

Therapeutic Management of Thiamine Responsive Polioencephalomalacia in a Goat-A Case Report

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Abstract

A case of thiamine responsive polioencephalomalacia (PEM) in a 3 years old non-descriptive female goat was presented a complaint of anorexia, in-coordination with occasional aim less movement and upward deviation of the neck. The clinical examination revealed congested conjunctival mucus membrane, swollen and bulging tendency of eye ball, and typical star gazing posture with extended fore limbs and hind limbs. The goat was treated with intramuscular injection of thiamine hydrochloride and Dexamethasone along with rumenotonic bolus daily orally for 5 days. The animal showed a rapid response after 24 hours of treatment, and the animal became normal after five days of treatment.

Introduction

Polioencephalomalacia (PEM), also known as cerebrotical necrosis is a non-infectious neurological disorder results from a disturbance in thiamine metabolism and absorption in ruminants (Rachid et al., 2011). PEM affects animals of all ages, but the disease is most commonly encountered in younger animals than adults and associated with several risk factors as most commonly with changes in diet (high consuming concentrate rations or those grazing on lush pastures) (Sharma et al., 2021), sulfur intoxication, lead poisoning, and use of amprolium, thiabendazole and levamisole hydrochloride for medication (Radostits et al., 2007). In goats, it occurs sporadically or as a herd outbreak. Regardless of the etiology of the polioencephalomalacia, affected animals frequently respond to thiamine administration (Rammell and Hill, 1986 and Sivaraman et al., 2016).

The present communication reports a case of therapeutic management of thiamine responsive PEM in a goat.

Case history and Clinical examination:

A non-descriptive female goat of 3 years, weight around 22 kg was presented to Veterinary Clinical Complex, BVC, Patna with a complaint of anorexia, in-coordination with occasional aim less movement and upward deviation of the neck. The clinical examination revealed congested conjunctive mucus membrane, swollen and bulging tendency of eye ball, and typical star gazing posture (Fig. 1) with extended fore limbs and hind limbs. Besides grazing, the owner was feeding cooked rice daily. The vital parameters, rectal temperature (103⁰F), pulse and respiration were all in normal ranges with slight variation along with normal micturition and defecation. Blood, urine, stool and rumen fluid samples were collected for further investigation. Blood sample was subjected to routine hematological (Hb, PCV, TEC, TLC, DLC and Haemprotozoans) and biochemical tests like blood glucose. Whereas urine samples was subjected to Rothera's test for presence of ketone bodies. Rumen fluid was subjected to pH examination and showed low pH of 5.8. All blood parameters and biochemical tests were in normal range

with negative reports of blood smears and Rothera's test. Fecal examination revealed no evidence of ova or oocysts of endoparasites.

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Figure 1: Female Goat showing a typical star grazing postur

Treatment and Discussion:

Based on the clinical signs, blood picture and biochemical tests, the case was speculated to be thiamine associated polioencephalomalacia (PEM). The affected goat was treated with intramuscular injection of thiamine hydrochloride @ 10 mg/kg body weight every 12 hours for 5 days and Dexamethasone @ 1mg /Kg IM daily for 5 days along with one rumenotoric bolus (Ecotas^R) daily orally for 5 days. There was marked reduced in severity of clinical signs after 24 hrs. of treatment especially in gait and posture, and animal became normal after five days of treatment. The findings are in agreement with the finding of Mahajan et al. (2013) and Sharma et al. (2021). Dexamethasone @ 1mg/kg IM was recommended to decrease edema and inflammation of the brain (Sivaraman et al., 2016).

In ruminants, under normal environmental conditions, rumen bacteria and protozoa produced thiamine (Vitamin B1). But, any changes in the ruminal environment would affect thiamine production, increases thiamine degradation, or prevent thiamine from working properly in sheep and goats. The present case study revealed low ruminal pH (5.8) indicating ruminal acidosis, with resultant thiamine deficiency which might be due to excess feeding of cooked rice. Feeding of high carbohydrate diet lead to inactivation of thiamine molecules or reduced synthesis by thiaminases produced by *Bacillus* sp., and *Clostridium sporogenes* (Sivaraman et al., 2016) due to acidic nature of ruminal fluid. Some types of ferns or weeds inhibit the processing of Thiamine and induce thiamine deficiency (Mohanambal et. al., 2017). Thiamine is essential for carbohydrate metabolism in the nervous system and muscles. As a result its deficiency, it reduces the supply of carbohydrates to the neurons in the brain and causes alteration in the mechanism of action of the nervous system and ultimately lead to neuronal death, particularly in the cortical region of the brain and, hence may be responsible for origination of the symptoms (Mohanambal et al., 2017). The response to treatment depended on the condition and extent of brain lesions (Sivaraman et al., 2016). Early treatment is necessary after the onset of clinical signs within 24-72 hours, otherwise animals with PEM may have a permanent brain damage and culling or euthanasia may be recommended (Sharma *et al.*, 2021). The measurement of erythrocyte transketolase activity in the blood considered as the gold standard method for diagnosing thiamine deficiency in ruminants (Sharma et al., 2021), but due to a lack of facilities, this test was not performed in the present case study. PEM is most commonly diagnosed in veterinary practice by the response to thiamine therapy, and the clinical signs of progressive CNS involvement, combined with a rapid response to thiamine therapy, as seen in this case, can be used as a clinical diagnostic technique for thiamine responsive PEM in animals.

In conclusion, the polioencephalomalacia can effectively treated parenterally by thiamine at early presentation of the disease, and the rapid treatment response may also provide a method to diagnose PEM in field condition for clinicians where specific laboratory tests are not available to perform.

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