

## **Acute Carbohydrate Engorgement of Ruminants**

### **(Ruminal Lactic Acidosis, Rumen Overload) and Subacute Ruminal Acidosis**

It can be studied as acute disease of ruminants caused by ingestion of large amounts of highly fermentable carbohydrates rich feed and production of excessive amount of lactic acid in rumen and the case characterized by severe toxemia, dehydration, ruminal stasis weakness, recompency and high mortality.

**Acute ruminal acidosis** is most commonly caused by the sudden ingestion of toxic doses of carbohydrate-rich feed, such as grain. Less common causes include engorgement with apples, grapes, bread, baker's dough, sugar beet, mangels, sour wet brewers' grain that was incompletely fermented in the brewery, and concentrated sucrose solutions used in apiculture.

**Subacute ruminal acidosis (SARA)** in dairy cattle is a disorder of ruminal fermentation in dairy cattle caused by the ingestion of large amounts of concentrates and inadequate amounts of fiber administered to increase milk production in early lactation.

### **Occurrence**

All types of **ruminant** cattle and sheep are susceptible to acute ruminal acidosis, but the disease is most common in feedlot cattle. It also occurs in lamb feedlots and has been recorded in goats, wild deer, and farmed ungulates. SARA is most common in dairy cattle fed high-level grain diets. The morbidity will vary from 10% to 50%. The case–fatality rate may be

up to 90% in untreated cases, whereas in treated cases it still may be up to 30% to 40%.

### **Etiology**

Sudden ingestion of toxic doses carbohydrate especially ground grains, all species of grain are toxic, wheat, barley, corn are considered to be more toxic than other and all considered much more toxic when ground finally or even crushed. The toxic dose are 25-62gm /kg for cow, 50-60 gm/ kg for sheep and less common causes include diet , breed , beaker dough , apples, grapes , sugar beet....etc. mortality and depend on the species to the grain total amounts , eaten and previous exposure.

### **Pathogenesis**

Ingestion of high fermentable feed increases the activity of *Strep. bovis*, *Lactobacillus*, and production of large quantity of lactic acid, decrease rumen pH which is decrease the tone or frequency of rumen movements or accompanied stuck of construction the cellulolytic layer killed and protozoa and excessive quantity of the lactic acid in reduce, osmotic pressure of the rumen increase , body fluid especially water drown in rumen from circulation, and increase blood concentration and dehydration and renal failure due to decrease blood flow and cause unurea, shock and death.

Absorption of lactic acid from the urine cause lactic acidosis, also chemical ruminates occur due to fungal infection which favorite by low ruminal pH lead to thrombosis.

### **Clinical finding**

The acuteness of disease depend on type and amount of feed eaten, in milled cases, there is anorexia, animal bright and alert with soft feces,

decrease rumen movements, animal don't rumination for few days and return to eat within 3-4 days without any specific treatment.

In sever form the signs begin in 24-48 hrs., the animals are staggering, recumbent and my standing by themselves, complet anaroxia, apathetic, depress, grinding teeth, soft feces to watery, body temperature below normal, sever increase in hart rate may reach to 120-140 /min. respiration shallow and increase up to 69-90/min. , diarrhea almost present and profuse and light in color. There is dehydration may be milled or sever, rumen content may firm and doughy, ruminal contraction is absent, gargling sound of gases and fluid is notable audible auscultation, acute laminitis present in milled cases due to elaboration of histamine, unurea is common, recombiny fallow after 24hrs., head turn into the trunk which is prognosis and give necessity for argent treatment, death occurin 24-72 hrs.

### **Clinical pathology**

- 1- Measuring ruminal pH
- 2- Abscence of ruminal protozoa.
- 3- Hemoconcentration detected by measuring PCV
- 4- Uric pH also 4-5.

And necropsies the ruminal reticular contain are fine and porridge like and have odor of fermentation. Ruminal epithelium is easily remove and leaving dark hemorrhagic surface, abomasitis and enteritis and there is large quantity of grain in the abomasum.

### **Diagnosis**

- 1- Case history
- 2- Clinical finding and clinical pathology

## **Differential diagnosis**

**Simple indigestion.** The consumption of large quantities of palatable feed, such as ensiled green feed offered to cattle for the first time, may cause simple indigestion, which may resemble grain overload. The rumen is full, the movements are reduced in frequency and amplitude, and there may be mild abdominal pain from the distension, but the ruminal pH and protozoan numbers and activity are normal.

- **Parturient paresis.** Severe cases that are recumbent may resemble parturient paresis, but in the latter the feces are usually firm and dry, marked dehydration does not occur, the absolute intensity of the heart sounds is reduced, and the response to calcium injection is favorable.

- **Toxemias.** Common toxemias of cattle that may resemble ruminal overload include peracute coliform mastitis and acute diffuse peritonitis, but clinical examination will usually reveal the cause of the toxemia.

- **Subacute ruminal acidosis** must be differentiated from diseases of dairy cows in early lactation in which there is reduced appetite and milk production. These include simple indigestion, left-side displacement of the abomasum, and ketosis, as well as other causes of suboptimal milk production in dairy cows in early lactation. Feeding management problems such as poor-quality forage or poor feeding bunk management are common causes of suboptimal performance in lactating dairy cows that are not affected with SARA.

## **Treatment**

The following are principles of treatment:

- Correct the ruminal and systemic acidosis and prevent further production of lactic acid.
- Restore fluid and electrolyte losses and maintain circulating blood volumes.

- Restore forestomach and intestinal motility to normal.

When cattle are found engorging themselves, the following procedures are recommended:

- Prevent further access to feed.
- Monitor water intake and prevent the rapid intake of excessive quantities of water.
- Offer a supply of good-quality palatable hay equal to one-half of the daily allowance per head.
- Exercise all animals every hour for 12 to 24 hours to encourage movement of the ingesta through the digestive tract.

- Intravenous sodium bicarbonate and fluid therapy
- Rumen lavage
- Intraruminal alkalinizing agents
- Rumenotomy