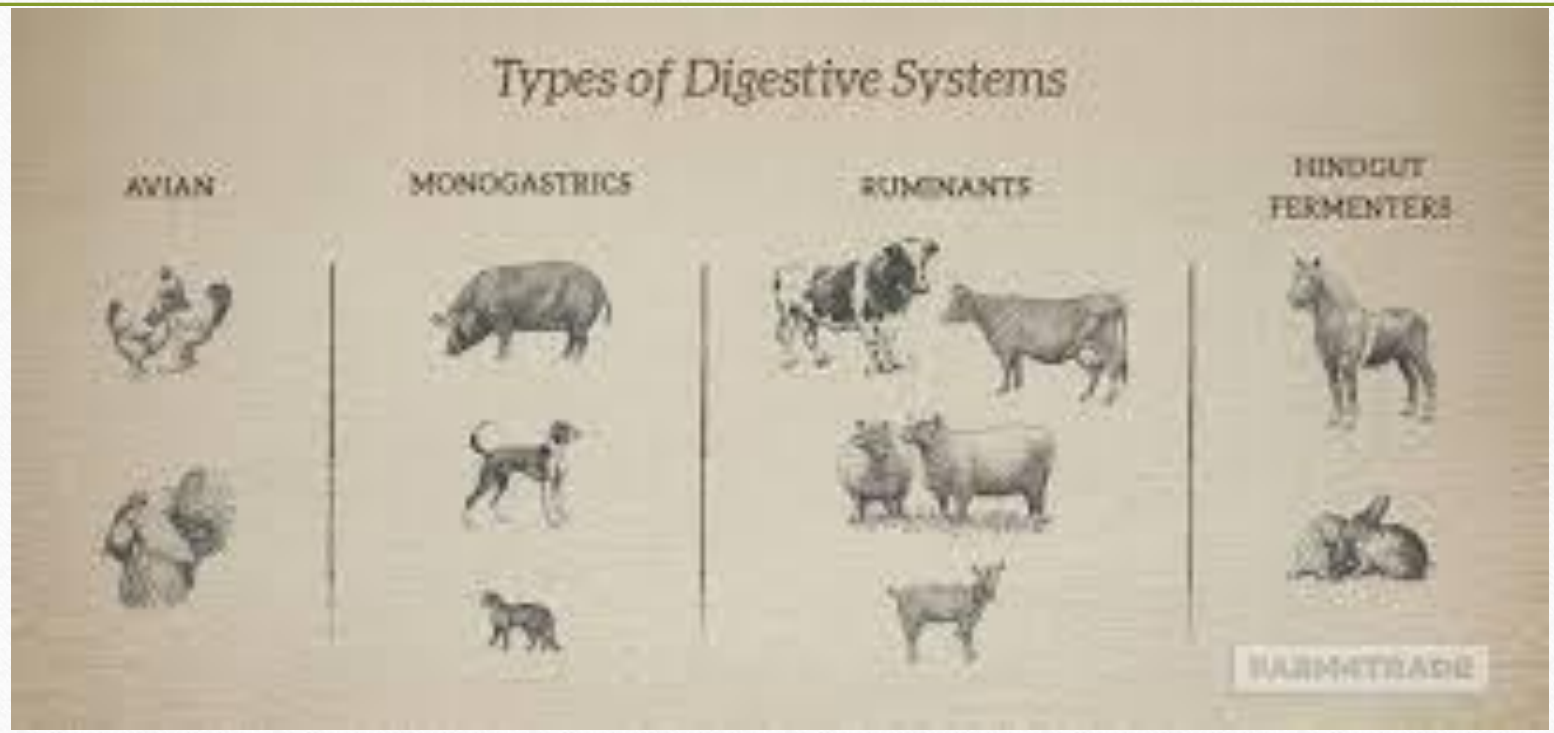
DIGESTIVE SYSTEM

Internal medicine; fourth stage

Part I

INTRODUCTION



- The primary functions of alimentary tract are the prehension, digestion, absorption of food & water and maintenance of the internal environment by modification the amount and nature of absorbed materials.
- There are 4 major modes function and correspondingly 4 major modes dysfunction are (motility, secretion, digestion and absorption).
- The procedure in diagnosis should be determined (which mode of function are disturbed before proceeding to determination the site and nature of the lesion and ultimately the specific cause).

Modes dysfunction

1. Motility dysfunction (hyper/hypomotility, distension)
2. Secretion dysfunction
3. Digestive dysfunction
4. Absorption dysfunction

Motility dysfunction

- The abnormalities in stomach and intestine motility represent the most common consequence of gastrointestinal tract diseases. These abnormalities include:
- 1) Hypermotility or hypomotility
- The most important GIT motilities are:

1. Peristaltic movement that moves ingesta from esophagus to rectum
2. Segmentation movements that chum and mix the ingesta
3. Tones of the sphincters

- The motility depends on stimulation by the sympathetic and parasympathetic nervous systems.
- The abnormal function may take the form of increased or decreased motility.
- Debility and severe inflammation (such as in acute peritonitis, trauma and infarction) results in attenuation of intestinal wall.
- Less severe inflammation (such as in mild gastritis and enteritis) may result in an increase in muscular activity.
- Increasing in motility causes → diarrhea, while decreasing in motility causes → constipation, and both have harmful effects on digestion and absorption.

Motility dysfunction

- 2) Distention

1. The causes of distention are:
2. Rapid accumulation of gases or inefficient expulsion of gases
3. Complete lumen obstruction by accident or valve obstruction
4. Engorgement with solid or liquid feeds

- The results of distention are:
- Abdominal pain that occur due to increasing spasm
- Further secretion of fluid into intestinal lumen that stimulated by motility of adjoining gut segments and this exaggerates the distension

Secretion dysfunction

- The immediate effect of distension of stomach or small intestine is a stimulation of further secretion of fluid and electrolytes resulting in loss of them to the point where fatal dehydration can occur. Diarrhea can lead to the endpoint dehydration resulting in cardiac failure due to severe metabolic acidosis and renal ischemia leading to uremia that may cause shock.

Digestion dysfunction

- The ability of alimentary tract for digestion depends on:

1. The motor and secretory functions
2. The activity of microflora that inhabits the forestomach in ruminants or cecum & colon in equine

- The flora of forestomach in ruminants is capable for digestion of cellulose to volatile fatty acids and converting of nitrogenous substances to ammonia and protein
- There are several causes for impairment of microbial digestion includes:-

1. Failure to provide the correct diet
2. Prolonged starvation or inappetence (anorexia)
3. Hyper-acidity
4. Oral administration of antibiotic, sulfonamide & other drugs that drastically alter rumen the rumen pH content

Absorption dysfunction

- Absorption may affect by the increasing motility or by the disease of the intestinal mucosa. In most instances, the two occur together but with some helminthes infestation, lesions occur in the intestinal wall without accompanying changes in motility

Prehension abnormalities

- Prehension: is the action of food grasping by mouth (lips, tongue and teeth) as well as the ability to drink.
- There are several causes for prehension abnormalities includes:

1. Paralysis the muscles of jaw or tongue, which indicated by the behavior of animal as it attempts to ingest feed without success. The animal is hungry and attempts to feed but cannot do so
2. Mal-apposition of incisor teeth due to inherited skeletal defect and rickets
3. Absence of some incisor teeth
4. Mouth pain due to stomatitis, glossitis, foreign body in mouth and decayed teeth
5. Congenital abnormalities of tongue & lips due to inherited harelip & inherited smooth tongue of cattle

Mastication abnormalities

- Painful mastication (as in bad teeth) is manifested by slow jaw movements interrupted by pauses.
- In stomatitis, there is usually complete refusal to chew
- An incomplete mastication is evidenced by dropping of the food from mouth during eating and passage of large quantities of undigested material in feces.

Swallowing abnormalities and dysphagia

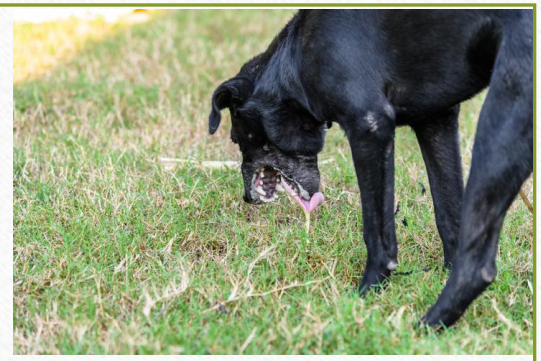
- Causes: 1 Any defect in nervous control of swallowing reflex 2 Narrowing in the lumen of pharynx and /or esophagus
- Dysphagia is manifested by forceful attempts to swallow accompanied, initially, by extension of the head that followed by forceful flexion & violent contractions in the muscles of neck and abdomen.
- The inability to swallow is usually caused by the same lesions of dysphagia but with greater degree.
- The results depend on the site of the obstruction:
- Lesions in pharynx cause → regurgitation through the nostrils or coughing up of material
- In a latter instance of pharynx, there is danger because of that some materials may be aspirated into lungs and causes acute respiratory & cardiac failure or aspiration pneumonia.
- When the obstruction at a low level in esophagus, large materials may be swallowed and then regurgitated.
- The causes of dysphagia and inability to swallow are: 1 Foreign body, tumors, inflammatory swelling in pharynx or esophagus 2 Painful conditions in pharynx or esophagus 3 Esophageal dilatation due to paralysis 4 Esophageal diverticulum 5 Esophageal spasm at site of mucosal erosion

Drooling of saliva and Excessive salivation

- Local causes
- Foreign body in mouth or pharynx
- Ulceration, deep erosion or vesicular eruption of the oral mucosa
- Inability to swallow due to esophageal abnormality
- Systemic causes

1-Poisonous trees or other poisonous plants 2-Fungal toxins 3-Iodism 4-Watery mouth of lambs 5-Sweating sickness

Vomiting & Regurgitation



- Vomiting:
- Vomiting is a forceful ejection to the contents of stomach and/or proximal small intestine through mouth due to a complex motor disturbance in alimentary tract
- Vomiting is, essentially, a protective mechanism with the function of removing excessive quantities of ingesta or toxic materials from stomach.
- According to vomiting nature, there are 2 types of vomiting are :-

1. Projectile vomiting that not accompanied by retching movements and large amounts of fluid material are ejected with little effort. It's occurring mostly as a result of overloading of stomach or forestomach with feed or fluid.
2. True vomiting which accompanied by retching movements including contraction of abdominal wall and muscles of neck with extension of the head.

Vomiting

- Depending on whether the stimulation arises, vomiting is originated either:

1. Centrally at the vomiting center.
2. Peripherally by 1- overloading of stomach 2-or inflammation of gastric mucosa 3-or by presence of foreign bodies in pharynx and / or esophagus.

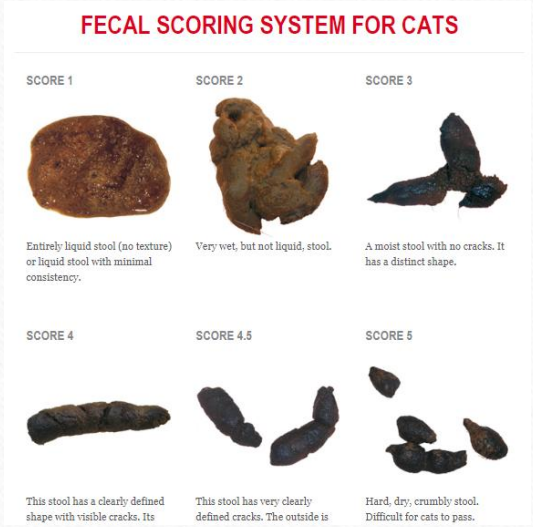
- Vomiting may have serious effects on fluids and electrolytes balance due to gastric & intestinal contents losses during vomiting. Aspiration pneumonia or laryngeal obstruction is the potential serious consequences of vomiting.
- True vomiting is rare in farm animals except in pigs with gastroenteritis and some systemic diseases.
- True vomiting is not a feature of gastric disease in the horse because of:-
- 1. The strong cardiac sphincter that inhibits releasing of stomach contents. In horses, the rupture of stomach is more likely to occur before vomiting takes place.
- 2. The soft palate and epiglottis are combined to form a seal between the oral and nasal parts of pharynx, so that, any vomited stomach contents must be discharged through nasal cavities and not through mouth.

Regurgitation

- Regurgitation is an expulsion of feed, saliva and other substances through mouth or nasal cavities, before it reached to stomach. In most cases, it occurs due to abnormalities in esophagus (esophageal obstruction and esophagitis).
- Ruminants regurgitate their rumen contents as part of rumination but the materials are not expelled from mouth or into nasal cavities.
- It is necessary to differentiate between material regurgitated from esophagus and vomiting (the first is, usually, slightly alkaline and the latter is acid).
- Etiology (vomiting and regurgitation)
- 1. In horses, acute gastric dilatation. 2. Vomiting in cattle is, in fact, regurgitation of large quantities rumen contents through mouth. 3. Third-stage milk fever (loss of tone in cardia). 4. Arsenic poisoning. 5. Poisoning by plants. 6. Veterinary administration of large quantities of fluids into the rumen.7. In dogs & cats: gastritis, gastroenteritis (infectious/non-infectious)

FECES ABNORMALITIES

1. Diarrhea
2. Constipation
3. Scant feces



Diarrhea

- A state of increasing defecation frequency, in which the feces contain large amounts of water and low dry matter content.
- The consistency of diarrheic feces varies from soft to liquid.
- Pathogenesis is including an increasing in Peristaltic activity → ↑ caudal flow → ↓ Intestinal transit time → diarrhea.
- Due to lack of fluid absorption, feces usually are:

1. Softer than normal
2. The dry matter content is below than normal range
3. Increasing the total amount of feces passed per day
4. Increasing the frequency of defecation

Causes of Diarrhea

1. Enteritis
2. Malabsorption
3. Neurogenic diarrhea as in excitement
4. Local structural lesions of stomach or intestine (such as ulcer of the abomasum or stomach)
5. Tumor (such as intestinal adenocarcinoma)
6. Indigestible diet (such as lactose intolerance in foals)
7. Carbohydrate engorgement in cattle
8. In some cases of ileal hypertrophy, ileitis and diverticulitis
9. Terminal stages of congestive heart failure (visceral edema)
10. Endotoxic mastitis in cattle
11. Chronic and acute undifferentiated diarrhea in horses
12. Vagus indigestion in cows

Constipation

- It's a state of decreasing in frequency of defecation, in which, the feces contain low amounts of water.
- The feces vary in consistency from being hard to dry and of small bulk.
- True constipation (as in humans) is usually characterized by failure to defecate & impaction of rectum with feces
- When intestine motility is reduced, the alimentary transit time is prolonged & constipation or scant feces occur
- Constipation may, also, occur when defecation is painful, as in cattle with acute traumatic reticulo-peritonitis.

Constipation

- Most common in cats suffering from rickets or osteoporosis fed with meat-based diets
- Megacolon

Scant feces

- It's a state characterized by small quantities of feces that may be dry or soft.
- Scant feces occur most commonly in cattle with forestomach or abomasum abnormalities resulting in movement of only small quantities of ingesta into small and large intestines.

Common causes of scant feces or constipation

1. Diseases of the forestomach and abomasums, which causing failure of outflow.
2. Impaction of large intestine in horse.
3. Severe debility (as in old age).
4. Deficient dietary bulk, usually fiber.
5. Chronic dehydration.
6. Partial obstruction of large intestine.
7. Painful conditions of the anus.
8. Paralytic ileus.
9. Grass sickness in horses.
10. Chronic zinc poisoning in cattle.
11. Terminal stages of pregnancy in cows.