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Lecture title: Manifestations of Alimentary Tract Dysfunction

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Summary: Manifestations of Alimentary Tract Dysfunction 1

- ✓ **Inanition** is the major physiologic effect of alimentary dysfunction when the disease is **chronic.**
- ✓ **dehydration** is the major effect in **acute diseases**
- ✓ **shock** is the important physiologic disturbance in **hyperacute diseases.**

1- Abnormality of prehention, mastication and swallowing

2- Drooling saliva and extensive salivation

3- Vomiting and regurgitation(Rumenation)

4- Diarrhea, constipation and scant feces

5- Alimentary Tract Hemorrhage

6- Abdominal pain and Tenesmus

7- Abdominal distention

Function of Digestive system

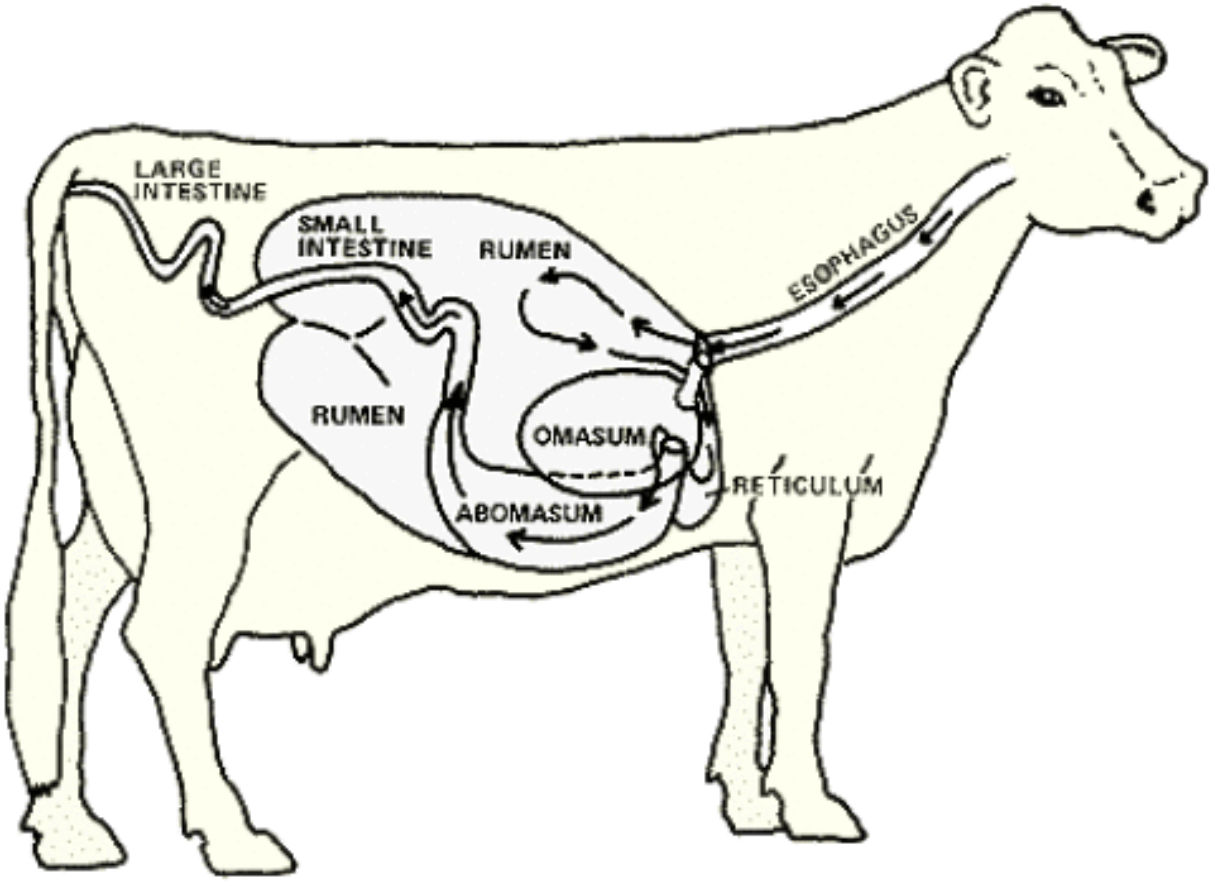
✓ **<u>The general functions of digestive system include</u>**:

- ingestion (eating)
- chewing (mastication)
- swallowing (deglutition)
- Digestion
- absorption of nutrients
- elimination of solid waste materials(defecation)

- ✓ The digestive system changes food nutrients into compounds that are easily absorbed into the blood stream.
- ✓ Ruminants are those animals that contain a multi-chambered digestive system (***polygastric***) that allows the animal to gain the majority of their nutritional needs from ***forages*** and other ***roughages*** (*Forage refers to grasses, roughages refers to other high-fiber food sources*).
- ✓ The digestive tract extend from the lips to the anus. It includes the mouth, pharynx, esophagus, stomach, and the small and large intestines.
- ✓ Accessory glands include the salivary glands, liver, and pancreas.

The digestive system of ruminant animals include:

- ✓ Mouth - grasps the food contain only one set of teeth in the front of the mouth (incisors), and two sets in the back (molars), as well as dental pad in upper.
- ✓ Teeth - Dental pad grind the food.
- ✓ Tongue - covered with finger-like projections (***papillae***) that contain taste buds.
- ✓ Salivary glands - secrete saliva, that moistens food and is mixed with the food material to aid in swallowing.
- ✓ Pharynx - funnels food into the esophagus, preventing food material from entering trachea and lungs.
- ✓ Esophagus - food tube that leads from the mouth to the stomach.



— Reticulum 5% of capacity
— Rumen 80% of capacity
— Omasum 7% of capacity

— Abomasum 8% of capacity

At this point, ruminant animals have a ***multi-chambered "stomach"***

- ✓ **Reticulum** (**honeycomb-like**)
- **honeycomb-like interior surface**, this part helps to remove foreign matter from the food materials. Esophagus empties here.
- ✓ Cattle swallow small pieces of metal Can irritate or pentrate the lining, Helped by putting a small magnet into the reticulum Holding area for food; also site of regurgitation.
- ✓ Ruminant animals grasp mouthfuls of food and swallow it before it is chewed.
- ✓ Ruminants will "chew their cud" (regurgitate) their food material and then grind it with their molars at a time when the animal is resting.This is done until the food particles are small enough to pass through the reticulum into the rumen.

Rumen the organ that allows for bacterial and chemical breakdown of fiber. The rumen has a very thick muscular wall. It fills most of the left-side of the abdomen. **Looks like carpet** due to papillae lining it. Have fermentation function, Primary digestion site for ruminants, Microbial digestion takes place here, Breakdown cellulose-simple sugars and Nitrogen containing compounds like protein, Physical mixing and breakdown. Not active in the early stages of life.

The omasum ("many plies")
The abomasum ("true stomach")
Small intestine
Large intestine

- **Digestive Function**
- ✓ The ability of the alimentary tract to digest food depends on its mechanical and secretory functions.

in herbivores, depend on the activity of the microflora that inhabits the fore stomachs of ruminants or cecum and colon of Equidae.

- ✓ The flora of the fore stomachs of ruminants is capable of **digesting cellulose**, **fermenting the end products of other carbohydrates to volatile fatty acids**, and **converting nitrogenous substances to ammonia and protein.**
- **In a number of circumstances, the activity of the flora can be modified so that digestion become abnormal or ceases**:
- ✓ Failure to provide the correct diet(change in diet)
- ✓ prolonged starvation or inappetence
- ✓ hyperacidity such as occurs in engorgement on grain

- ✓ impairment of microbial digestion (bacteria, yeasts, and protozoa) may be adversely affected by the oral administration of antibiotic and sulfonamide drugs or drugs that alter the pH of the rumen content.

- **Absorptive Function**

- ✓ Absorption of fluids and the dissolved end products of digestion depend on motility and intestinal mucosa activity.
- ✓ Absorption of fluids and the dissolved end products of digestion can be adversely affected by increased motility or by disease of the intestinal mucosa. In most instances, the two occur together but, occasionally, as with some helminth infestations, lesions occur in the intestinal wall without accompanying changes in motility(**such as ulcers and villus atrophy**).

1- Abnormalities of Prehension, Mastication, and Swallowing:

- **Prehension:** take of food and water by mouth (lips, tongue, and teeth)

Or the ability to eat and drink Failure of prehension may be duo to:

1- Paralysis of the muscles of the **jaw or tongue**.

2- Malposition or absent of some incisor teeth (inherited, congenital anomalies "mandibular prognathism", osteoporosis and Rickets).

3- Congenital abnormalities of tongue and lips.

4- Inflammation of tongue and mucosal lining of oral cavity.

- ❖ When the animal failure to prehension we just apply simple exam of mouth usually reveal the causes.
- ❖ Except anorexia caused by systemic disease.
- ❖ the animal is hungry and attempts to feed but cannot do so.

- **Mastication**(chewing): may be painful and is manifested by slow jaw movements may duo to a bad tooth, stomatitis (there is usually complete refusal to chew).
- The **Signs** of incomplete mastication: dropping of food from the mouth while continuous eating and the passage of large quantities of undigested food material in the feces.
- **Swallowing:** is a complex action by reflexes mediated through the glossopharyngeal, trigeminal, hypoglossal, and vagal nerves, to pass the bolus into the esophagus, and involuntary movements of the musculature of the esophageal wall to carry the bolus to the stomach. Any defect in nervous

control of the reflex or a narrowing of the lumen of the pharynx or esophagus may interfere with swallowing.

It is difficult to differentiate clinically between physical and functional causes of dysphagia (difficulty in eating and swallowing) that's include:

1-Foreign body, tumor, or inflammatory swelling in pharynx or esophagus.
2- Esophageal obstruction by impacted feed materials.
3- Esophageal dilatation caused by paralysis.
4- Esophageal diverticulum.
5- Esophageal spasm.

- **Dysphagia:** is manifested by forceful attempts to swallow. accompanied initially by extension of the head, followed by forceful flexion and violent contractions of the muscles of the neck and abdomen.If there are present lesions in the pharynx cause regurgitation through the nostrils or coughing up of the material. in the latter instance, there is danger that some of the material aspirated into the lungs and could cause acute respiratory failure or aspiration pneumonia. When the obstruction is at a low level in the esophagus, a large amount of material can be swallowed and then regurgitated.

2- Drooling of Saliva and Excessive Salivation: (excessive secretion,ptyalism:

there are local and systemic causes of this circumstance:

- **local causes of drooling:**

✓ Foreign body in mouth or pharynx.
✓ Ulceration, deep erosion or vesicular eruption of the oral mucosa.
✓ Inability to swallow (esophageal abnormality)

- **systemic causes of excessive salivation:**

✓ Poisonous plants (*Oleander spp.*)
✓ Fungal toxins, e.g. *Claviceps purpurea*
✓ Iodism
✓ Sweating sickness.
✓ Hypocalcemia.
✓ Carbohydrate engorgement.

3- Vomiting and Regurgitation:

✓ Vomiting is the forceful ejection of contents of the stomach and the proximal small intestine through the mouth. Vomiting is essentially a protective mechanism with the function of removing excessive quantities of ingesta or toxic materials from the stomach.

✓ **Vomiting occurs in two forms: projectile and true vomiting.**

Projectile Vomiting

1-This is not accompanied by retching movements
2- large amounts of fluid material are ejected with little effort
3- as a result of overloading of the stomach or fore stomach with feed or fluid.

True Vomiting

1-It occurs in monogastric animals like the dog and cat, true vomiting is accompanied by retching movements including contraction of the abdominal wall, neck muscles and extension of the head

2- The vomitus is usually small in amount and of porridge-like or pasty consistency.

3-It is usually a result of irritation of the gastric mucosa. It is usually a result of irritation of the gastric mucosa and vomiting center in the medulla oblongata, or by the presence of foreign bodies in the pharynx, esophagus, or esophageal groove.

- ✓ Central stimulation of vomiting by apomorphine and in nephritis and hepatitis are typical examples but vomiting occurs rarely in these diseases in farm animals but in human are common.

Complication of vomiting:

1-Vomiting can have serious effects on fluid and electrolyte balance because of the losses of gastric and intestinal contents.

2-Aspiration pneumonia and laryngeal obstruction.

- ✓ **True vomiting is rare in farm animals** except in pigs with gastroenteritis and some systemic diseases.
- ✓ **True vomiting does not occur in ruminants** but abnormal regurgitation may be, and in case of abomasal reflex.
- ✓ **True vomiting is not a feature of gastric disease in the horse for two reasons.** First, the strong cardiac sphincter inhibits the release of stomach contents.
- ✓ in horses rupture of the stomach is more likely to occur before vomiting takes place.
- ✓ Second, the soft palate and epiglottis combine to affect a seal between the oral and nasal parts of the pharynx so that any vomited stomach contents must be discharged through the nasal cavities and not through the mouth.
- ✓ **Spontaneous nasal regurgitation or vomiting does occur occasionally, as manifested by** the production of green stomach contents at the nostrils. This suggests extreme gastric distension or a dilated esophagus and cardiac sphincter and perhaps some underlying neurologic defect. Thus vomiting of large quantities of material in the horse is usually a terminal event and suggests gastric rupture and animal go to die.

Regurgitation:

- ✓ Regurgitation is expulsion of feed, saliva, and other substances through the mouth or nasal cavities. caused by abnormalities of the esophagus (esophageal obstruction. Esophagitis) that interfere with swallowing and distension of the stomach with fluid(specially occurs in horse)
- ✓ Ruminants regurgitate rumen contents as a part of rumination, but the material is not expelled from the mouth or into the nasal cavities.
- ✓ The regurgitation of rumen contents through the mouth does occur in cattle occasionally and consider abnormal. It is usually associated with loss of tone of the cardia(Third-stage milk fever) or inflammation of the cardia (Arsenic poisoning and some plant poisoning) and administration of large quantities of fluids into the rumen.

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Constable PD, Hinchcliff KW, Done SH, et al. (2017). Veterinary Medicine: A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs, and Goats. 11th ed. Elsevier, St. Louis, Missouri, USA.