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Popular Article

Rumen Dysfunction

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Abstract

As we all are aware of the fact that human population in India is the highest and to fulfill their feed requirements, farmers are trying to gain more benefits from the animals in the form of milk. For this purpose, which they are feeding animals more concentrate and a smaller number of roughages. But this imbalance in diet may impair the digestion of ruminants which can ultimately affect the economics of farmers. Following divisions of stomach are present in ruminants, namely rumen, reticulum, omasum, and abomasum, of which the rumen is the largest. Any abnormality, impairment, or disruption in the functioning and the physiology of the rumen causes rumen dysfunction. So, here we will explain some of the basic problems related to rumen dysfunction and their control.

Rumen dysfunction includes

- Simple indigestion
- Acidic indigestion
- Rumenitis
- Ruminal tympany
- Vagal indigestion
- Ruminal impaction.

A) Simple indigestion

It is assumed to be a fastidious change in the intraruminal environment leading to a change in the rumen microbial population.

Clinical symptom

loss in appetite, reduced milk production in lactating animals is the first symptom of basic indigestion.

Faecal consistency

malodorous loose stool is typically voided within 12 to 24 hours of the clinical signs start to appear.

Rumino-reticular motility

The motility of reticulorumen is reduced or absent and rumination ceases.

Treatment

Magnesium oxide is potent alkalizing agent that increases the ruminal pH significantly and thus creates a good environment for rumen protozoa can be used during simple indigestion.

B. Acidic indigestion

When feed is deficient in fibre then, it allows the sugar content to degrade rapidly, leading to increased production of volatile fatty acids in rumen. This increase in production of volatile fatty acids and insufficient fibre will lead to acidic pH of the rumen. Lactic acid production raises the osmotic pressure within the rumen so that fluid from the circulatory system and also from other tissues is drawn into the rumen. This further lead to reduction in the pH of rumen resulting in loss of rumen microflora.

Clinical symptoms

Low feed intake, decreased weight gain, low milk fat, liver abscesses, chronic laminitis, ketosis, rumenitis or rumen parakeratosis, bloat and obesity.

Treatment- Balanced electrolyte deficits should be used to replace existing fluid deficits and provide for maintenance fluid needs. Sodium bicarbonate should be followed with isotonic intravenous or oral fluids to further expand plasma volume and prolong the duration of effect.

Prevention

- Access to easily digestible high concentrates ration to be avoided.
- Sudden changes in feedstuffs should be avoided and these changes should be done gradually, as adaptation of the rumen microbes to new feeds might take several weeks.
- Feed additives such as antimicrobials, bicarbonate, and limestone might reduce disease severity and incidence when used appropriately.

C) Rumenitis

Rumenitis refers to inflammatory changes in rumen mucosa and underlying tissues that develop in animals when fed with high-concentrate rations and inadequate roughage. Rumenitis occurs as a result to rumen acidosis and *Fusobacterium necrophorum* the main rumenitis-causing organism. Damage to the mucosal rumen wall leads to the spread of infection to other abdominal organs.

List of events that occur during rumenitis are

- Inflammation of the rumen mucosa
- Adherence of debris
- Ulcer formation and infection of deeper layers in the rumen wall
- Focal pus formation in the rumen wall

D) Bloat or Ruminal tympany

Bloat is an excess collection of fermentation gases in reticulorumen. The eructation potential of a healthy ruminant animal is always greater than the production rate of gas. So, bloat is not a result of excessive gas formation, it is due to eructation failure. This failure can be due to the result of any



mechanical or functional disruption along the path of the eructation of gas and contribute to free gas bloat.

Anything that interferes with eructation process is life-threatening to the ruminant because the expansion of rumen quickly interferes with breathing. Animals suffering from bloat or tympany die due to asphyxiation.

Types of bloat

1. Primary or frothy bloat

The cause of primary bloat is accumulation of the normal gases of fermentation in foam. Feed containing soluble leaf proteins, saponins and hemicelluloses are the main factors responsible for the formation of foaming agents and form a single molecular layer around gas.

2. Secondary ruminal tympany or free-gas bloat

There is obstruction to eructation of gases that may be caused by obstruction in esophagus, foreign body stenosis, or pressure from enlargement outside the esophagus. Disruption in function of esophageal groove can cause chronic ruminal tympany in case of vagal indigestion and diaphragmatic hernia. Ruminal tympany is also found in cases of tetanus, tumors and other lesions, caused due to infection of *Actinomyces bovis* that may lead to obstruction of esophageal groove.

Treatment

Bloated, recumbent animals need emergency ruminal decompression by trocarization (free gas) or emergency rumenotomy. An orogastric tube is passed for less severely affected animals to allow the removal of the gas.

Poloxalene, mineral or vegetable oils are examples of antifoaming agents.

E) Vagus indigestion

Vagal indigestion is also known as “Hoflund Syndrome” is a condition characterized by the impairment of the tenth pair of cranial nerves causing changes in motility of rumen. Vagus indigestion is a persistent disorder of the ruminants (mainly bovines) forestomach, resulting in reduced outflow and subsequently results in severe bloat formation, reduced feed intake and weight loss. Traumatic reticuloperitonitis (TRP), vagal nervous lesions and reticular adhesions are the main cause of vagus indigestion.

F) Ruminal impaction

Rumen impaction is a disorder arising from the accumulation of the indigestible substances in rumen that interferes with the flow of ingesta contributing to distension of rumen and passing of less or no faeces. Metallic or non-metallic foreign bodies accumulation is mainly responsible for ruminal impaction.

Clinical signs- anorexia, fever, tachypnea, and an arched stance with abducted elbows indicating cranial abdominal pain. If the foreign body had penetrated the diaphragm and pericardium, affected cattle also can have muffled heart sounds, jugular pulses, and brisket oedema secondary to congestive heart failure caused by pericarditis.



Accumulated material can obstruct the fermentation process, mixing content and affect the rumen microflora resulting in indigestion. Polythene and other plastic products in the rumen/reticulum do not degrade and remain obstructive in ruminal orifice. This will all lead to rumenitis, erosion and hyperplasia of rumen wall. This can also be attributed to the sloughing, erosion, inflammation and hyperplasia. Chronic irritation of the forestomach wall most likely due to the pressure changes on rumen wall caused by the foreign body results in persistent inflammation and making it vulnerable to secondary infection that contributes to both inflammatory and hyperplastic changes.

Conclusion

Rumen disorders are very common in cattle, buffaloes, sheep and goats, thereby making their prevention and management extremely important as it greatly affects the production efficiency of the animal and the farmer's economy. Most of the ruminal disorders are the result of variations in diet. Rumen is the fermentation vat of animals, very crucial for digestion and hence, must be taken proper care of by avoiding irrational feeding.

