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Calcium Toxicity in Animals

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Abstract

Calcium is important and most essential mineral for animal body for the skeleton, bone and teeth development. It is also required for milk production, to maintain muscle tone, contraction and relaxation, blood clotting etc. Its deficiency in animal body leads to osteomalacia, rickets, and milk fever in animals that further leads to bone damage, loss of production and thereby affect economics of animal husbandry. Its sufficient supply to animal body results in normal skeleton development along with better productive performance of animals. But, unknowingly farmers sometimes fed excess calcium and that may leads to calcium toxicity. In calcium toxicity symptoms like respiratory distress, trembling, collapse and sudden death are found. Proper care during calcium feeding and infusion avoids calcium toxicity in animals. Therefore, it is concluded that though calcium is important macro-mineral to animal body, its supplementation with due care is required to prevent calcium toxicity.

Keywords: Animals, Calcium, Mineral, Toxicity

Introduction

Calcium is the mineral element that has the greatest abundance in mammals. Calcium has vital role for the development of healthy bones and teeth (where 90% of this mineral is found) where along with phosphorus it provides rigidity and shape to body structures.

It has also a fundamental role in the information transfer between the cells and in the nerve impulses transmission. For example, it plays essential roles in blood coagulation and muscular contraction as well as serving as a second messenger in a host of intracellular reactions. The deficiency of calcium (Ca) and phosphorus (P) negatively influences many different steps of the reproduction process in mammals, from gamete maturation to fetal development (De Clercq, and Variens, 2018). Though calcium has role in different body functions, it is necessary to take care while supplementation of calcium with respect to the dose, frequency and way of administration. Excess calcium supplementation may leads to calcium toxicity.

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Causes of Calcium toxicity

i) Over dosing of the calcium

ii) Rapid administration of calcium

iii) Unduly prolonged and repeated administration of calcium

iv) Toxemia

v) Excessive excitement of animals during calcium administration.

Symptoms of calcium toxicity

i) In toxemic animals- marked increase in heart rate (upto 180/min). Respiratory distress, trembling, collapse and death in few minutes.

ii) Sudden death in apparently healthy animal due to acute heart block.

iii) Sudden death may occur after giving calcium injection if animal is frightened or excited. It is due to over sensitiveness to epinephrine.

Treatment of calcium therapy

i) Atropine sulphate @ 0.03-0.06 mg/kg I/M, I/V in cardiac arrhythmia/ bradycardia.

ii) Magnesium sulphate 10% solution @ 200-400 ml I/V to antagonize cardio-excitory effects of calcium.

How to avoid calcium toxicity

i) Check calcium solution for any abnormal /fungal growth in the solution. The solution should be clear one.

ii) Warm the bottle to body temperature prior to the administration.

iii) Give the calcium injection very slowly @ 20 min. for 450 ml in adult cow.

iv) Overdosing should be avoided.

v) Perform the cardiac auscultation repeatedly during administration of calcium. If any abnormality then stop the giving of calcium.

vi) Prefer subcut route in toxaemia cows and should not exceed 250 ml.

vii) Animal should be calm and quiet as far as possible while giving calcium injection.

viii) Avoid repeated administration of calcium.

Conclusion

It is concluded that though calcium is necessary for performing different body functions, due care should be taken while supplementation of calcium to the animals to avoid calcium toxicity.

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