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Case Report

Successful Therapeutic Management of Albendazole Toxicity in a Calf

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Abstract

This report describes a case of albendazole toxicity in a calf presented in recumbency with the history of albendazole oral overdosing and thereafter lethargy, weakness, and recumbency. Physical examination depicted normal rectal temperature (104.5 ℉), congested mucus membrane, and a heart rate of 80 beats per minute. Cranial nerve dysfunction was depicted by absent menace response and pupillary light reflex at the onset of presentation. Haemato-biochemical analysis was done, which revealed anaemia, relative neutrophilia, and a disturbed liver function profile. Kidney function profile was normal, along with all electrolytes. The therapeutic management was done with Dextrose Normal saline intravenously, an antibiotic, liver tonic, and vitamin C for three days. Thereafter, the animal was active and alert with normal feed intake. Therefore, the calf was discharged from the hospital with follow-up treatment with oral liver tonic and multivitamin liquid syrup. This case emphasizes the importance of dosing precision and awareness of potential adverse effects.

Keywords: Albendazole, Calf, Deworming, Therapy, Toxicity.

Introduction

Albendazole, a benzimidazole anthelmintic, is commonly administered to control gastrointestinal roundworms, lungworms, tapeworms and liver flukes in livestock (McKellar and Scott, 1990). The dose used for the Despite its effectiveness, cases of albendazole toxicity are reported, particularly in animals with immature hepatic metabolism, underdeveloped immunity, or when overdosing occurs (McKellar and Scott, 1990; Sangster and Gill, 1999). In calves, overdoses may lead to adverse effects, primarily affecting hepatic and haematological systems due to the accumulation of albendazole metabolites (Dayan AD, 2003). This report discusses a case of albendazole toxicity in a young calf and its clinical management and prevention.

Case History

A 10 days old male calf (weighing approximately 25kg) was presented to Large Animal Medicine OPD of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. The calf was presented in recumbency (fig. 1) with the history of an excessive dose of albendazole (calculated as 60 mg/kg) offered one day before the presentation for the routine deworming. The owner of the calf was unaware of the specific dosing guidelines for young ruminants. The clinical signs recorded were lethargy, loss of appetite and weakness and mild ataxia. Physical examination depicted pale and congested mucus membranes, high rectal temperature (104.5 F) and normal rhythmic pulse rate (80 beats per minutes). Neurological examination depicted absent menace response and pupillary light reflexes (PLR) which indicated cranial nerve dysfunction. Hemato-biochemical analysis was performed which depicted moderate anaemia with a decrease in total erythrocyte counts ($3.38x10^6$/µL), packed cell volume (PCV) (13.9%) and haemoglobin (4.3 g/dL). There was relative neutrophilia and markedly elevated liver enzymes. Gamma glutamyl transaminase (GGT) and alkaline phosphatase (ALKP) were markedly elevated as 55 IU/L and 296 IU/L respectively. Aspartate aminotransferase (AST), alanine aminotransferase (ALT) and total bilirubin were in the normal range as 88 IU/L, 23 IU/L and 0.1 mg/dL respectively. Kidney function profile and glucose was also normal. All the electrolytes were in the normal range. Faecal revealed no significant parasitic load, indicating that the symptoms were likely due to drug effects rather than parasitic infection. The diagnosis was made based on the clinical signs, laboratory findings indicative of hepatic damage, history of overdose, and exclusion of other causes of hepatotoxicity or systemic illness.

Fig 1: Recumbent calf after albendazole overdose

Treatment

Therapeutic management was done with the intravenous Dextrose Normal Saline (DNS) fluid to correct dehydration, support renal function, aid in toxin clearance and to correct electrolyte disturbances. Vitamin C (@25mg per Kg b.wt.) was administered to mitigate oxidative damage from drug metabolites along with administration of antibiotic ceftriaxone (1 gm IV OD), liver protective drug (Belamyl® 3 mL IM od) for 5 days. Clinical signs, appetite, and blood biochemistry were monitored after five days.

Results and Discussion

The calf showed gradual improvement with normal feed intake and routine activity along with normal haemato-biochemical profile (TEC 5x10^6/µL, PCV 24%, Hb 8 g/dl, GGT 31 IU/L and ALKP 126 IU/L). Thereafter, the calf was discharged from hospital with the follow up treatment with oral liver tonic (Livbega @ 5 mL PO OD) and multivitamin liquid syrup (Zincovit @5 mL po od) for 2 weeks. The calf recovered fully after two weeks of supportive care, with restored appetite and energy (Fig. 2). Albendazole toxicity in calves can lead to hepatotoxicity, nephrotoxicity, and neurological symptoms, particularly in younger animals or with incorrect dosing (Dayan, 2003). Normally, the dose recommended for calves is 5-10 mg/kg b.wt. (Velik *et al.,* 2005; Yun *et al.,* 2001). Albendazole's metabolism results in reactive metabolites, such as albendazole sulfoxide and albendazole sulfone, which are primarily processed by the liver, making young animals with immature liver functions more susceptible to toxicity (McKellar *et al.,* 1990).

Additionally, studies suggest that albendazole metabolites induce oxidative stress, leading to hepatic cell damage and systemic effects, which can be moderated with antioxidant therapy (Li *et al.,* 2015). Case reports and experimental studies in ruminants underline the significance of adhering to recommended doses and monitoring hepatic function, particularly in young and compromised animals (Yun *et al.,* 2001).

Fig 2: Calf after treatment

Conclusion

This case emphasizes the risks associated with improper dosing of albendazole in calves. Adherence to recommended guidelines and proper dosing calculations are essential in avoiding toxicity. Veterinarians and livestock handlers should be aware of albendazole's potential adverse effects and provide supportive care promptly in cases of suspected toxicity.

Contribution by Authors

All the authors contributed equally to writing the manuscript. The final manuscript was read by all authors and consented to publication.

Conflict of Interests

There is no conflict of interest.

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