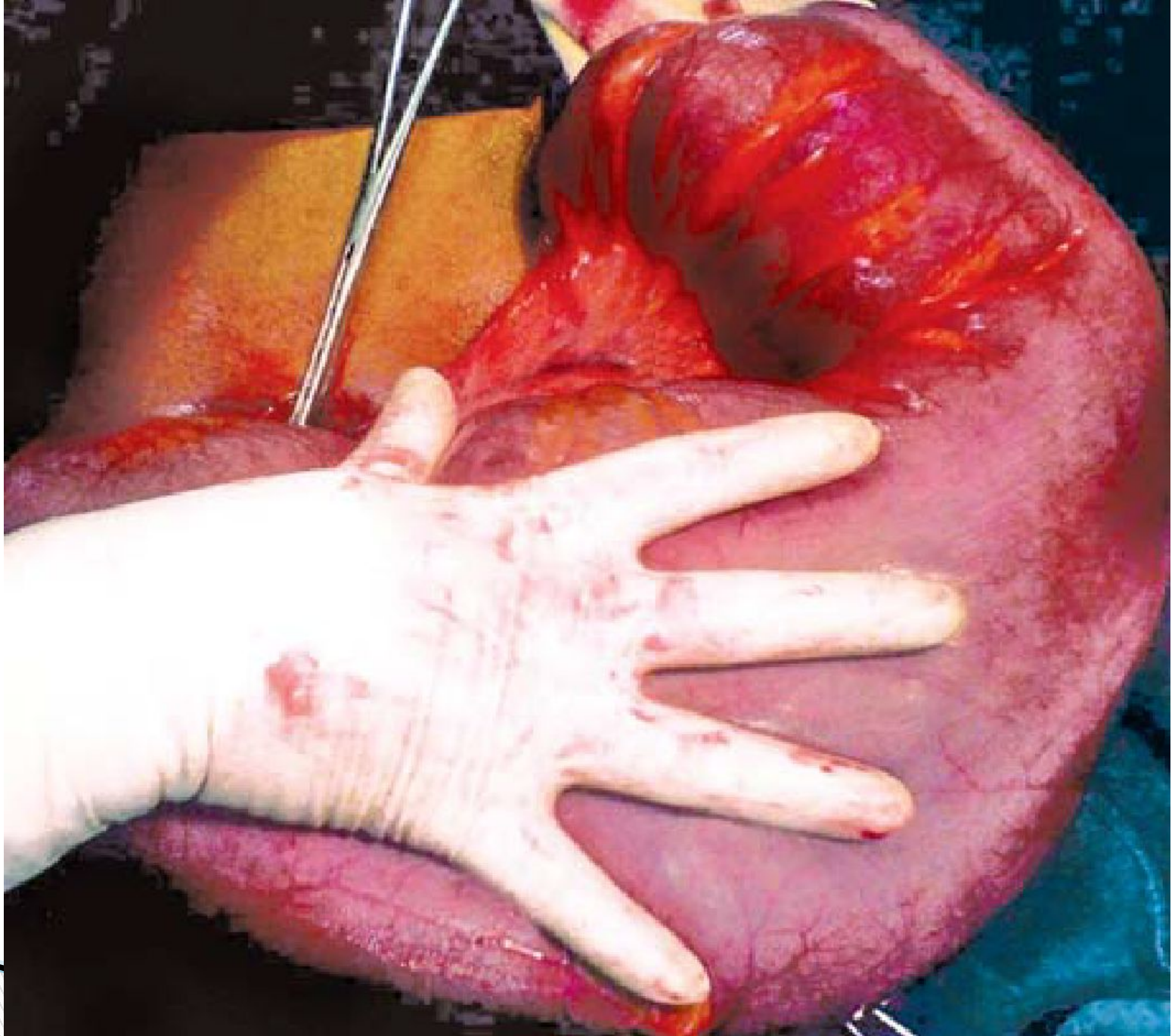


Predisposing factors

- ❖ Adhesions
- ❖ Peridiverticulitis
- ❖ Overloaded redundant pelvic colon
- ❖ Long pelvic mesocolon
- ❖ Narrow attachment of sigmoid mesocolon









:Surgery

Immediate laparotomy is done and the site (by finding the junction of dilated proximal and collapsed distal bowel) and cause of the obstruction is identified. The obstruction is relieved

Adhesions and bands

are the most common causes of intestinal obstruction hernia and then adhesions are the two other common causes of intestinal obstruction

Causes

Infection due to peritonitis, appendicitis, postlaparotomy, and other-1

.acute infective abdominal conditions

Materials used during surgery can cause dense inflammatory-2

reactions—suture materials like silk, thread, and foreign body, mop, and

.gauze, talc powder, drugs like sulphonamides and penicillins

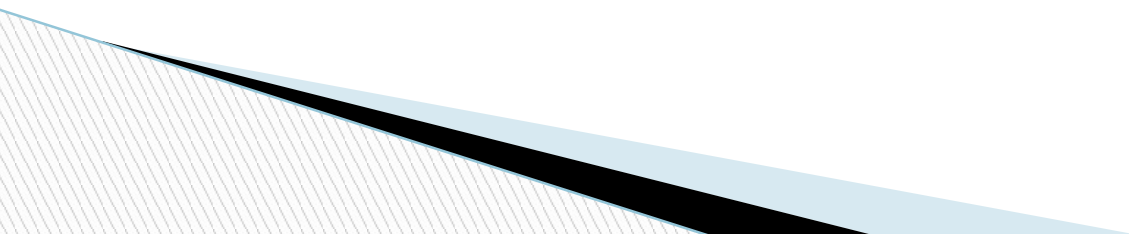
,Ischaemia of bowel due to poor blood supply-3

.sepsis-4

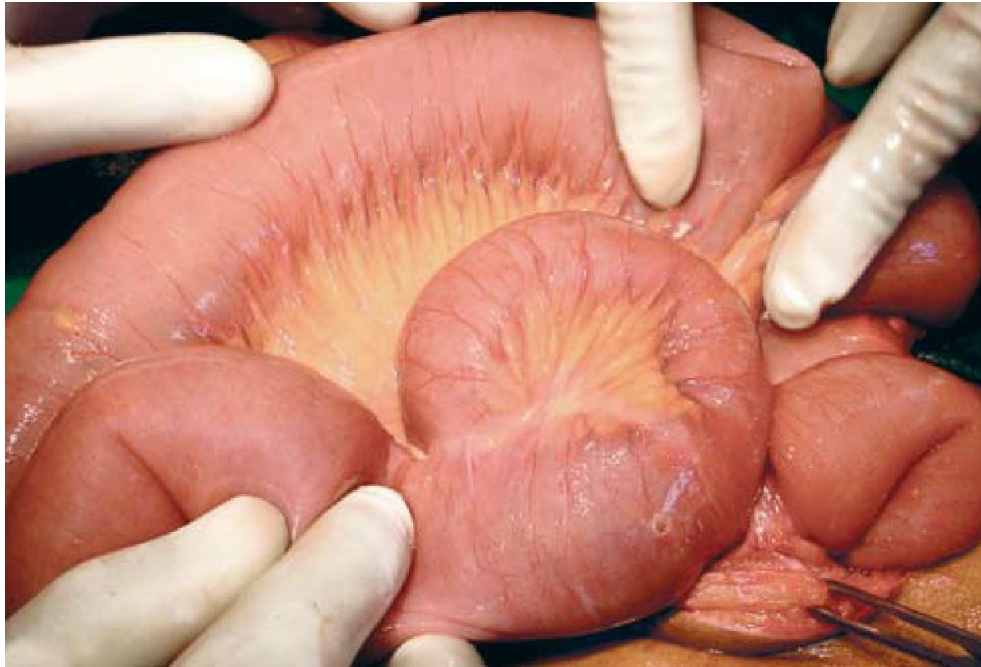
Gynaecological conditions, bowel injury, radiation-induced enteritis,-5

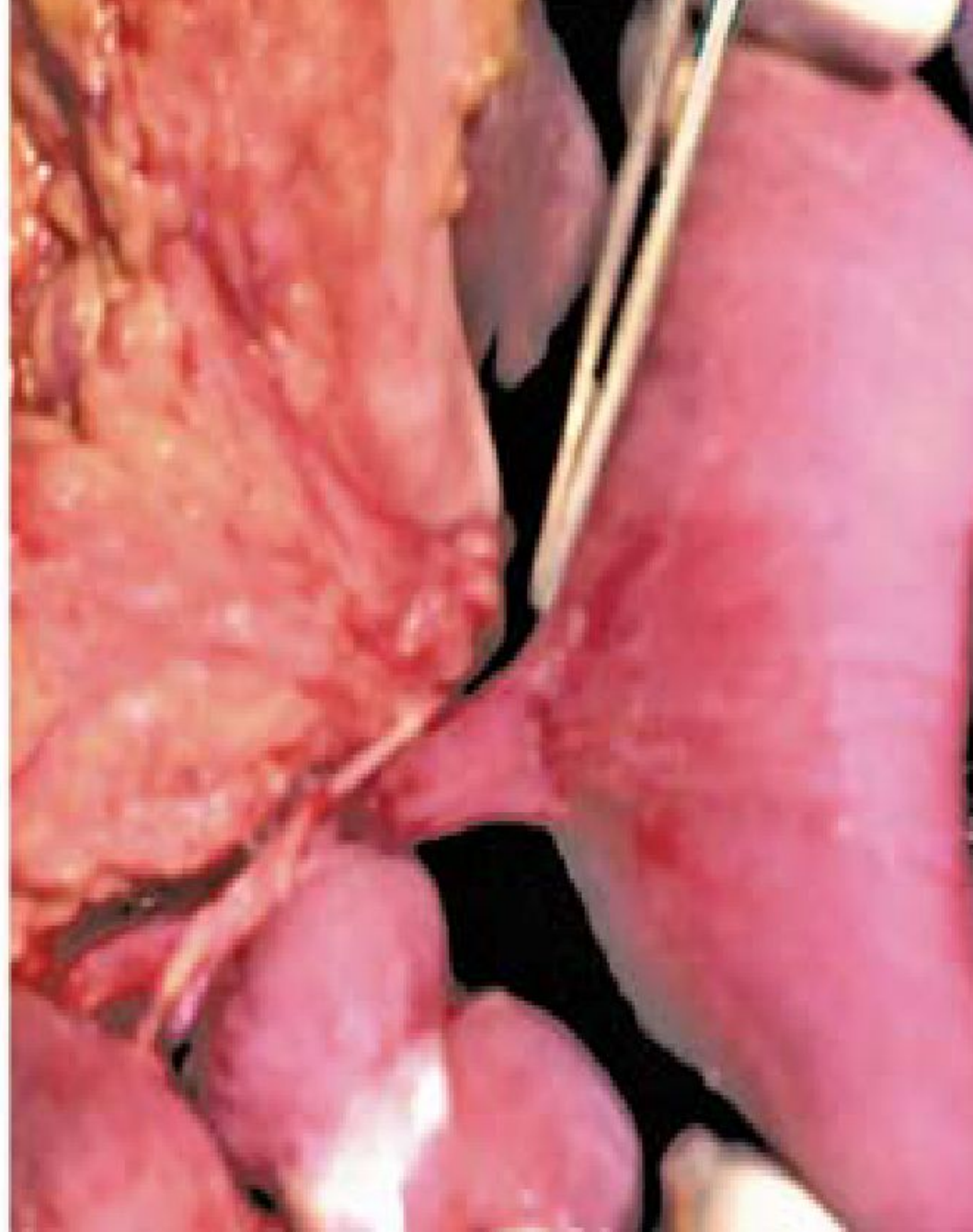
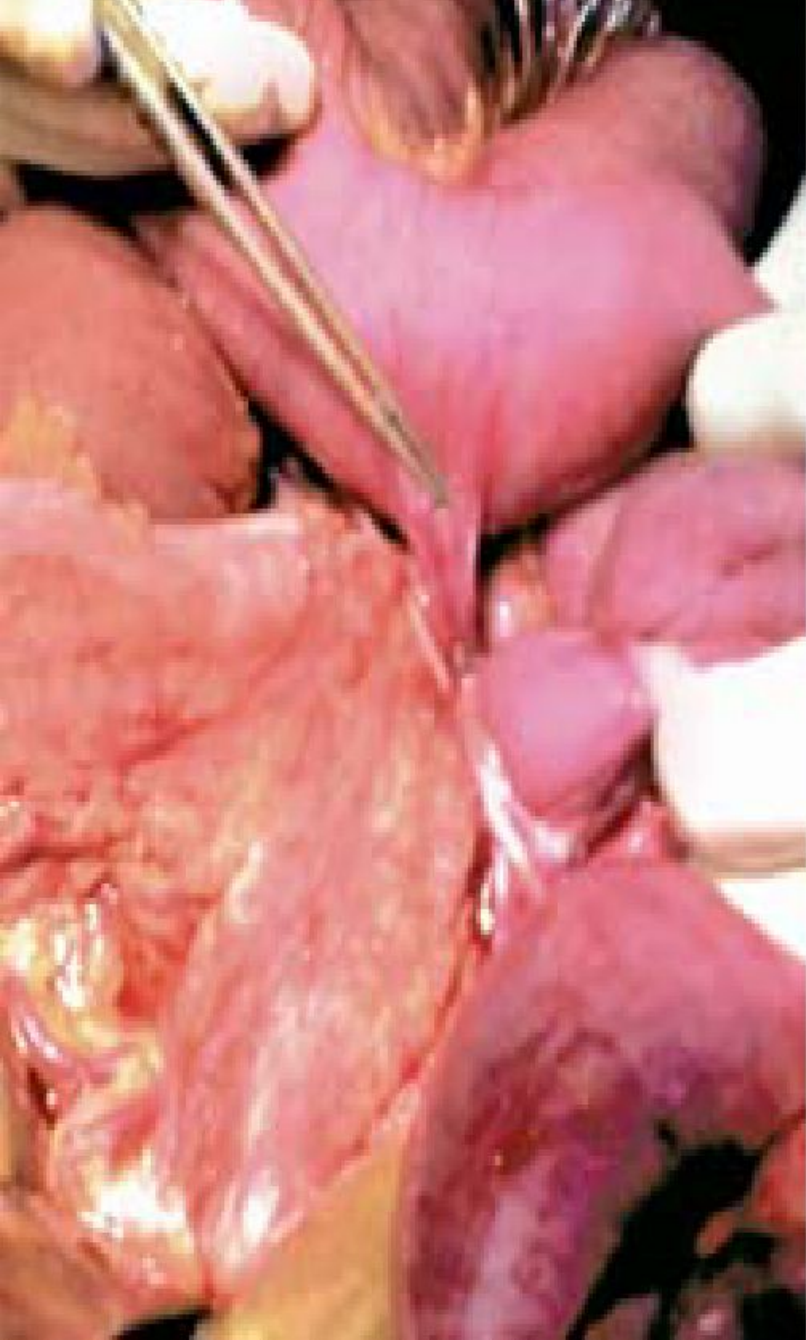
.Crohn's disease, other inflammatory bowel diseases

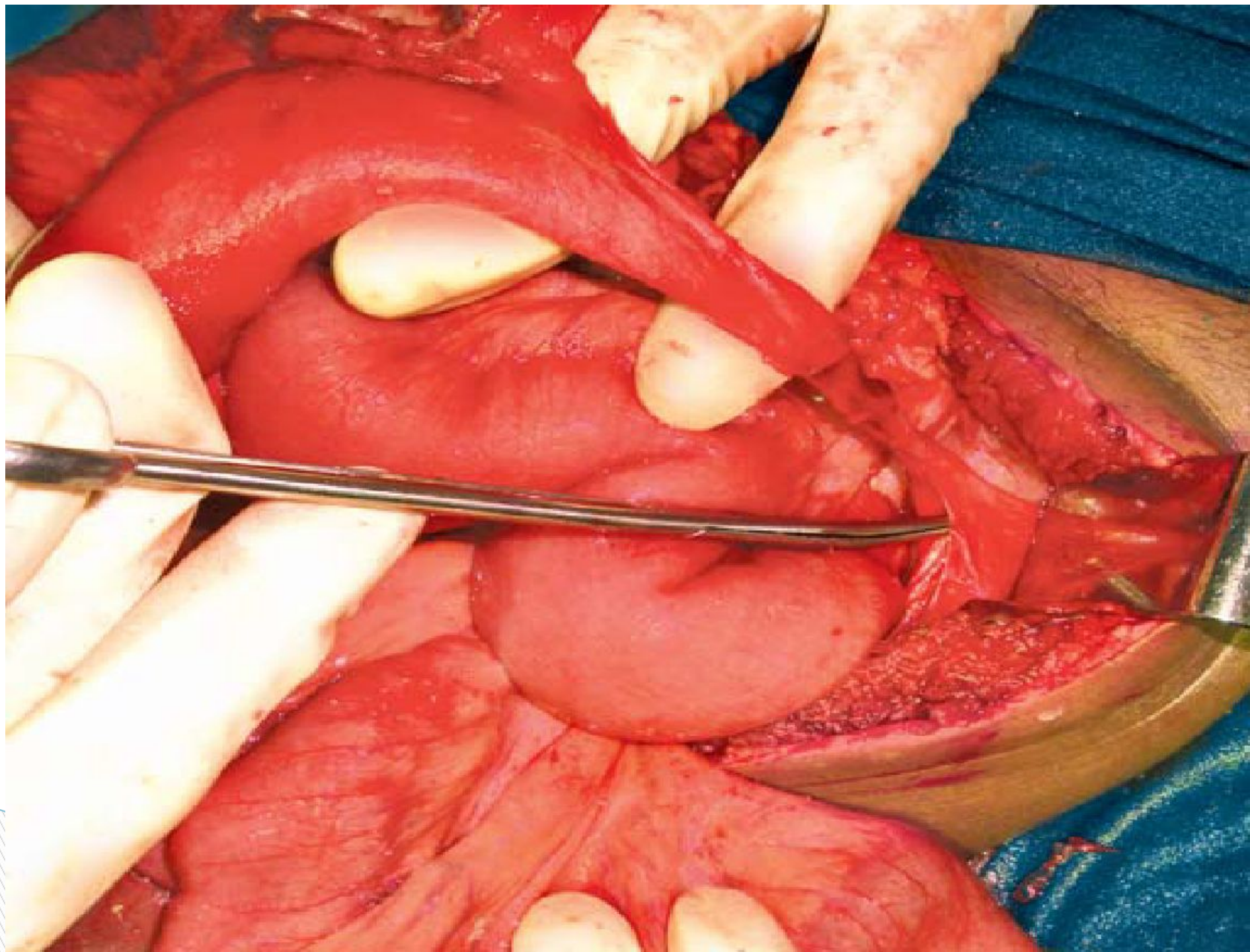
Specific conditions like tuberculosis, malignancy-6

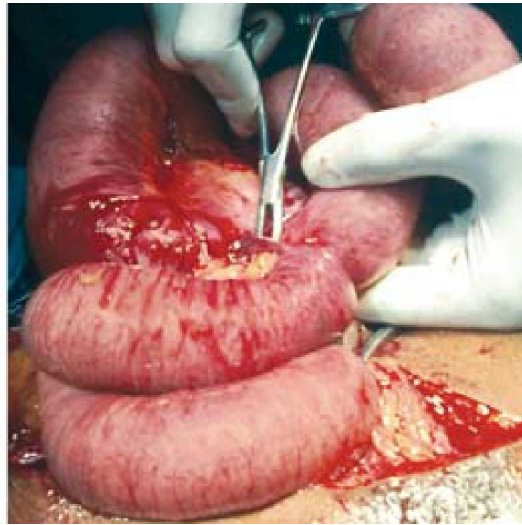
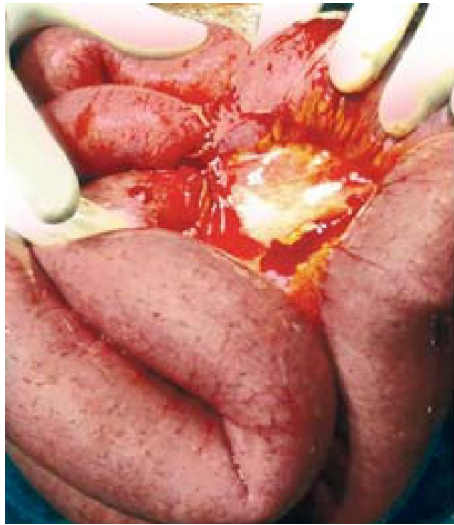










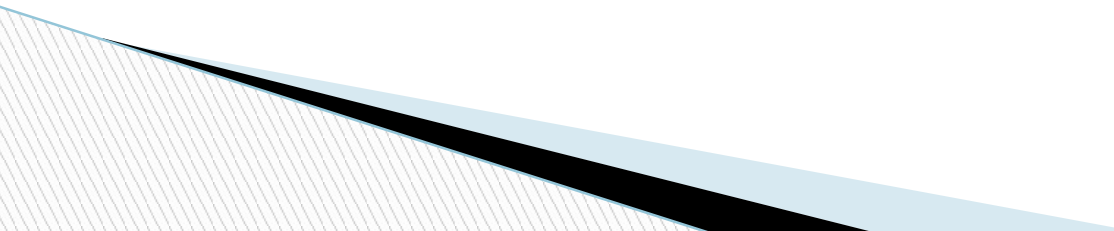


(Adynamic Intestinal Obstruction)

PARALYTIC ILEUS

It is a state in which intestines fail to transmit peristalsis due to failure of neuromuscular mechanism, i.e. Auerbach's and Meissner's plexus

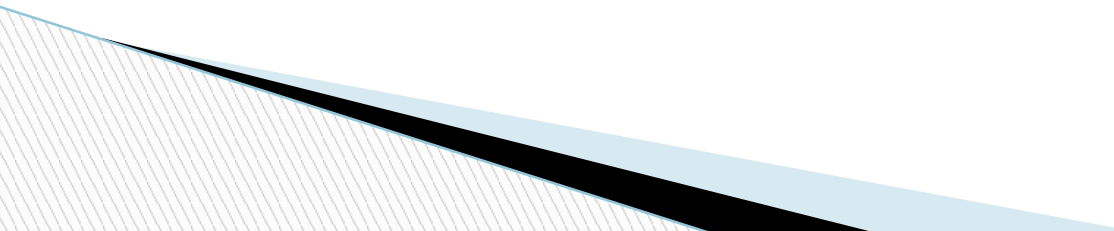
It may be localised or generalised



Causes

- ❖ Postoperative
- ❖ Infective—pus, blood, bile, toxins, enteritis
- ❖ Uraemia
- ❖ Hypokalaemia
- ❖ Spinal injury
- ❖ Retroperitoneal haemorrhage
- ❖ Spinal surgery
- ❖ Plaster jacket

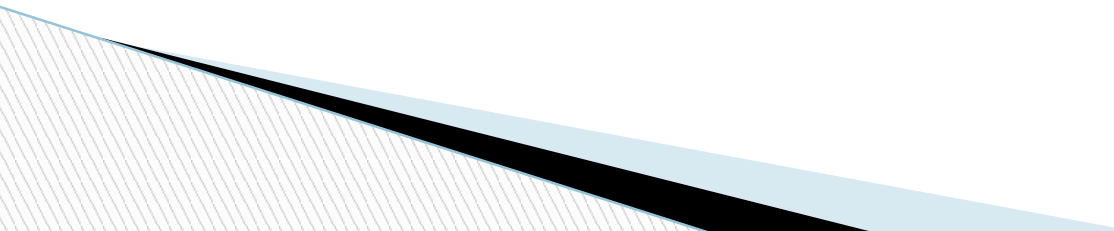
Clinical Features

- .No passage of fl atus-1
 - .No bowel sounds-2
 - .Marked abdominal distension-3
 - .Vomiting of large volume of fluid-4
 - .Tachycardia-5
 - .Respiratory distress due to pressure over the diaphragm-6
 - .High pitched tinkling note 'like bells at evening pealing'-7
 - .Dull abdominal pain (not colicky)-8
 - Features of fluid/protein/electrolyte imbalance-9
- 

Investigations

- .Serum electrolyte estimation: Especially serum potassium-1
- .ECG-2
- .X-ray abdomen-3
- Ultrasound abdomen to find out the possible cause of ileus,e.g. sepsis-4

Treatment

- .Nasogastric aspiration-1
 - .The primary cause is treated-2
 - .IV fluids-3
 - .Electrolyte management-4
 - .Catheterisation and urine output measurement-5
- 

.Do not stimulate the peristalsis (“Don’t flog a tired horse”)

Measurement of abdominal girth is necessary to see-6

.whether patient is recovering or not

**Decompression of the large bowel can be tried by inserting a flatus-7
tube per anally into the rectum and**

.keeping in place for few hours

.Most often, patient recovers in 3-6 days by conservative treatment-8

In prolonged, life threatening paralytic ileus,laparotomy-9

is done and bowel is decompressed with Savage’s

.decompressor and closed with tension sutures

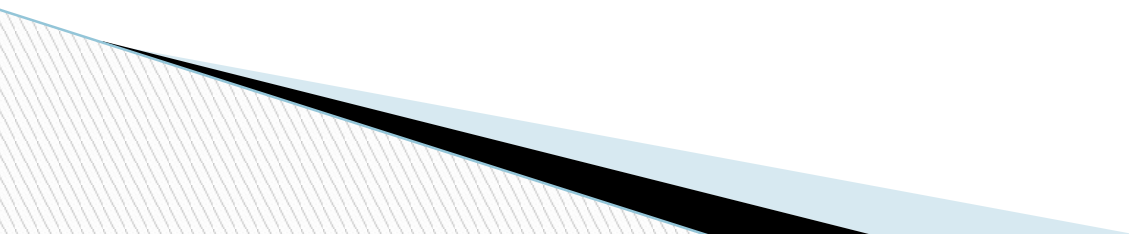
Adrenergic blocking agent along with cholinergic stimulant-10

(neostigmine) is used rarely only in resistant cases as medical therapy

Pseudo-obstruction

This condition describes an obstruction, usually of the colon, that occurs in the absence of a mechanical cause or acute intraabdominal disease

The peristalsis in pseudo obstruction usually inadequate



Colonic pseudo-obstruction

This may occur in an acute or a chronic form. The former, also known as **Ogilvie's syndrome**, presents as acute large bowel obstruction.

Abdominal radiographs show evidence of colonic obstruction, with marked caecal distension being a common feature. Indeed, caecal perforation is a well-recognised complication

The absence of a mechanical cause requires urgent confirmation by colonoscopy or a single-contrast water-soluble barium enema or CT. Once confirmed, pseudo-obstruction requires treatment of any identifiable cause. If this is ineffective, intravenous neostigmine should be given (1 mg intravenously), with a further 1 mg given intravenously within a few minutes if the first dose is ineffective

thanks

