

PHYSIOLOGY OF THE DIGESTIVE SYSTEM

- The function of digestive system:
 - Ingestion-eating food
 - Digestion of food-breakdown of food
 - Absorption-extraction of nutrients from the food
 - Defecation-removal of waste products.

DIGESTIVE ORGANS

- The digestive system is a group of organs that breakdown the chemical component of food with digestive juices,into tiny nutrients which can be absorbed to generate energy for the body.
- 1)The buccal cavity:Food enters the mouth and is chewed by the teeth,turned over and mixed with saliva by the tongue.The sensation of the smell and taste from the food sets up reflexes which stimulate the salivary glands.

- 2)Salivary glands:These glands increases their output of secretions though 3 pairs of duct into the oral cavity,and begins the process of digestion.Saliva lubricates the food enabling it to be swallowed and contains the enzyme ptyalin which serves to begin to breakdown starch.
- The pharynx:It is situated at the back of the nose and oral cavity,receives the softened food mass or bolus by the tongue pushing it against palate which initiates the swallowing action.At the same time ,a small flap called the epiglottis moves over the trachea to prevent any food particles getting into the windpipe.

ALIMENTARY CANAL

- From the pharynx onwards,the alimentary canal started.
- The oesophagus:It travels through the neck and thorax,behind the trachea and in front of the aorta.The food is mixed by the rhythmical muscular contractions known as peristalsis caused by the contractions of the longitudinal and circular bands of muscles.
- The stomach:It is the widest part of the alimentary canal and acts as reservoir of the food where it may remains for between 2-6 hrs.Here the food is turned around and mixed with various enzymes including pepsinogen which begins the digestion of protein.At regular interval,a circular muscle at the lower end of the stomach,the pylorus opens allowing small amount of food,now known as chyme to enter the small intestine.

- Small intestine:Because of its vast structure,provides a vast lining,through which further absorption takes place.There is a large lymph and blood supply to this area to transports nutrients to the rest of the body. Digestion in the small intestine relies on its own secretions plus those from the pancreas,liver and gall bladder.
- The pancreas:It opens into the 2nd part of the duodenum and has 2 main functions:
 - To produce enzymes to aid the process of digestion.
 - To release insulin directly into the blood stream for the purpose of controlling the blood sugar level.
- Enzymes suspended in the very alkaline pancreatic juice include amylase for breaking down starch into sugars and lipase which when activated by bile salts,helps to break down fat.

- The liver:Important functions are:
 - secretions of bile to the gall bladder
 - carbohydrates, protein and fat metabolism.
 - storage of glycogen ready for conversion into glucose when energy is required.
 - Storage of vitamins.
 - phagocytosis
- The gall bladder:It stores and concentrates bile which emulsifies fats making them easier to break down by the pancreatic juices.
- The large intestine:After food is passed into the caecum,a reflex action in response to the pressure,causes the contraction of the ileo-colic valve preventing any food returning to the ileum.Water is mainly absorbed by large intestine,finally the food reaches the anal canal where the indigestible foods are expelled from the body.

PEPTIC ULCER DISEASE

- Acid peptic digestion of the alimentary mucosa, resulting in an ulcer is called peptic ulcer disease.
- Types:
 - Depending on the site: chronic duodenal ulcer, chronic gastric ulcer, combined
 - Depending on the duration: acute peptic ulcer, chronic peptic ulcer

Aetiology :

1) Chronic duodenal ulcer

- hyperacidity is the chief cause
- genetic causes
- food habits
- bacteriological cause
- endocrinal causes

2) Chronic gastric ulcer

- ulcers occurs due to defective gastric mucosal barrier caused by NSAIDs, smoking, spicy food, alcohol and reflux of bile into the stomach.

Clinical features:

- site
- pain
- vomiting
- weight
- incidence of malignancy

Investigations:

- oesophagogastroduodenoscopy
- barium meal study

Treatment:

- medical line of treatment: H₂ receptor blockers, proton pump inhibitors, antacid
- eradication therapy
- surgical treatment:
 - highly selective vagotomy
 - total truncal abd vagotomy with gastrojejunostomy
 - truncal vagotomy and antrectomy.

Complications:

- Acute: perforation, haematemesis and melena
- subacute: residual abscess
- chronic: gastric outlet obstruction, teapot deformity, hourglass contracture of the stomach, penetration of the stomach, ca of stomach.

CARCINOMA OF THE STOMACH

- Aetiology:
 - Dietary factors: smoked food, spirits, smoking, salted foods, contaminated water rich in lead, zinc and nitrosamines
 - Precancerous conditions:
 - atrophic gastritis
 - pernicious anemia
 - hypogammaglobinemia
 - h. pylori infections
 - adenomatous polyp
 - Menetrier's disease
 - Gastric ulcer
 - previous GJ or gastric resection
 - Genetic factors:
 - can run in families (10%)
 - more common in blood group A patients.

Clinical features:

- vague symptoms-early satiety, flatulence, discomfort, pain upper abdomen.
- Growth is silent but manifests as secondaries in the liver, ascites, virchow's node, umbilical nodule (sister mary joseph's nodule)
- Obstructions at pylorus (pyloric antrum) with vomiting, dysphagia
- Lump in the abdomen which is hard and irregular
- Dyspepsia

SPREAD OF THE TUMORS

- Local spread
- Lymphatic spread
- Blood spread
- Transcoelomic spread

INVESTIGATIONS:

- complete blood picture
- endoscopy to know the extent of lesion and to take the biopsy
- ultrasound, CT scan and MRI
- Barium meal

TREATMENT OF CARCINOMA STOMACH

- Surgery is the main modality of the treatment. Adjuvant chemotherapy has been found to be beneficial in a few patients only.
- 1) carcinoma of pyloric antrum and body of the stomach: radical subtotal gastrectomy followed by gastrojejunal anastomosis is the treatment of choice.
- 2) carcinoma of the fundus: oesophago-gastrectomy followed by oesophagogastric anastomosis or oesophagojejunal anastomosis.
- Diffuse growth (linitis plastica): radical total gastrectomy followed by oesophagojejunostomy.