

Small and Large Intestine

VASCULAR ANOMALIES (ANGIODYSPLASIA)

- Capillary or cavernous hemangiomas
- In the middle-aged or elderly
- May cause sudden massive hemorrhage
- from 5 to 25% over the age of 60 years
- Particularly in the ascending colon and caecum of elderly patient
- Dilated tortuous submucosal veins and, in severe cases, the mucosa is replaced by massive dilated deformed vessels.

Clinical features:

- Majority, the symptoms are subtle and patients can present with anemia
- About 10–15%: melena or significant per rectum bleeding that is often intermittent

Investigation:

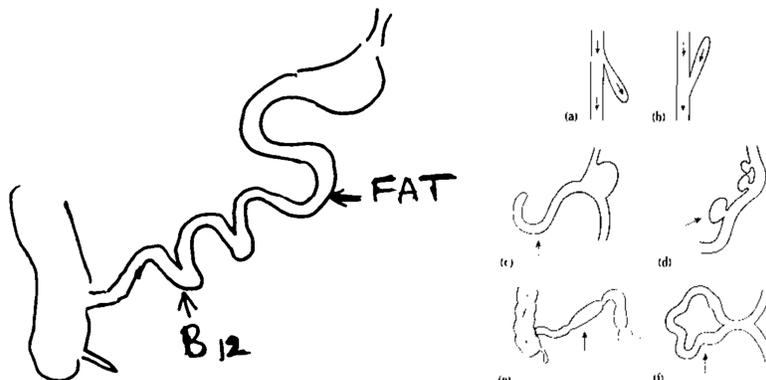
- Barium enema is usually unhelpful
- Colonoscopy: lesions are only a few millimetres in size and appear as reddish, raised areas at endoscopy
- Pill' endoscopy
- Selective superior and inferior mesenteric angiography
- If this fails, a radioactive test using technetium-99m (99mTc)-labelled red cells may confirm and localize the source of hemorrhage

Treatment:

- The first principle is to stabilize an unstable circulation
- Cauterization
- In severe uncontrolled bleeding: surgery
- If not localized and the patient is at risk: total abdominal colectomy with ileorectal anastomosis may be necessary

BLIND LOOP SYNDROME:

- If this occurs in the upper intestine, the defect is chiefly of fat absorption
- If in the lower intestine, there is vitamin B12 deficiency
- Stasis produces an abnormal bacterial flora, which prevents proper breakdown of the food (especially fat) and mops up the vitamins
- In general, high loops produce steatorrhea, whereas low loops tend to produce anaemia
- Antibiotics: temporary improvement
- Treatment: correction (prevent stasis)



DIVERTICULAR DISEASE:

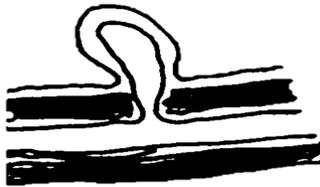
From the oesophagus to the rectosigmoid

- Two varieties:

1) Congenital. All three coats of the bowel are present in the wall of the diverticulum, e.g. Meckel's diverticulum.



2) Acquired. The wall of the diverticulum lacks a proper muscular coat. Most alimentary diverticula are thought to be acquired.

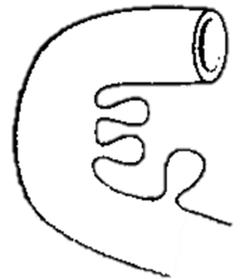


Duodenal diverticula

There are two types:

1) Primary. Mostly occurring in older patients on the inner wall of the second and third parts

- Usually found incidentally on barium meal and asymptomatic
- They can cause problems locating the ampulla during endoscopic retrograde cholangiopancreatography (ERCP).



2) Secondary. Diverticula of the duodenal cap result from longstanding duodenal ulceration

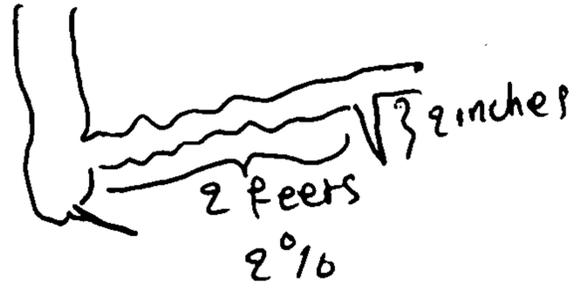


Jejunal diverticula

- Usually of variable size and multiple. May be:
 1. symptomless
 2. give rise to abdominal pain
 3. produce a malabsorption syndrome
 4. present as an acute abdomen with acute inflammation and occasionally perforation
- More common in patients with connective tissue disorders.
- **Treatment:** resection if caused problems

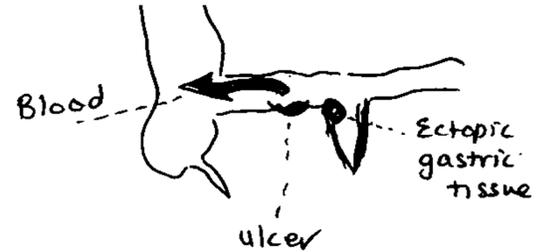
Meckel's diverticulum

- In 2% of the population
- Situated on the anti-mesenteric border of the small intestine,
- commonly 60 cm from the ileocecal valve
- Usually 3–5 cm long
- (2% – 2 feet – 2 inches) is a useful aide-mémoire
- It represents the patent intestinal end of the vitellointestinal duct
- possesses all three coats of the intestinal wall and has its own blood supply, so vulnerable to infection and obstruction in the same way as the appendix
- In 20% of cases, the mucosa contains heterotopic epithelium, namely gastric, colonic or sometimes pancreatic tissue
- In order of frequency, these symptoms are as follows:



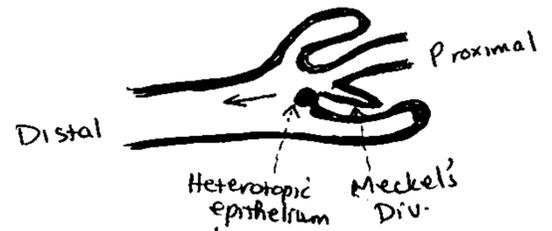
1) Severe hemorrhage: caused by peptic ulceration

Painless bleeding occurs per rectum and is maroon in color



2. Intussusception:

In most cases, the apex of the intussusception is the swollen, inflamed, heterotopic epithelium at the mouth of the diverticulum

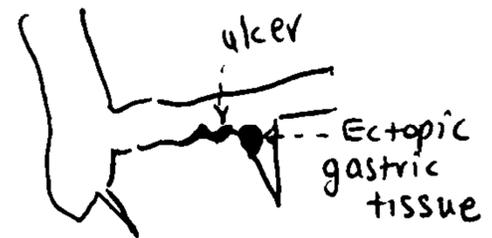


3. Meckel's diverticulitis:

- May be difficult to distinguish from the symptoms of acute appendicitis
- When a diverticulum perforates, the symptoms may simulate those of a perforated duodenal ulcer.

4. Chronic peptic ulceration:

As the diverticulum is part of the mid-gut, the pain, although related to meals, is felt around the umbilicus



5. Intestinal obstruction:

The presence of a band between the apex of the diverticulum and the umbilicus may cause obstruction either by the band itself or by a volvulus around it.



Imaging

Can be very difficult to demonstrate by contrast radiology; small bowel enema would be the most accurate investigation.

Technetium-99m scanning

- May be useful in identifying Meckel's diverticulum as a source of gastrointestinal bleeding
- Exceptionally, a Meckel's diverticulum is found in an inguinal or a femoral hernia sac – Littre's hernia.
- Treatment: excision

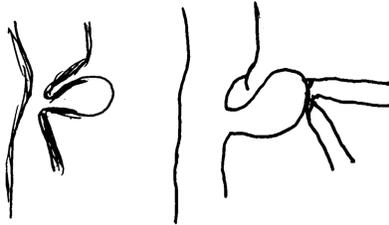


Colon:

- Diverticulosis: protrusion of mucous membranes covered with peritoneum
- There is thickening of the circular muscle fibres of the intestine, which develops a concertina or saw-tooth appearance on barium enema

Complications:

1. **Recurrent periodic inflammation and pain** – in some patients: these episodes may be clinically silent.
2. **Perforation:** leading to general peritonitis or local (pericolic) abscess formation
3. **Intestinal obstruction:**
 - a. In the sigmoid as a result of progressive fibrosis causing stenosis.
 - b. In the small intestine caused by adherent loops of small intestine on the pericolicitis.



4. Haemorrhage:

Diverticulitis may present with profuse colonic hemorrhage in 17% of cases, often requiring blood transfusions.

5. Fistula formation:

(vesicocolic, vaginocolic, enterocolic, colocutaneous) occurs in 5% of cases, with vesicocolic being the most common

Clinical features

- Elective
 - In mild cases: may be indistinguishable from those of irritable bowel syndrome.
- Emergency:
 - Persistent lower abdominal pain, usually in the left iliac fossa: painful diverticulosis
 - Fever, malaise and leucocytosis: diverticulitis
 - May pass loose stools or may be constipated
- lower abdomen is tender, especially on the left, but occasionally also in RIF if the sigmoid loop lies across the midline
 - Sigmoid colon: often palpable, tender and thickened
 - Rectal examination: may reveal a tender mass
 - Any urinary symptoms may herald the formation of a vesicocolic fistula, which leads to pneumaturia (flatus in the urine) and even faeces in the urine.

Diagnosis:

- Radiology:
- Acute diverticulitis: clinically diagnosed, but confirmed by CT, which shows abscess
- After recovery from acute phase:
- Barium enemas:
 - Sigmoid colon is thickened and narrowed, a 'sawtooth' appearance
- Sigmoidoscopy
- Water soluble contrast enemas:
 - to show obstruction
 - detecting intraluminal changes and leakage
- Barium radiology:
 - to exclude a carcinoma
 - to assess, the extent of the disease.

Management

Non-complicated:

- High-residue diet: containing roughage in the form of whole-meal bread, flour, fruit and vegetables
- Bulk formers: such as bran, Celevac, Isogel and Fybogel
- Antispasmodics: painful diverticular disease may require

Acute diverticulitis:

- Bed rest
- Intravenous antibiotics (usually cefuroxime and metronidazole)
- CT, barium enema: after the acute attack has subsided, and if the diagnosis has not already been confirmed

Principles of surgical management:

- In elective cases with full bowel preparation, or when bowel is cleaned by on table lavage:
 - resection and primary anastomosis is usually possible
 - sometimes suturing of small perforation possible
- If bowel not prepared:
 - staged operations
- Laparoscopic assessment has been described but is controversial

ULCERATIVE COLITIS

Etiology:

- Unknown
- ?genetic
- ?bacterial
- ? stress
- Smoking seems to have a protective effect

Epidemiology:

- Common in West
- Rare in East, but increasing: increasing 'westernization' of diet and/or social habits and better diagnostic facilities
- Sex ratio is equal in the first four decades of life, after 40, decreases in female but stays as it is in males
- Uncommon before the age of 10
- Most seen between 20-40 yrs

Pathology:

- 95% rectum involved
- Diffuse inflammatory disease, primarily affecting the mucosa and superficial submucosa
- Only in severe disease are the deeper layers of the intestinal wall affected
- Multiple minute ulcers, which coalesce
- When the disease is chronic, inflammatory polyps (pseudopolyps) occur in up to 20% of cases and may be numerous
- Severe fulminant colitis: acute dilatation, usually transverse colon and may lead to perforation ('toxic megacolon')
- Precancerous changes can develop (= severe dysplasia or carcinoma in situ).

Symptoms

- The first symptom is watery or bloody diarrhea
- There may be a rectal discharge of mucus that is either blood-stained or purulent
- Pain as an early symptom is unusual
- In most cases: chronic and characterized by relapses and remissions

Complications of UC

- Acute:
 - Toxic dilatation
 - Perforation
 - Hemorrhage
- Chronic:
 - Cancer
 - Extra-alimentary manifestations: skin lesions, eye problems, liver disease

Fulminating colitis and toxic dilatation (megacolon):

- Admission
- Occurs in 5–10% of patients
- Severe rectal symptoms with systemic upset such as weight loss and dehydration
- 1/3 urgent surgery
- Dilatation with severe abd pain:?? Perforation
- If the patient is on steroid: there may be few symptoms
- Diagnosis by plain X-ray: the colon with a diameter of more than 6 cm
- DD: dysentery, typhoid and amoebic colitis
- Plain abdominal radiographs should be obtained daily in patients with severe colitis, and a progressive increase in diameter in spite of medical therapy is an indication for surgery

Perforation

- A grave complication with a mortality rate of 50% or more.
- Steroids may mask the physical signs.
- Perforation can sometimes occur without toxic dilatation

Severe hemorrhage:

- Uncommon and may occasionally require transfusion and, rarely, surgery

Investigations

- Plain X-ray: can often show the severity of disease
- Feces are present only in parts of the colon that are normal or only mildly inflamed
- Mucosal islands can sometimes be seen
- Small bowel loops in the right lower quadrant may be a sign of severe disease.

Barium enema

The principal signs are:

- loss of haustration, especially in the distal colon;
- mucosal changes caused by granularity
- pseudopolyps;
- In chronic cases: a narrow contracted colon.

Sigmoidoscopy:

Colonoscopy and biopsy: not in acute cases to avoid aggravation

Treatment:

Many patients can be adequately maintained for years on medical therapy

Indications for surgery

- Severe or fulminating disease failing to respond to medical therapy
- Chronic disease with anaemia, frequent stools, urgency and tenesmus
- Steroid-dependent disease – here, the disease is not severe but remission cannot be maintained without substantial doses of steroids
- The risk of neoplastic change: patients who have severe dysplasia on review colonoscopy
- Extraintestinal manifestations:
- Rarely, severe haemorrhage or stenosis causing obstruction.

CROHN'S DISEASE (REGIONAL ENTERITIS)

- 1932 by Crohn, Ginzburg and Oppenheimer
- It can affect any part of GIT from the lips to the anal margin, but ileo-colonic disease is the most common presentation

Epidemiology:

- Most common in North America and northern Europe
- Slightly more common in women than in men
- Most common between 25-40ys
- Second peak of incidence around the age of 70 years

Aetiology:

- No causative organism
- Focal ischaemia, from a vasculitis arising through an immunological process
- ? Foods
- Smoking increases the risk threefold, which is contrary to the protective effect seen in UC
- Genetic factors
- Association with ankylosing spondylitis
- CD can predispose to cancer, although the incidence of malignant change is not nearly as high as in UC and is most manifest in the ileum

Pathology:

- Ileal disease is the most common, accounting for 60%
- Thickened bowel with shortened fibrotic mesentery, containing enlarged lymph nodes
- Mucosal lesions include pinpoint hemorrhage, aphthos ulcers, deep linear fissures, & ultimately cobblestoning.
- Common to occur segmentally rather than being continuous

Microscopic appearance:

- Full-thickness, transmural inflammation, crypt abscesses, aphthos ulcers and linear fissures
- Transmural lesions can lead to sinus tracts & fistulae between crypt abscesses & adjacent segments of bowel
- Granulomas in the wall in 40%-60%, and in the mesenteric nodes in 25%

Clinical features:

- Diarrhea: in more than 90%, in up to 1/3 bloody
- Abdominal pain: typically intermittent, worse after meal, relieved by defecation, and poorly localized
- Constant and localized pain???? Peritonitis
- A mass: caused by thickened bowel, a phlegmon, or an abscess may be palpable
- Weight loss: by: decreased intake, malabsorption, protein-losing enteropathy, steatorrhea
- In children: vit and mineral deficiencies and growth retardation
- Constitutional symptoms: malaise, fever, anemia
- Anorectal disease:
 - common, may precede intestinal symptoms by years
 - Recurrent, non-healing anal fissures
 - Large ulcers
 - Complex anal fistulae
 - Perianal abscesses
 - Large fleshy tags
 - Bluish skin discoloration
- They are characterized by multiplicity of the lesions, lateral fissures, deep ulcers of the perianal skin and anal canal, and anal strictures. Any patient with recurrent or atypical anorectal pathology should be investigated for Crohn's disease

Extraintestinal manifestations:

- **Eyes:** conjunctivitis, iritis, and uveitis
- **Skin:** pyoderma gangrenosum, erythema nodosum multiforme, ophthalmitis
- **Musculoskeletal:** arthritis, ankylosing spondylitis, hypertrophic osteoarthropathy
- The associated **sclerosing cholangitis** can lead to cirrhosis

Investigation

- Laboratory:
 - full blood count to exclude anaemia
 - usually a fall in albumin, magnesium, zinc and selenium, especially in active disease
 - Protein levels that correspond to disease activity include C-reactive protein and orosomucoid
- Endoscopy
- Barium enema
 - Best: small bowel enema show up areas of delay and dilatation
 - involved areas tend to be narrowed,
 - irregular and, sometimes,
 - when a length of terminal ileum is involved, there may be the string sign of Kantor
- Sinograms: are useful in patients with enterocutaneous fistulae
- CT scans: are used in patients with fistulae and those with intra-abdominal abscesses and complex involvement
- Magnetic resonance imaging (MRI): has been shown to be useful in assessing perianal disease

Principles of management of CD

- Close liaison between physician and surgeon is crucial
- Medical therapy
- Surgical resection should be as conservative as possible, it is a chronic relapsing disease, requiring multiple operations

Treatment

- Medical therapy
- Steroids
- Antibiotics
- Immuno-modulatory agents: Azathioprine is used for its additive and steroid-sparing effect and is now standard maintenance therapy
- Monoclonal antibody: Infliximab, the murine chimeric monoclonal antibody
- Nutritional support:

Indications for surgery

- recurrent intestinal obstruction
- bleeding
- perforation
- failure of medical therapy
- intestinal fistula
- fulminant colitis
- malignant change
- perianal disease

INFECTIONS

Intestinal amoebiasis:

- By *Entamoeba histolytica*
- worldwide distribution
- transmitted mainly in contaminated drinking water

Pathology

- The ulcers, described as 'bottlenecked' because of considerably undermined edges, have a yellow necrotic floor, from which blood and pus exude
- 75%, confined to the lower sigmoid and upper rectum.

Biopsy

- Endoscopic biopsies or fresh hot stools are examined carefully to look for the presence of amoebae
- Presence of the parasite does not indicate that it is pathogenic

Clinical features

- Principal manifestation dysentery
- Other manifestations:
- Amoebic caecal mass, a differential diagnosis of a RIF mass
- In endemic tropical countries: it is recurring problem
- The bowel is friable, and satisfactory closure of the appendix stump becomes difficult or impossible, especially in cases where a palpable mass is present.
- When there is an amoebic mass, there tends to be tenderness on deep palpation over the caecum and the sigmoid
- Perforation
 - The most common sites are the caecum and rectosigmoid
 - usually, perforation occurs into a confined space where adhesions have formed previously, and a pericolic abscess results, which eventually needs draining.
 - When there is sudden faecal flooding into the general peritoneal cavity:
 - ????? sometimes no need for surgery, only
 - drainage of the region of the perforation
 - gastrointestinal aspiration
 - intravenous fluid
 - antibiotics
 - and a full course of emetine
- Severe rectal haemorrhage: as a result of separation of the slough is liable to occur.
- Granuloma: Progressive amoebic invasion of the wall of the rectum or colon, with secondary inflammation, can produce a granulomatous mass indistinguishable from a carcinoma
- Amebic colitis is a differential diagnosis of ulcerative colitis. A search for amoebae should always be made in the stools of patients believed to have UC.
- Other presentations include the following:
 - Fibrous stricture may follow the healing of extensive amoebic ulcers
 - Intestinal obstruction is a common complication of amoebiasis, and the obstruction is the result of adhesions associated with pericolicitis and large granuloma.
 - Paracolic abscess, ischiorectal abscess and fistula occur from perforation by amoebae of the intestinal wall followed by secondary infection.

Treatment

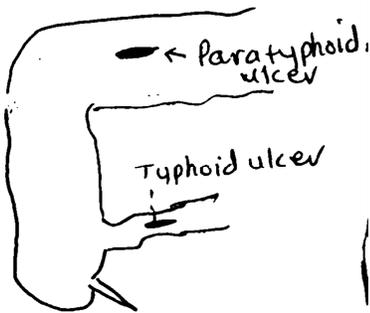
- High-dose intravenous steroids when there is catastrophe
- Metronidazole (Flagyl) is the first-line drug, 800 mg three times daily for 7–10 days
- Diloxanide furoate is best for chronic infections associated with the passage of cysts in stools
- Intestinal antibiotics improve the results of the chronic stages, probably by coping with superadded infection

Typhoid

- Paralytic ileus is the most common complication of typhoid.
- Intestinal haemorrhage may be the leading symptom.
- Other surgical complications of typhoid and paratyroid include:
 - haemorrhage
 - perforation
 - cholecystitis
 - phlebitis
 - genitourinary inflammation
 - arthritis
 - osteomyelitis

Typhoid ulcer:

- Perforation of a typhoid ulcer usually occurs during the third week and is occasionally the first sign of the disease
- The ulcer is parallel to the long axis of the gut and is usually situated in the lower ileum.



Paratyphoid B:

- Perforation of the **large intestine** sometimes occurs in paratyphoid B infection
- Vigorous intravenous **antibiotic** therapy is given.
- Occasionally, surgery may be required to dysfunction the colon. In cases where severely diseased bowel is present, a colectomy may be necessary, as for UC

Tuberculosis of the intestine

- Tuberculosis can **affect any part** from mouth to the anus.
- The affected sites most often are the **ileum, proximal colon** and **peritoneum**
- Two principal types:
 - Ulcerative tuberculosis
 - Hyperplastic tuberculosis

Ulcerative tuberculosis:

- **Secondary to pulmonary TB** as a result of swallowing tubercle bacilli
- Multiple ulcers in the terminal ileum, lying **transversely**, and overlying **serosa** is thickened, reddened and covered in tubercles



Clinical features

- Predominant symptoms diarrhoea and wt loss
- usually on treatment for pulmonary TB

Radiology

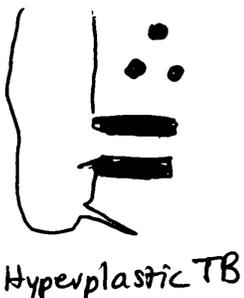
- A barium meal and follow-through or small bowel enema: **absence of filling** of the lower ileum, caecum and most of the ascending colon as a result of **narrowing** and **hypermotility** of the ulcerated segment

Treatment:

- Anti-TB
- Operation is only required in the rare event of a perforation or intestinal obstruction

Hyperplastic tuberculosis

- Usually **ileocaecal region**, although **solitary** and **multiple** lesions in the lower ileum are sometimes seen
- By ingestion of Mycobacterium TB by patients with a **high resistance to the organism**
- The infection establishes itself in **lymphoid follicles**, and the resulting chronic inflammation causes **thickening** of the intestinal wall and **narrowing** of the lumen
- **Early involvement** of the regional **lymph nodes**, which may caseate.
- Unlike CD **abscess** and **fistula** formation is **rare**



Clinical features

- Usually attacks of abdominal pain with intermittent diarrhoea
- The ileum above the partial obstruction is distended, and the stasis and consequent infection lead to steatorrhoea, anaemia and loss of weight.
- Sometimes, the presenting picture is of a mass in the right iliac fossa in a patient with vague ill health
- DD of an appendix mass:
 - carcinoma of the caecum
 - CD
 - TB
 - Actinomycosis of the caecum.

Radiology

- A barium follow-through or small bowel enema will show a long narrow filling defect in the terminal ileum

Treatment:

- If no complications: anti TB
- If obstruction: operation ilio-caecal resection

TUMOURS OF THE SMALL INTESTINE

Compared with the large intestine, the small intestine is rarely the seat of a neoplasm, and these become progressively less common from the duodenum to the terminal ileum

Benign

- Adenomas, submucous lipomas and gastrointestinal stromal tumours (GISTs):
- Intussusception.



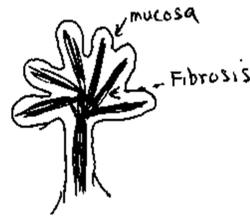
- Intestinal bleeding from an adenoma, in which event the diagnosis is frequently long delayed because the tumor is overlooked at barium radiology, endoscopy and even surgery

Peutz–Jeghers syndrome

- Autosomal dominant disease. The gene STK11 on chromosome 19 has been found in a proportion of patients. This consists of:
- Intestinal hamartomatosis is a polyposis affecting the whole of the small bowel and colon, Causes haemorrhage and often intussusception
- Melanosis of the oral mucous membrane and the lips, the melanosis takes the form of melanin spots sometimes present on the digits and the perianal skin, but pigmentation of the lips is the sine qua non
- Reduced survival secondary to complications of recurrent bowel cancer and development of a wide range of cancers. These include:
 - colorectal
 - gastric
 - breast
 - cervical
 - ovarian
 - pancreatic
 - testicular cancer
- Endoscopy or contrast examinations every 3 years to detect early GI cancers
- Also important to make sure that female patients attend cervical and breast screening programmes

Histology:

The polyps can be likened to trees: The trunk and branches are smooth muscle fibres and the foliage is virtually normal mucosa.



Treatment:

- As malignant change rarely occurs
- Resection is only necessary for serious bleeding or intussusception
- Large single polyps can be removed by enterotomy
- Short lengths of heavily involved intestine can be resected.

Malignant

Lymphoma

There are three main types, as follows:

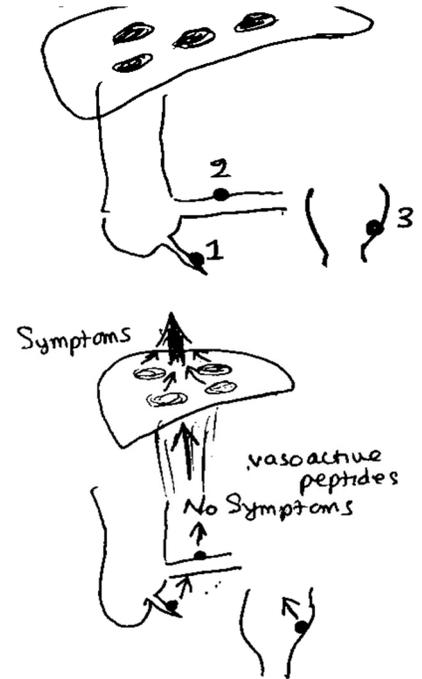
1. Western-type lymphoma: Annular ulcerating lesions, which are sometimes multiple. They are now thought to be non-Hodgkin's B-cell lymphoma in origin. They may present with obstruction and bleeding, perforation, anorexia and weight loss.
2. Primary lymphoma associated with coeliac disease: There is an increased incidence of lymphoma in patients with coeliac disease; this is now regarded as a T-cell lymphoma. Worsening of the patient's diarrhoea, with pyrexia of unknown origin together with local obstructive symptoms, are the usual features.
3. Mediterranean lymphoma: This is found mostly in North Africa and the Middle East and is associated with α -chain disease. Unless there are particular surgical complications these conditions are usually treated with chemotherapy.

Carcinoma

- Like small bowel tumors, these can present with:
- Obstruction, bleeding or diarrhea.
- Complete resection offers the only hope of cure

Carcinoid tumour

- Occur throughout GIT
- Most commonly in the appendix, ileum and rectum in decreasing order of frequency
- Arise from neuroendocrine cells at the base of intestinal crypts
- The primary is usually small but, when they metastasize, the liver is usually involved, with numerous secondaries, which are larger and more yellow than the primary; when this has occurred, the carcinoid syndrome will become evident.
- The tumours can produce a number of vasoactive peptides, most commonly 5-hydroxytryptamine (serotonin), which may be present as 5-hydroxyindoleacetic acid (5-HIAA) in the urine during attacks
- The clinical syndrome itself consists of: reddish-blue cyanosis, flushing attacks, diarrhoea, borborygmi, asthmatic attacks and, eventually, sometimes pulmonary and tricuspid stenosis.
- Classically, the flushing attacks are induced by alcohol.

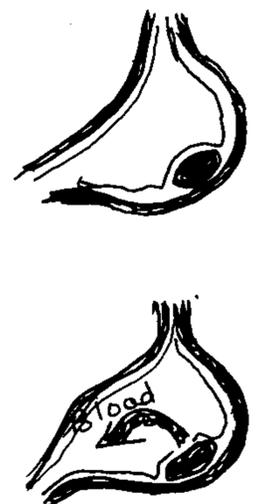


Treatment

- Surgical resection is usually sufficient
- In the cases found incidentally at appendectomy, nothing further is required
- Octreotide (a somatostatin analogue), which reduces both flushing and diarrhea, and octreotide cover is usually used in patients with a carcinoid syndrome who have surgery to prevent a carcinoid crisis

Gastrointestinal stromal tumours (GIST)

- Either benign or malignant
- Increased size is associated with malignant potential
- GIST is a type of sarcoma that develops from connective tissue cells
- Found most commonly in the stomach but can be found in other sites of the gut
- Most commonly in the 50- to 70-y
- Although its cause is unknown, patients with neurofibromatosis have an increased risk of developing these types of tumor



Symptoms

- May be asymptomatic
- Other symptoms include lethargy, pain, nausea, haematemesis or melaena

Treatment

- Surgery is the most effective way of removing GISTs as they are radio-resistant
- Glivec (imatinib) is a tyrosine kinase inhibitor that has been shown to be effective in advanced cases.

TUMOURS OF THE LARGE INTESTINE

- Polyp: a clinical description of any elevated tumor
- Polyps can occur singly, synchronously in small numbers or as part of a polyposis syndrome
- In familial adenomatous polyposis (FAP), more than 100 adenomas are present
- Have significant malignant potential

Adenomatous polyps

- **Adenomatous polyps** vary from a tubular adenoma, rather like a raspberry on a stalk, to the villous adenoma, a flat spreading lesion
- **Solitary adenomas** are usually found during the investigation of colonic bleeding or sometimes fortuitously (by accident)
- **Villous tumours** more usually give symptoms of diarrhoea, mucus discharge and occasionally hypokalaemia
- The risk of malignancy developing in an adenoma increases with increasing size of tumour; for example, in 1-cm-diameter tubular adenomas there is a 10% risk of cancer, whereas with villous adenomas over 2 cm in diameter, there may be a 15% chance of carcinoma
- Adenomas larger than 5 mm in diameter are usually treated because of their malignant potential
- Colonoscopic snare polypectomy or diathermy obliteration with hot biopsy forceps can be used
- Huge villous adenomas of the rectum can be difficult to remove even with techniques per anus, and occasionally proctectomy is required; the anal sphincter can usually be preserved

Familial adenomatous polyposis

- Autosomal dominant inherited disease due to mutation of the APC gene
- More than 100 colonic adenomas are diagnostic

Clinical features:

- Polyps are usually visible on sigmoidoscopy by the age of 15 years and will almost always be visible by the age of 30 years
- Carcinoma of the large bowel occurs 10–20 years after the onset of the polyposis
- One or more cancers will already be present in two-thirds of those patients presenting with symptoms (synchronous tumors)
- Loose stools, lower abdominal pain, weight loss, diarrhea and the passage of blood and mucus
- Polyps are seen on sigmoidoscopy
- Double-contrast barium enema: to see the number and distribution of polyps, and usually cancers if they are symptomatic
- If in doubt, colonoscopy is performed with biopsies to establish the number and histological type of polyps

Screening policy

- At-risk family members are offered genetic testing in their early teens
- At-risk members of the family should be examined at the age of 10–12 years, repeated every year
- Most of those who are going to get polyps will have them at 20 years, and these require operation
- If there are no polyps at 20 years, continue with 5-yearly examination until age 50 years; if there are still no polyps, there is probably no inherited gene
- Carcinomatous change may exceptionally occur before the age of 20 years
- Examination of blood relatives, including cousins, nephews and nieces, is essential, and a family tree should be constructed and a register of affected families maintained.

Treatment

- Resection of colon and follow up, including endoscopies of the left rectum and gastroscopies are carried out to detect upper gastrointestinal tumours

Hereditary non-polyposis colorectal cancer (Lynch's syndrome)

This syndrome is characterised by:

- increased risk of colorectal cancer
- and also cancers of the endometrium, ovary, stomach and small intestines
- It is an autosomal dominant condition
- The lifetime risk of developing colorectal cancer is 80%
- The mean age of diagnosis is 44 years. Most cancers develop in the proximal colon. Females with HNPCC have a 30–50% lifetime risk of developing endometrial cancer. The average age of diagnosis is 46 years in this group.

Malignant Adenocarcinoma of the colon

- Colorectal cancer is the most common type of GIT malignancies, being responsible for 500,000 deaths a year all over the world
- In the United States of America, it is the third most frequently diagnosed cancer in men and women

The risk factors:

- **Age:** more than 90% of the diagnosed patients are above 50; however it may occur at any time throughout the life
- **Hereditary risk factors:** twenty-five percent of patients with colorectal cancer have a positive family history. Examples of the familial factors are:
 1. Familial Adenomatous Polyposis (FAP):
 2. Hereditary nonpolyposis colorectal cancer (HNPCC):
- **Inflammatory Bowel Disease:** the risk is increased in both ulcerative colitis and Crohn's disease, if they were present for a long time and/or extensive

- **Environmental factors:**

1. **Obesity:** it is a significant risk factor for colorectal carcinoma. Increased levels of endogenous hormones (e.g. sex steroids, insulin, and insulin growth factor) are sometimes seen

2. **Diet:** various dietary factors are responsible such as:

- High-fat diet: it increases the risk, possibly through increasing bile acid concentration in the bowel, or promoting formation of excess diacylglycerol in the bowel's lumen
- Red meat: if it is consumed frequently, it increases the risk. The mechanism of causation is not fully understood. However it is hypothesized that when fish or meat is cooked at high temperature, heterocyclic amines are released
- Dietary fiber: foods rich in fiber have been associated with a decrease the rate of colorectal cancer
- Vegetables and Fruit: no association between overall fruit and vegetable consumption and the risk of colorectal cancer was found in either men or women
- Calcium: calcium intake reduces the risk. By decreasing bile acids in colon with formation of insoluble soap. It also modulates protein kinase C and fatty acid-induced destabilization of cellular membranes
- Antioxidants: these are retinoids, carotinoids, ascorbic acid, α-tocopherol, and selenium which are available in fruits and vegetables
- Folate and Methionine: high concentration of folate is present in fresh fruit and leafy green vegetables, and methionine in red meat, chicken, and fish

3. **Medications:**

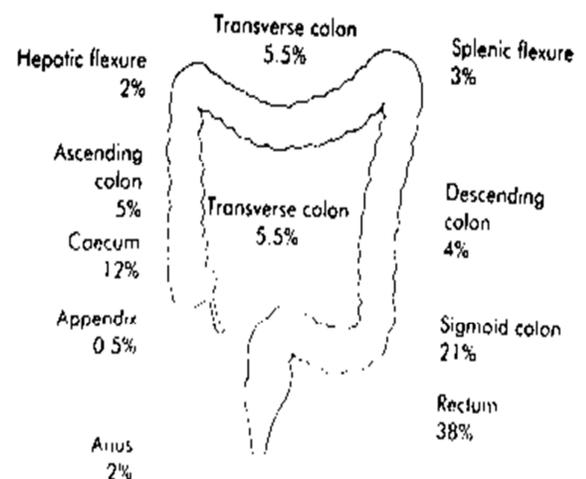
- Hormone Replacement Therapy (HRT): reduces the risk
- Nonsteroidal anti-inflammatory Drugs (NSAID): regular use of aspirin reduces the incidence of colorectal adenoma and carcinoma
- Drugs used in FAP: taking sulindac reduces the size and number of the adenomas

4. **Life Style Factors:**

- Physical Activity: if it is performed regularly, reduces the risk of colorectal carcinoma by 40%.
- Cigarette Smoking: it increases the risk of adenomas, in addition to the risk of their recurrence after polypectomy in both men and women

Pathology

- **Microscopically:** columnar cell carcinoma originating in the colonic epithelium
- **Macroscopically:** the tumour may take one of four forms
- Type 4 is the least malignant form.
- It is likely that all carcinomas start as a benign adenoma, so called 'adenoma–carcinoma sequence'.
- The annular variety tends to give rise to obstructive symptoms, whereas the others will present more commonly with bleeding.
- Tumours are more common in the left colon and rectum.
- The spread of carcinoma of the colon:

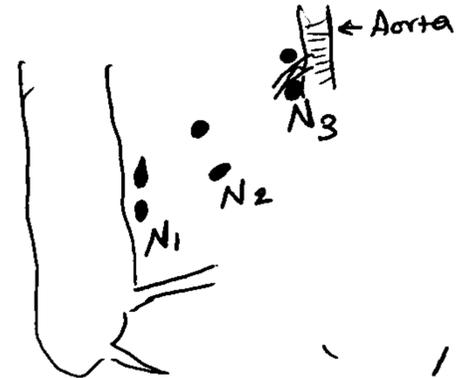


Local spread

- The tumour can spread in a longitudinal, transverse or radial direction; it spreads round the intestinal wall and usually causes intestinal obstruction before it invades adjacent structures
- Ulcerative type more commonly invades locally, and an internal fistula may result, for example into the bladder
- There may also be a local perforation with an abscess or even an external faecal fistula

Lymphatic spread

- N1: nodes in the immediate vicinity of the bowel wall
- N2: nodes arranged along the ileocolic, right colic, midcolic, left colic and sigmoid arteries
- N3: the apical nodes around the superior and inferior mesenteric vessels where they arise from the abdominal aorta.



Bloodstream spread

- This accounts for a large proportion (30–40%) of late deaths.
- Metastases are carried to the liver via the portal system, sometimes at an early stage before clinical or operative evidence is detected (occult hepatic metastases)

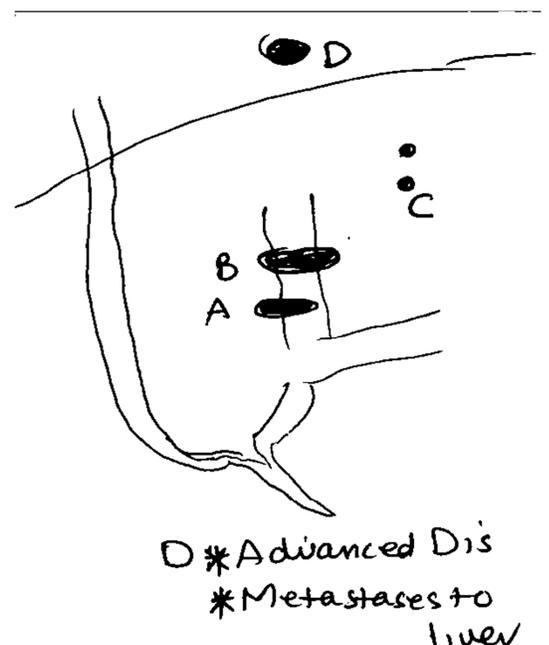
Transcoelomic spread

- Rarely, colorectal cancer can spread by way of cells dislodging from the serosa of the bowel or via the subperitoneal lymphatics to other structures within the peritoneal cavity.

Staging colon cancer:

Dukes' classification:

- A: confined to the bowel wall;
- B: through the bowel wall but not involving the free peritoneal serosal surface;
- C: lymph nodes involved.
- Dukes himself never described a D stage, but this is often used to describe either:
 - advanced local disease
 - or metastases to the liver



TNM classification

The TNM classification is more detailed and accurate but more demanding:

T Tumour stage:

- T1 Into submucosa;
- T2 Into muscularis propria;
- T3 Into pericolic fat but not breaching serosa;
- T4 Breaches serosa or directly involving another organ;

N Nodal stage:

- N0 No nodes involved;
- N1 One or two nodes involved;
- N2 Three or more nodes involved;

M Metastases:

- M0 No metastases;
- M1 Metastases;

Ly Lymphatic invasion:

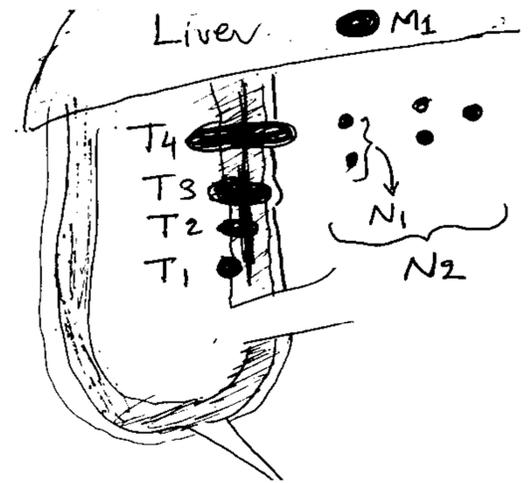
- L0 No lymphatic vessels involved;
- L1 Lymphatics involved;

V Venous invasion:

- V0 No vessel invasion;
- V1 Vessels invaded;

R Residual tumour

- R0 No residual tumour;
- R1 Margins involved, residual tumor present.



Clinical features

- Carcinoma of the colon usually occurs in patients over 50 years of age, but it is not rare earlier in adult life
- Twenty per cent of cases present as an emergency with intestinal obstruction or peritonitis.
- In any case of colonic bleeding in patients over the age of 40 years, a complete investigation of the colon is required
- A careful family history should be taken. Those with first-degree relatives who have developed colorectal cancer at the age of 45 years or below are at high risk and may be part of one of the colorectal cancer family syndromes



Carcinoma of the left side of the colon

- They are usually of the stenosing variety.

Symptoms

- The main symptoms are those of increasing intestinal obstruction.
- This includes lower abdominal pain, which may be colicky in nature, and abdominal distension. The patient may have a change in bowel habit with alternating diarrhoea and constipation

Carcinoma of the sigmoid

- In addition to symptoms of intestinal obstruction, a low tumor may give rise to a feeling of the need for evacuation, which may result in tenesmus accompanied by the passage of mucus and blood
- Bladder symptoms are not unusual and, in some instances, may herald a colovesical fistula.

Carcinoma of the transverse colon

This may be mistaken for a carcinoma of the stomach because of the position of the tumor together with anaemia and lassitude.

Carcinoma of the caecum and ascending colon

This may present with the following:

- anaemia: severe and unyielding to treatment;
- the presence of a mass in the right iliac fossa; colonoscopy may be needed to confirm the diagnosis
- a carcinoma of the caecum can be the apex of an intussusception presenting with the symptoms of intermittent obstruction.

Metastatic disease:

- Patients may present for the first time with liver metastases and an enlarged liver, ascites from carcinomatosis peritonei and, more rarely, metastases to the lung, skin, bone and brain

Investigation:

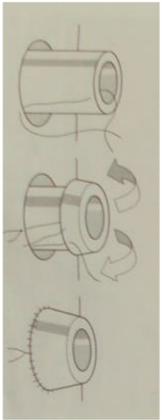
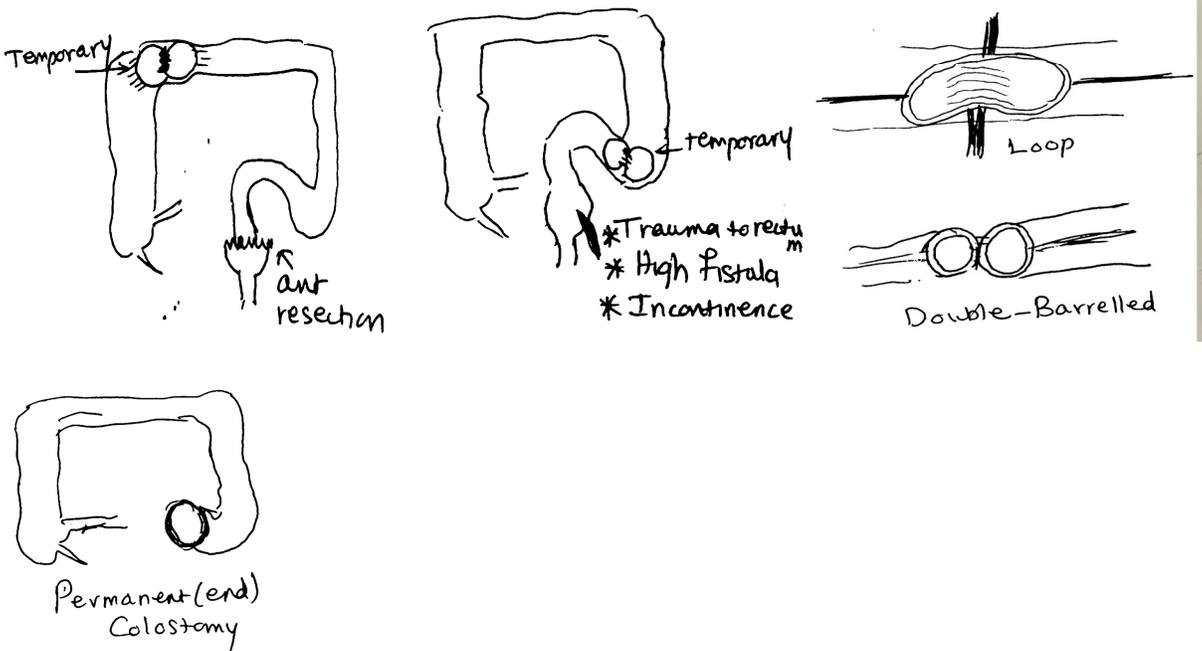
- Flexible sigmoidoscopy
- Colonoscopy: It has the advantage of not only picking up a primary cancer but also having the ability to detect synchronous polyps or even multiple carcinomas, which occur in 5% of cases
- Biopsy: every case should be proven histologically before surgery.
- Radiology:
 - Double-contrast barium enema is used when colonoscopy is contraindicated.
 - It shows a cancer of the colon as a constant irregular filling defect
- Ultrasonography: is often used as a screening investigation for liver metastases over the size of 1.5 cm, and CT is used in patients with large palpable abdominal masses, to determine local invasion, and is particularly used in the pelvis in the assessment of rectal cancer.

Principles of management of colorectal cancer

- **Assessment of local and distant tumor spread** should be performed both preoperatively and intraoperatively to allow planning of surgery
- **Synchronous tumours** occur in about **5%** of patients and should be excluded preoperatively
- Operations are planned to **remove the primary tumour** and its **draining locoregional lymph nodes**
- **Histological examination** of resected tumors contributes to decision making regarding the need for **adjuvant therapy**

STOMAS

A colostomy: is an artificial opening made in the large bowel to divert feces and flatus to the exterior, where it can be collected in an external appliance. Depending on the purpose for which the diversion has been necessary, a colostomy may be temporary or permanent



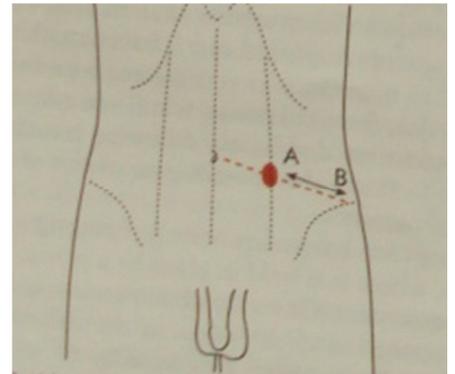
Temporary colostomy: A transverse loop colostomy has in the past been most commonly used to defunction an anastomosis after an anterior resection. It is now less commonly employed as it is fraught with complications and is difficult to manage; a loop ileostomy is preferred

A loop left iliac fossa colostomy is still sometimes used to

- Prevent faecal peritonitis developing following traumatic injury to the rectum
- To facilitate the operative treatment of a high fistula in ano and incontinence

Double-barrelled colostomy: This colostomy was designed so that it could be closed by crushing the intervening 'spur' using an enterotome or a stapling device. It is rarely used now, but occasionally the colon is divided so that both ends can be brought to the surface separately, ensuring that the distal segment is completely defunctioned.

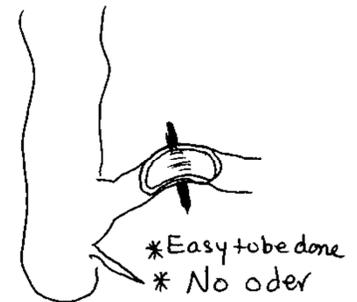
Permanent colostomy: This is usually formed after **excision of the rectum** for a carcinoma by the **abdominoperineal technique**. It is formed by bringing the distal end (end-colostomy) of the divided colon to the surface in the left iliac fossa, where it is sutured in place, joining the colonic margin to the surrounding skin



Complications of colostomies

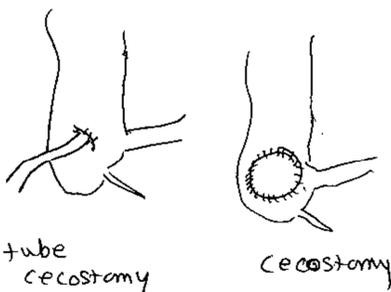
more common in poor technique or siting of the stoma:

prolapse | retraction | necrosis of the distal end | fistula formation | stenosis of the orifice | colostomy hernia | bleeding (usually from granulomas around the margin of the colostomy) | colostomy 'diarrhoea': this is usually an infective enteritis and will respond to oral metronidazole 200 mg three times daily



Loop ileostomy

- An ileostomy is now often used as an alternative to colostomy, particularly for defunctioning a low rectal anastomosis.
- The advantages of a loop ileostomy over a loop colostomy are:
 - the ease with which the bowel can be brought to the surface
 - and the absence of odor. Care is needed, when the ileostomy is closed, that suture line obstruction does not occur.



Caecostomy

- This is rarely used now.
- In desperately ill patients with advanced obstruction, a caecostomy may be useful.
- In late cases of obstruction, the caecum may become so distended and ischaemic that rupture of the caecal wall may be anticipated. This can occur spontaneously, giving rise to faecal peritonitis, or at operation, when an incision in the abdominal wall reduces its supportive role and allows the caecum to expand.
- Caecostomy is only a short-term measure to allow a few days for the condition of the patient to improve
- Reoperation should normally follow soon thereafter and a definitive procedure should be carried out.

Stomas

- May be colostomy or ileostomy
- May be temporary or permanent
- Temporary or defunctioning stomas are usually fashioned as loop stomas
- An ileostomy is spouted; a colostomy is flush
- Ileostomy effluent is usually liquid whereas colostomy effluent is usually solid
- Ileostomy patients are more likely to develop fluid and electrolyte problems
- An ileostomy is usually sited in the right iliac fossa
- A temporary colostomy may be transverse and sited in the right upper quadrant
- End-colostomy is usually sited in the left iliac fossa
- All patients should be counselled by a stoma care nurse before operation
- Complications include skin irritation, prolapse, retraction, necrosis, stenosis, parastomal hernia, bleeding and fistulation