

CLINICO-THERAPEUTIC MANAGEMENT OF KETOSIS IN GIR CATTLE

V.B. Vaja, N.B. Manvar*, P.G. Dodiya, J.S. Patel, Joice P. Joseph and B.R. Patel

Department of Veterinary Medicine

College of Veterinary Science and Animal Husbandry

Junagadh Agricultural University, Junagadh, Gujarat-362001

E-mail: dr.vijayvets@yahoo.com (*Corresponding Author)

Abstract: The present study was undertaken for clinico-therapeutic management of ketosis in 7 years old Gir female cattle. Having history of calving before one month, partially off feed for last one week, refuse to eat concentrate feed and typical vinegar like (sweetish) smell on breath, mild decreased rumen motility (1/3min.) and mucous coated faces passed were noticed. Clinical parameters of ketotic cattle (temperature, pulse, and heart and respiration rate) were revealed within the normal range except reduced ruminal motility. Urine analysis revealed positive for ketone body (150 mg/dl). Cow was treated with 25% dextrose, glucocorticoids (isoflupredone acetate), B-complex with liver extract and fluid therapy for four consecutive days. Cow recovered within three days of treatment without any complications. The present investigation suggest 25% Dextrose plus isoflupredone acetate along with B-complex vitamins was found more effective for rational therapy of ketosis in cattle.

Keywords: Ketosis, Ketone bodies, Gir cattle, Urine analysis.

Introduction

Ketosis is a major metabolic disorder caused by negative energy balance and characterized by relatively high concentration of ketone bodies (acetoacetate, beta-hydroxy butyrate and acetone) with a concurrent decrease in blood glucose level, decrease of dry matter intake around parturition, increase demands for glucose and insufficient propionate production during the early postpartum period could explain the occurrence of ketosis at post-partum period (Dann *et al.*, 2005). Ketosis could be result due to deprived feeding management practices, high energy requirement and lack of exercise in post partum period. Primary ketosis diagnosed based on the ketotic clinical signs viz. gradual loss of appetite, mucous coated faeces, sudden reduced milk yield and body weight, sweetish smell in breath, urine and milk, sub normal body temperature and decreased ruminal contraction examined the presence of ketone bodies in the urine of the animals by using Rothera's test and strip test (Carrier *et al.*, 2004). In absence of sufficient energy intake for high producing dairy cows requirement of glucose increases which causes mobilization of body fat, fat accumulation in

the liver and the rate of ketone body production and contributes to results in ketosis (Bendixen *et al.*, 1987). Similar clinical findings of ketosis were also reported by Radostits *et al.* (2001) and Asrat *et al.* (2013). High incidence of clinical and subclinical ketosis causes economic loss to the dairy farmers due to loss of milk production as well as sharp drop in the SNF content of milk and failure of affected animals to return to normal production after recovery (Radostits *et al.*, 2007).

Glucose administration either parentally or orally in combination with gluconeogenic precursors fortified with B-complex vitamins, insulin, sodium bicarbonate and isoflupredone acetate gave excellent recovery rate (Dar *et al.*, 2014). Among the different treatment 25% dextrose administered cows restore their original milk yield within 12 hours (Banerjee, 1992). The decreased glucose level before treatment was found in all ketotic bovine animals (Ambore *et al.*, 2001). The low level of blood glucose in ketotic cattle could be attributed to negative energy balance reflecting the greater demand of glucose in the mammary gland (Anantwar and Singh, 1993). Present paper reports therapeutic regimen in the management of ketosis in Gir cattle. Isoflupred one acetate (glucocorticoid) in therapy which increases blood glucose level within 24 hours by increasing the availability of gluconeogenic amino acids from increased protein mobilization and the faster elimination of ketone bodies from the blood within 24-48 hours of treatment with 75% animals recovering after single therapy due to more sustained response.

Materials and Methods

The study was conducted in Department of Veterinary Medicine, College of Veterinary Sciences, Junagadh Agricultural University, Junagadh-362001, Gujarat. A complete history of diseased animals with regard to age, lactation chronology, stage of lactation, and milk yield was obtained from the animal owners or handlers. Urine and blood samples were collected pre treatment. Urine sample was collected in wide mouth sterile vial after massaging the perineal region of the ketotic animals. Complete clinical examination of the suspected animals was made which included rectal temperature, pulse rate, respiration rate, colour of mucous membrane and ruminal movements. For confirmation of diagnosis, Gir cow was subjected to quantitative urine analysis (strip test) in automatic urine analyzer (fusion tek, Idexx. UA*strip) for the presence of ketone bodies (Fig. 2). A Gir cattle was positive reaction for ketone bodies in urine (Fig.3).

Procedure of urine analysis

The reagent areas strip were immersed completely in freshly collected urine and the strip was removed immediately. The strip was held in horizontal position to prevent possible mixing of chemicals from adjacent reagent areas. After dipping, the reagent areas on the strip were put into the automatic urine analyzer for 60 seconds and results were noted. The ketone body detected in urine by using reagent strips was acetoacetic acid but not acetone and beta-hydroxybutyrate (Fig.1).

After clinical examination and confirmation of diagnosis blood sample was collected from jugular vein of ketotic animal in a new sterile syringe with the help of 18 or 16 gauge needles pre treatment and immediately transferred into the K₃EDTA (ethylene-diamine tetra-acetate) vacutainer for the estimation of various hematological parameters. Haematological parameters viz. Hb, PCV, TEC, TLC and DLC were analyzed by using automatic blood analyzer Machine-Abacus ABJ Vet-5, (company-Junior vet 5) (Jain, 1986 and Sahinduran *et al.*, 2010).



Fig.1- urine analysis, **Fig.2-**urine strip in urine analyzer and **Fig.3-**Pre-treatment urine ketone (mg/dl) level in ketotic cattle

Results and Discussion

A 7 years old Gir female cattle having history of calving before one month, partially off feed for last one week, refuse to eat concentrate feed and typical vinegar like (sweetish) smell on breath, mild decreased rumen motility (1/3min.) and mucous coated faces passed were noticed. They were in third lactation numbers, parturated one month back and suspected to be suffering from ketosis. The urine sample was tested in urine analyzer (strip test) and revealed positive for ketone bodies.

Clinical examination revealed almost normal ranges rectal temperature (101.3 °F), slightly elevated pulse (62/min) and respiratory (29/min) rates, pulse (58/min) rate and except reduced ruminal movements (1-3/min). A characteristic sweetish odour was also detected in the breath, milk and urine in most of the cases (Swain and Tripathy, 1987). The findings of present case study revealed no significant ($P < 0.05$) differences in the haematological parameters like Hb, PCV, TEC and TLC. However, there was significant decrease in neutrophils (neutropenia) and increase lymphocyte count (lymphocytosis) in the ketotic cattle. The present findings are in agreement with findings of Benjamin (1978), Singh and Kasaralika (1988), Blood and Radostits (1989) and Rautmare (1987) who recorded neutropenia and lymphocytosis as the main haematological changes found in ketotic buffaloes. The findings of the present study aren't in accordance with the findings of Ahuja (2003), Shridhar (2009), Elitok *et al.* (2010), Sahinduran *et al.* (2010) and Reddy *et al.* (2014) who reported that there was no significant change in haematological parameters of ketotic cows when compared to the normal healthy cows.

Ketosis is a metabolic production disease in which there is increase the concentration of ketone bodies. The cortisol is also considered as stress hormone and is responsible for relative decrease in neutrophils as well as increase in lymphocytes count. In the present study neutropenia and lymphocytosis were found which might be due to increase the level of cortisol in blood (adrenal cortical insufficiency) as reported by Benjamin (1978). The low level of blood glucose in ketotic cattle could be attributed to the negative energy balance reflecting greater demand of glucose in the mammary gland (Anantwar and Singh, 1993). In ruminants glucose is synthesized from propionic acid and fulfills the requirement of glucose.

Recovery in ketotic animal could be due to additional glucocorticoid (dexamethasone) therapy which increases blood glucose level within 24 hr by increasing the availability of gluconeogenic amino acids from increased protein mobilization (Odedra *et al.*, 1980). In addition, glucocorticoids accompanied by temporarily depression in milk yield, which may contribute to the recovery rate (Radostits *et al.*, 2001). From this study, it can be concluded that glucocorticoids (isoflud) association with either parenterally or orally glucose (25% dextrose) and along with B-complex vitamins give excellent recovery rate in bovine ketosis.

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