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Maheshwarappa YP
Division of Medicine,
ICAR-Indian Veterinary
Research Institute, Bareilly,
Uttar Pradesh, India

Ahmad P
Division of Medicine,
ICAR-Indian Veterinary
Research Institute, Bareilly,
Uttar Pradesh, India

Raguvaran R
Division of Medicine,
ICAR-Indian Veterinary
Research Institute, Bareilly,
Uttar Pradesh, India

Corresponding Author
Raguvaran R
Division of Medicine,
ICAR-Indian Veterinary
Research Institute, Bareilly,
Uttar Pradesh, India

Successful management of hypomagnesemic tetany in a calf

Maheshwarappa YP, Ahmad P and Raguvaran R

Abstract

A two months old non-descript female calf presented to Referral Veterinary Polyclinic (RVP), Indian Veterinary Research Institute (IVRI) with the history of severe convulsion, frenzy behavior since two days. History also revealed that the calf was being fed with milk only. Investigation revealed total protein (5.0 g/dl), albumin (3.4 g/dl), glucose (79 mg/dl) calcium (5.08 mg/dl), phosphorus (1.8 mg/dl) and magnesium (0.8 mg/dl). The calf was treated with Inj. Normal Saline 500 ml IV, Inj. Tribivet 2 ml IM, Inj. Avil 2 ml IM, Inj. Intavita-H 1 ml IM and Inj. Melonex-P 1 ml IM and 100 ml of 10 % magnesium sulphate SC. The calf recovered after treatment and magnesium level was within the reference range.

Keywords: calf, magnesium, milk, tetany

Introduction

Hypomagnesemic tetany most often occurs in 2 to 4 months old calves being fed milk with poor quality or no roughage. Efficiency of magnesium absorption falls from 87% at 1 month to 32% at 2 months (Radostits *et al.*, 2007) ^[2]. Magnesium is absorbed from intestines in calves but, rumen is the site of absorption in adult cattle. Concurrent occurrence of coliform and salmonella mediated enteritis will hamper intestinal absorption due to reduced transit time in intestine. Clinically it is marked by hyperesthesia, convulsion and muscular spasm. Clinical signs appear when serum magnesium level falls below 0.8 mg/dl (Khan, 2010) ^[1]. To compensate the short term deficit, calves have the ability to mobilize the skeletal storage of magnesium (Sansom, 1983) ^[3]. Bone calcium to magnesium ratio is another indicator; normal calves have 70:1, whereas affected calves have more than 90:1. Some affected animals may have concurrent hypocalcemia. Magnesium deficiency inhibits the action and release of parathyroid hormone (PTH), and this is said to be the reason for concurrent hypocalcemia (Schnieder *et al.*, 1985) ^[4]. It has clinical similarity with hypovitaminosis A, polioencephalomalacia, lead poisoning and tetanus. Prompt diagnosis followed by treatment will save the calves from respiratory paralysis. Incorporation of hay or silage at 2 months of age will prevent the occurrence of disease.

Anamnesis and Clinical Observation

A two months old non-descript female calf presented to RVP, IVRI with the history of severe convulsion, frenzy behavior. History revealed that calf was being fed with milk only. Clinical examination revealed severely congested mucous membrane, rectal temperature of 103.2F, tachypnea and tachycardia. Ocular examination revealed presence of all the reflexes and vision in both eyes. Calf started showing severe convulsion during examination and it was very difficult to restrain.

Clinical Pathology

Whole blood and serum sample were collected for complete blood count and minerals estimation, respectively. Investigation revealed total protein (5.0 g/dl), albumin (3.4 g/dl), glucose (79 mg/dl) calcium (5.08 mg/dl), phosphorus (1.8 mg/dl) and magnesium (0.8 mg/dl). Blood profile was apparently normal. The case was diagnosed as hypomagnesemic tetany and treated accordingly. Serum biochemistry changes have been presented in table 1.

Treatment and discussion

The calf was treated with Inj. Normal Saline 500 ml IV, Inj. Tribivet 2 ml IM, Inj. Avil 2 ml IM, Inj. Intavita-H 1 ml IM and Inj. Melonex-P 1 ml IM. After bringing temperature to normal

level, 100 ml of 10 % magnesium sulphate was administered subcutaneously. We also advised the owner to give magnesium sulphate 10 g orally for the next 5 days. Calf showed intermittent convulsion during the course of therapy. We also advised them to incorporate leguminous fodder such as cowpea or alfalfa hay in ration as they are rich source of magnesium. The calf recovered after treatment and serum biochemistry was within the reference range. Hypomagnesemic tetany share clinical similarity with tetanus,

acute lead poisoning, meningitis, hypovitaminosis A and enterotoxaemia. Blindness is the hall mark finding in lead poisoning and hypovitaminosis A. But, in this case, there was normal vision with presence of all ocular reflexes. Serum biochemistry revealed severe deficiency of calcium, phosphorus and magnesium. There was a response to treatment with magnesium sulphate. Disappearance of clinical signs after treatment excludes tetanus and meningitis from the differential diagnosis list.

Table 1: Changes in serum biochemistry of affected calf

S. No	Parameters	Before Treatment	After Treatment	Reference Range
1	Calcium (mg/dl)	5.0	8.2	8.5-10.4
2	Phosphorus (mg/dl)	1.8	2.2	4.5-6
3	Magnesium (mg/dl)	0.8	1.7	1.2-3.0
4	Total Protein (g/dl)	5.0	5.5	5.2-6.2
5	Albumin (g/dl)	3.4	3.3	3-3.5
6	Glucose (mg/dl)	79	74	50-80



Fig 1: Calf before and after treatment

Summary

A case of hypomagnesemic tetany was diagnosed in a calf and treated successfully with 10 % magnesium sulphate.

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