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Research Article

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Clinical, Haemato - Biochemical and Managemental studies of zinc deficiency in a calf

Amaravathi M[*1], Bharath Kumar Reddy C[2], Jyosthna Devi S[3]

Veterinary Dispensary, Kadapa – 516 259
[1]Ph.D Scholar, Department of Veterinary Pathology, C.V.Sc, Tirupati
[2]Ph.D Scholar, Department of Veterinary Medicine, C.V.Sc, Tirupati.
[3]Veterinary Assistant Surgeon, Chakrayapet, Kadapa
*Corresponding author: *ammu.nihal@gmail.com*

Abstract

A three year old male calf was presented with the history of alopecia, poor appetite and emaciation. Clinical examination revealed thickened and hard skin, reddened areas (dermatitis) at head, neck region and crusty, rough, scabby lesions around muzzle. Oozing of serum from the involved areas and from crusty lesions was also observed. Hematological values were within normal range. Biochemical estimation revealed decreased levels of serum alkaline phosphatase and zinc (28µg/100ml).This case was diagnosed as parakeratosis based on history, clinical signs and biochemical estimation. Zinc oxide was administered per orally, at the dose of 80 mg/day for 10 days and then 20 mg/week for 2 weeks.

Keywords: Calf, zinc deficiency, zinc oxide.

Introduction

Deficiency of zinc occurs in cattle, pigs, sheep and goats. Chronic zinc deficiency causes hyperkeratosis and parakeratosis of the skin. The animal becomes lethargic, dull and depressed in appearance. This condition occurs both in young and adult cattle. (Anand et al., 2005).

Zinc is a component of the enzyme carbonic anhydrase, which is located in the red blood cells and parietal cells of the stomach. Zinc is also associated with RNA function related to insulin, glucagon and other hormones. It also has a role in keratinization, calcification, wound healing, somatic and sexual development. Since it has a critical role in nucleic acid and protein metabolism, a deficiency may adversely affect the cell – mediated immune system (Radostits et al., 2000).

Zinc has been shown to be a required nutrient for many species of animals and is believed to be essential for all. Intensification of production and increase of the milk yield of cows requires appropriate balancing of the mineral elements and vitamins with regard to physical form and interaction between the components of the feed provided (Strusinska et al., 2003).

Zinc deficiency results in decreased feed intake in all species and is probably the reason for the depression of growth rate in growing animals. Failure of keratinization results in parakeratosis, loss of hair, failure of growth of hair and lesions on the coronary bands. The bones of zinc deficient ruminants reveal abnormal mineralization and reduced of zinc concentration in bones (Radostits et al., 2000)
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Materials and Methods

For haematological studies 4 – 5 ml of blood was collected in EDTA vaccutainers aseptically from jugular vein. The haematological estimations, such as haemoglobin concentration (Hb), packed cell volume (PCV), total erythrocyte count (TEC), total leukocyte count (TLC) and differential count (DLC) were carried out.

For serum samples, 2- 3 ml of blood was collected separately in a dry, clean and sterilized test tube and allowed to clot. Serum sample was preserved at -20^{o} C till the estimations were carried out. Biochemically, the serum sample was analysed for zinc and alkaline phosphatase, using standard kits. Skin scrapings were collected at different intervals from different regions of body for microscopic examination of mites (10 X).

Results and Discussion

A three old male calf was presented to the veterinary dispensary Kadapa with a history of alopecia, poor appetite and emaciation. Clinically, the calf showed thickened and hard skin, reddened areas (dermatitis) at head, neck region (Fig. 1) and crusty, rough, scabby lesions around muzzle (Fig. 2). Oozing of serum from the involved areas and from crusty lesions was observed. This calf was earlier treated with the Ivermectin injection but there was no improvement. Skin scrapings were negative for mites, fungal elements and did not reveal any bacteriological agents. Hence the condition was suspected for any nutritional deficiency. The blood sample revealed normal haematological values. The serum zinc content was found to be 28 µg /100 ml and the normal zinc levels in calves being 75 – 76 µg/dl as reported by (Cevat et al., 2006) and 50 – 60 µg/dl (Anand et al., 2005). Based on the laboratory findings and gross lesions shown confirmation of zinc deficiency was made. Hence, the calf was administered orally with zinc oxide at the rate of 80 mg/day for 10 days and 20 mg/week for 2 weeks. Blood was collected after the three weeks treatment for estimation of serum zinc level. The estimated serum zinc level was 52 µg/100 ml and the skin lesions gradually disappeared by about one month.

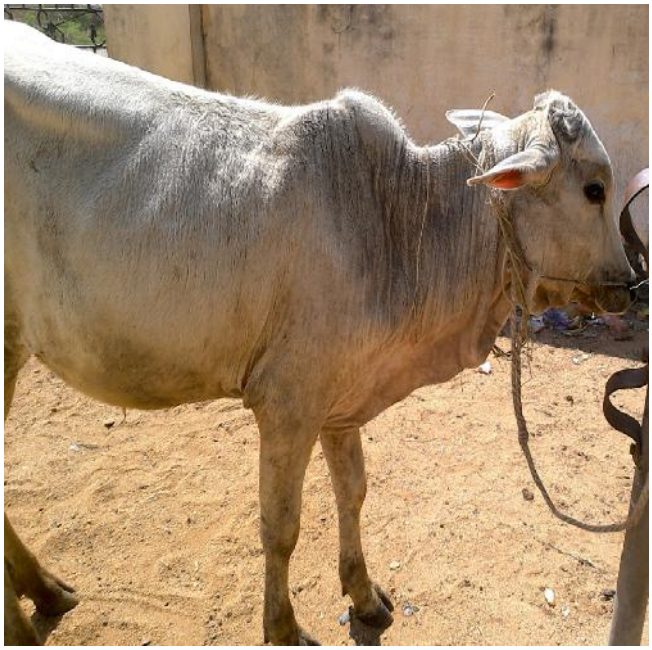

Fig. 1 Lateral view showing alopecia, emaciation and pimple like nodules at neck region

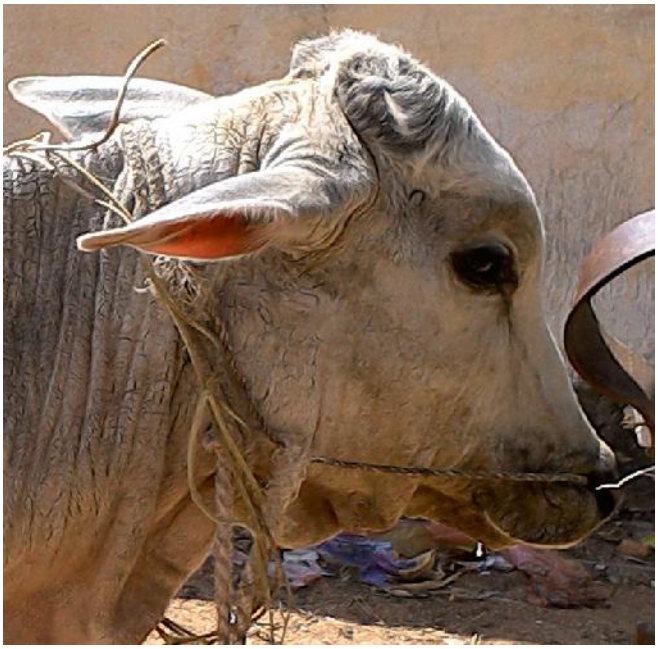

Fig. 2 Same animal showing rough and crusty hyperkeratotic lesions around muzzle.

According to Sastry and Rao (2001), in the animals with zinc deficiency the lesions are usually present on face, legs, perineum, inguinum, shoulder, ears and the hairs become sparse due to loss. Similar symptoms were also observed in the present study.

The zinc deficiency in young animals might be due to excess feeding of milk. Calcium and phosphorous inhibit the zinc absorption leading to zinc deficiency as reported by Sastry and Rao (2001).

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