

**Introduction :**

oesophagus muscular 25 cm from the cricoid cartilage to the cardiac orifice of the stomach. It has an upper and a lower sphincter. A peristaltic swallowing wave propels the food bolus into the stomach.

\* stomach acts retaining and grinding food, and then actively propelling it into the upper small bowel.

Gastrin, histamine and acetylcholine are the key stimulants of acid secretion from gastric parietal cells into the lumen of the stomach by a hydrogen–potassium adenosine triphosphatase (ATPase) ('proton pump').

**Protective factors**

Bicarbonate ions, stimulated by prostaglandins, mucins and trefoil factor family (TFF) peptides, together protect the gastroduodenal mucosa from the ulcerative properties of acid and pepsin.

**Small intestine**

The small bowel extends from the ligament of Treitz to the ileocaecal valve .

Functions of the small intestine are:

- digestion of fat, pr and carb (mechanical, enzymatic and peristaltic)
- absorption – the products of digestion, water, electrolytes and vitamins
- protection against ingested toxins
- immune regulation.

**Water and electrolytes:**

In healthy individuals, fluid balance is tightly controlled, such that only 100 mL of the 8 litres of fluid entering the gastrointestinal tract daily is excreted in stools.

Vitamins and trace elements.

Water-soluble vitamins are absorbed throughout the intestine.

**Physical defence mechanisms**

1- the gut lumen contains host bacteria ,mucins and secreted antibacterial products, including defensins and immunoglobulins that help combat pathogenic infections

2- epithelial cells have relatively impermeable brush border membranes and passage between cells is prevented by tight and adherens junctions.

**Immunological defence mechanisms**

Gastrointestinal mucosa-associated lymphoid tissue (MALT) constitutes 25% of the total lymphatic tissue of the body and its the heart of adaptive immunity.

**Colon**

absorbs water and electrolytes. acts as a storage organ and has contractile activity.

Two types of contraction occur.

1-ring contraction which leads to mixing but not propulsion; this promotes absorption of water and electrolytes.

2- Propulsive (peristaltic contraction) waves occur several times a day and propel faeces to the rectum.

**Intestinal microbiota '**

refers to the microorganisms that live in a particular niche,many environmental factors that can impact, including diet, drugs, physical activity, smoking, stress and natural ageing.

**A dysbiosis** or imbalance between the different components of the intestinal microbiota has been associated with diseases of the gastrointestinal tract, such as inflammatory bowel disease and colorectal cancer; liver disease, including hepatocellular carcinoma; and pathologies outside the gastrointestinal tract, such as diabetes, obesity, cardiovascular disorders, cerebrovascular disorders, asthma

**invex:**

1-Plain X-rays

intestinal obstruction or paralytic ileus, where dilated loops of bowel and (in the erect position) fluid levels

.Calcified lymph nodes, gallstones and renal stones can also be detected.

Chest X-ray erect :for suspected perforation,as it shows air under diaphragm

2-Barium study:

barium swallow and meal Motility disorders (achalasia and gastroparesis)

Perforation or fistula (non-ionic contrast)

- Barium follow-through: indicated for

♣Diarrhoea and abdominal pain of small bowel origin

♣ Possible obstruction by strictures

♣ Suspected malabsorption

♣Assessment of Crohn's

-Barium enema

♣ Altered bowel habit

♣ Evaluation of strictures or diverticular disease

♣Megacolon

♣ Chronic constipation

3-Ultrasound Abdominal

masses

Organomegaly

Ascites

Biliary tract dilatation

Gallstones

Guided biopsy of lesions

4-Computed tomography (CT)

Assessment of pancreatic disease

Hepatic tumour deposits

Tumour staging

Assessment of lesion vascularity

Abscesses and collections

5- (MRI)

Hepatic tumour staging

MRCP

Pelvic/perianal disease

Crohn's fistulae

Small bowel visualisation

6-CT–positron emission tomography (CT-PET)  
Detection of metastases not seen on US or CT.

**OGD:**

- Dyspepsia in patients > 55 years of age or with alarm symptoms
- Atypical chest pain
- Dysphagia
- Vomiting
- Weight loss
- Acute or chronic gastrointestinal bleeding
- Screening for oesophageal varices in chronic liver disease
- Abnormal CT scan or barium meal
- Duodenal biopsies in the investigation of malabsorption and confirmation of a diagnosis of coeliac disease
- Therapy, including treatment of bleeding lesions, banding/injection of varices, dilatation of strictures, insertion of stents, placement of percutaneous gastrostomies, ablation of Barrett's oesophagus and resection of high-grade dysplastic lesions and early neoplasia in the upper gastrointestinal tract

**COLONOSCOPY:**

- Suspected inflammatory bowel disease
- Chronic diarrhoea
- Altered bowel habit
- Rectal bleeding or iron deficiency anaemia
- Assessment of abnormal CT colonogram or barium enema
- Colorectal cancer screening
- Colorectal adenoma and carcinoma follow-up
- Therapeutic procedures, including endoscopic resection, dilatation of strictures, laser, stent

**Endoscopic ultrasound (EUS) :**

- visualisation through the wall of the gastrointestinal tract and into surrounding tissues, e.g. the pancreas or lymph nodes.
- used to perform fine needle aspiration or biopsy of mass lesions. ----EUS is helpful in the diagnosis of pancreatic tumours, chronic pancreatitis, pancreatic cysts, cholangiocarcinoma, common bile duct stones, ampullary lesions and submucosal tumours.
- It also plays an important role in the staging of certain cancers, e.g. those of oesophagus and pancreas.
- EUS can also be therapeutic, as in drainage of pancreatic fluid collections and coeliac plexus block for pain management.

**Capsule endoscopy .**

it transmits images to a battery powered recorder worn on a belt round the patient's waist. After 8 hours, the capsule is excreted. Images from the capsule are analysed as a video sequence and it is usually possible to localise the segment of small bowel in which lesions are seen.

(MRCP) :

largely replaced (ERCP) in the evaluation of obstructive jaundice since it produces comparable images of the biliary tree and pancreas, providing information that complements that obtained from CT and endoscopic ultrasound examination (EUS).

ERCP:

ERCP is used mainly in the treatment of a range of biliary and pancreatic diseases that have been identified by other imaging techniques such as MRCP, EUS and CT

### **Tests of infection**

1-Bacterial Stool cultures

essential in the investigation of diarrhoea, especially when it is acute or bloody, in order to identify pathogenic organisms

2-Serology

Detection of antibodies plays a limited role in the diagnosis of gastrointestinal infection caused by organisms such as *Helicobacter pylori*, *Salmonella* species and *Entamoeba histolytica*.

3-Breath tests

Non-invasive breath tests for *H. pylori* infection

### **Oesophageal motility**

A barium swallow can give useful information about oesophageal motility.

Oesophageal manometry, often in conjunction with 24-hour pH measurements, is of value in diagnosing cases of refractory gastro-oesophageal reflux, achalasia and non-cardiac chest pain.