

Alkalosis

Introduction

- Acidosis and alkalosis refer to the pathophysiologic process that cause net accumulation of acid or alkali (base) in the body
- Acidemia and alkalemia refer specifically to the pH of the blood
- Indigestion resulting from change in pH of ruminal fluid exceeding 7.5 is referred to as alkaline indigestion or ruminal alkalosis.
- Alkalosis is caused by an increased absorption of alkali, excessive loss of acid or a deficit of carbon dioxide.
- All clinical case of alkaline indigestion had history of ingestion of large amount of protein rich and low carbohydrate diet.

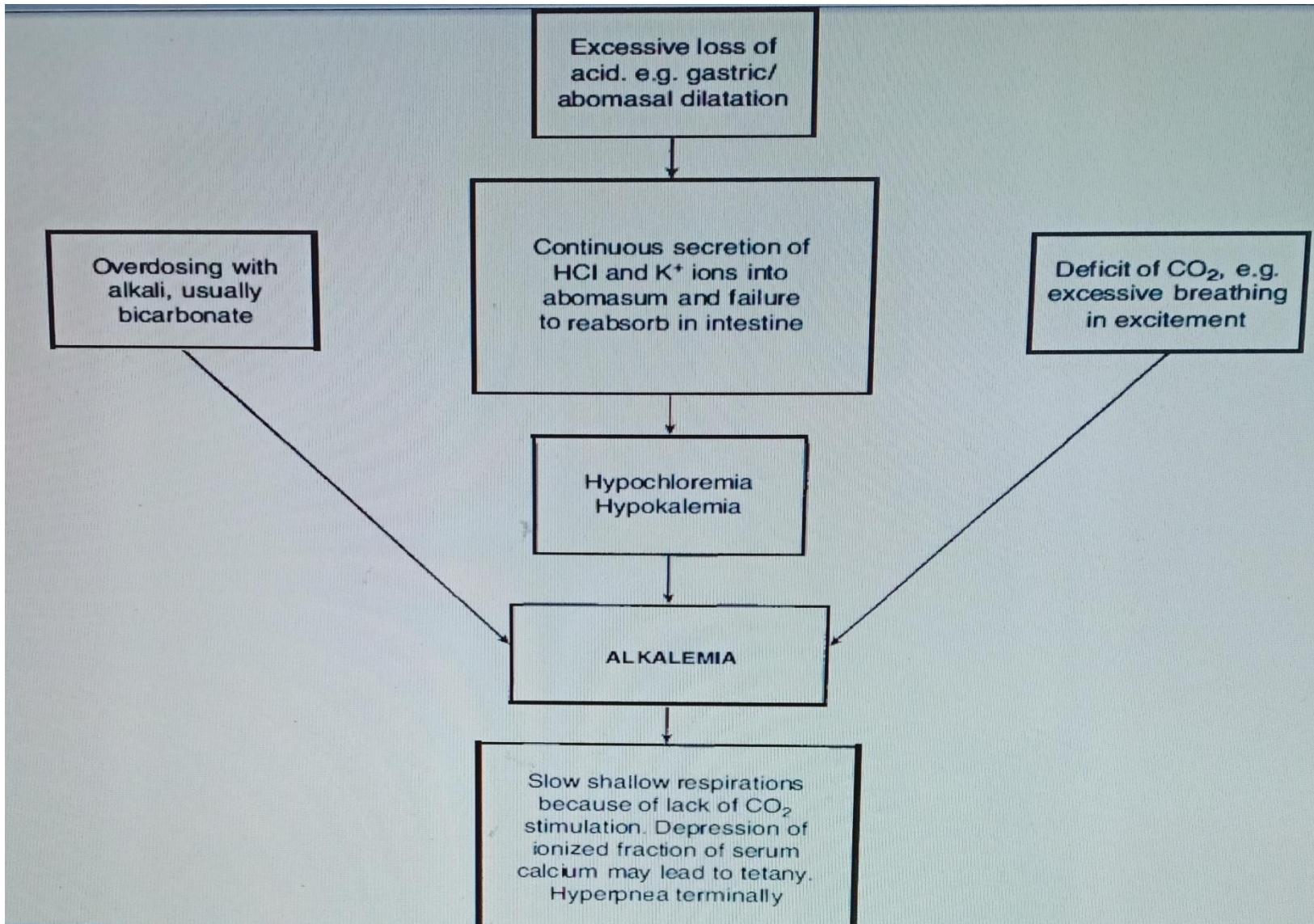
Causes of Alkalosis

- Abomasal atony due to dilatation, impaction or torsion of the abomasum is one of the commonest causes of alkalemia (alkalosis) in cattle.
- There is continuous secretion of hydrochloric acid and potassium into the abomasum, with failure of evacuation of the abomasal contents into the duodenum for absorption.
- Sequestration of hydrochloric acid and potassium occurs in the abomasum, along with reflux into the rumen, all of which results in a hypochloremic, hypokalemic alkalosis.







Causes of Alkalosis

- Alkaline indigestion occurs usually due to
Excess and sudden intake of protein rich feed,
Urea feeding,
Abrupt change of ration,
Drinking of contaminated and sewage water and
Excessive feeding of straw over a prolonged period of time.
- Most of the times Soyabean meal is commonly fed to dairy cows and growing cattle due to its high energy and nitrogen content leading to alkalosis.

Causes of Alkalosis



Pathophysiology

- Excess feeding of protein  In rumen excess production of ammonia
The microbes cannot utilize.
- Non-utilized ammonia for microbial synthesis, absorbed beyond the GIT.
- The increased level of ruminal ammonia  increased rate of absorption
- The excess ammonia  reaches the portal circulation,
- Transported to liver  converted to urea.
- Urea  excreted via kidney through urine
-  Or recycled into the rumen by way of saliva
- Or through blood
- Excessive accumulation of ruminal ammonia, nitrogen

Pathophysiology

- Decrease in VFA
- ↓
- Alkaline pH of ruminal fluid
- ↓
- Inhibit ruminal contractions
- ↓
- Cause paresis of rumen musculature

Pathophysiology

- The range of pH in alkaline indigestion remains between 7.5 to 9.5
- When pH exceeds to 7.5, there is decrease in the number of ruminal microflora
- Rumen fluid appears watery and dark brown in colour
- It may become slimy and having putrid odour
- The paresis of rumen musculature
- High ruminal fluid pH bring about inappetence and interfere with cellulose digestion

Clinical Signs

- The principal signs of alkaline indigestion include
- Anorexia,
- Moderate decrease in milk yield,
- Depression,
- Increased pulse and respiratory rate,
- Constipation & semi-solid or pasty faeces,
- Hepatic, renal, circulatory and nervous disturbances
- Ruminal fluid colour changed to khaki brown
- Ruminal fluid consistency changed to watery
- Decreased ruminal protozoan activity

Clinical Signs

- Dry muzzle
- Tachycardia
- Tachypnoea
- Dehydration
- Ruminal atony
- Grinding of teeth
- Salivation
- Twitching of ears and facial muscles
- Significant increase of Hb and PCV
- Leucocytosis
- Hypoglycemia
- Increased BUN
- Lower Protein, albumin and globulin
- Low serum Ca and P level

Clinical Signs

- As compared to other forms of indigestion, very less information is available on alkaline indigestion in cattle
- Alkalosis results in slow, shallow respirations in an attempt to preserve carbon dioxide.
- Muscular tremors and tetany with tonic and clonic convulsions may occur because of depression of the ionized fraction of serum calcium.
- Hyperpnea and dyspnea may also occur in the terminal stages.

Treatment

- Primary cause should be treated
- Use of different ruminal acidifier for the treatment of alkaline indigestion in cattle.
- 5 % Acetic acid in 250 ml water orally once a day can be used
- 0.9% NS for chloride responsive metabolic alkalosis @ 50 – 100ml/hrs until urinary chloride rises to > 25 mEq/L (> 25 mmol/L) and urinary pH normalizes.
- Underlying conditions are treated with the correction of hypovolemia and hypokalemia.
- For urgent correction of blood pH by hemofiltration or hemodialysis is an option.

Thank You