EFFECT OF HORMONAL AND HERBAL THERAPIES ON POSTPARTUM PLASMA PROFILE OF GLUCOSE AND TOTAL PROTEIN IN HOLSTEIN FRIESIAN COWS

B.B. PATEL[1], D.M. PATEL[2] AND J.A. PATEL[3@]
College of Veterinary Science & Animal Husbandry
Anand Agricultural University, Anand, Gujarat 388 001, India

Twenty-eight freshly calved HF cows of University farm were monitored through clinical diagnosis and fortnightly plasma profile of glucose and total protein from the day of calving till 75 days postpartum. Blood glucose and protein status was also studied at 6 and 24 h postpartum in all the animals. The animals were randomly and equally divided into four groups, each of seven animals. Group I served as Control; Group II included $PGF_{2\alpha}$ 500 µg (Iliren) i/m alone and Group III $PGF_{2\alpha}$ 500 µg (Iliren) plus Oxytocin 50 units i/m immediately after parturition, while Group IV was treated with intra-uterine infusion of herbal ecbolic (Vantab) at weekly interval thrice. The regression of pregnancy CL, uterine involution, first and fertile estrus postpartum were significantly earlier/shorter in PG treated than the herbal treated and control group. The overall mean plasma glucose and total protein concentrations were 57.79 Ø 0.50 (range 50 to 67) mg/dl and 7.25 Ø 0.05 (range 6.65 to 7.87) g/dl, respectively. The differences between groups were highly significant ($P<0.01$) for plasma glucose profile only, while differences between periods were highly significant ($P<0.01$) for both glucose and protein. The values of glucose declined significantly within 24 hrs of calving, which further declined to the lowest level around day 15-30 postpartum and then again rose steadily till 60-75 days postpartum. Plasma protein levels were also significantly low around day 15-30 postpartum as compared to other periods of study. These changes were associated with stress of calving, lactation and uterine involution.

Key words: Holstein Friesian cows, Hormone therapy, Plasma glucose, Plasma protein, Postpartum period.

INTRODUCTION

For economic dairy farming, exotic dairy cows should calve regularly at every 12-13 months interval. To achieve this goal, animals with longer postpartum estrus interval need to be identified and managed in time. Blood plasma profile of certain metabolites is a potential aid in characterizing nutritional status and reproductive problems in bovines (Larson et al., 1980). Cows loosing body weight and undergoing negative energy balance postpartum usually suffer from prolonged anoestrus or sub-fertility condition leading to extended calving interval (Roche and Diskin, 2000). Prostaglandins during early postpartum period improve the reproductive efficiency in dairy animals (Narsimha Rao, 1991; Kozicki et al., 1996; Patel and Dhami, 2006), and hence is of valuable aid in reproductive herd health management. Several reports are available on peripartum monitoring of blood glucose and total protein in zebu cows (Patil and Deshpande, 1979; Setia et al., 1992) and even in exotic cows from abroad (Tegegne et al., 1993; Butler et al., 2000). The present study was designed to evaluate the effect of hormonal and herbal therapies on postpartum protein and glucose profile in HF cows.

[1]Veterinary Officer, Veterinary Dispensary, Sojitra, District Anand, Gujarat.
@Corresponding author: E-mail: japatel@aau.in
[2]Professor and Head, TVCC,
[3]Associate Professor, ARGO.

MATERIALS AND METHODS

This study was carried out from calving till 75 day postpartum on 28 healthy HF cows managed under routine feeding and housing protocol of University farm at Anand. The animals as and when calved normally were selected for this study over one year period. The animals were randomly divided into four groups each having seven animals. The four groups were: Group I served as Control, while Group II was treated with $PGF_{2\alpha}$ 500 µg (Iliren) alone and Group III with $PGF_{2\alpha}$ 500 µg plus Oxytocin 50 units i/m immediately after parturition, and Group IV was given intra-uterine infusions of Herbal ecbolic (Vantab) at weekly interval thrice postpartum.

Jugular blood samples were collected in heparinized vaccutainers at 0, 6 and 24 hr, and on day 15, 30, 45, 60 and 75 postpartum. Blood plasma was separated out immediately after collection. Two aliquots from each sample were made and stored at ¬20°C till analyzed. A drop of 0.01 % sodium merthiolate solution (Thiomersal) was added as preservative. The estimations of the concentrations of plasma glucose and total protein were done using standard assay kits and an autoanalyzer. The data were analyzed statistically using 2 factors« factorial completely randomized design (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The periods for regression of pregnancy CL, uterine involution, first estrus postpartum and days open were significantly shorter in PG treated group II and III as compared to herbal treated group IV and control group I. The details of these puerperal events together with changes in plasma progesterone profile have been reported earlier (Patel et al., 2013).

The fortnightly mean plasma glucose levels from day of parturition (0 day) to day 75 postpartum varied significantly from 52.25 Ø 1.19 to 63.25 Ø 1.32 mg/dl with an overall pooled mean of 57.79 Ø 0.50 mg/dl in HF cows. The difference between groups was also highly significant ($P<0.01$). The pooled mean plasma glucose level was significantly higher in group-III (60.48 Ø 1.09 mg/dl) when compared to the group-I, II and IV (i.e. 55.94 Ø 0.87, 57.10 Ø 0.90, 57.64 Ø 1.07 mg/dl, respectively). Low levels of plasma glucose concentrations were observed in control group than in various treatment groups. The plasma glucose concentration on the day of parturition (0 day) was higher in all the groups, which declined significantly within 24 hrs and further declined to lowest level by day 15-30 postpartum and then a rising trend was noted till day 75 postpartum in most groups.

In the present study, the plasma glucose concentrations recorded in treatment and control groups were within normal physiological range. The mean plasma glucose concentrations were slightly higher in treatment groups than control group under the present study. A significant drop in plasma glucose occurred within 24 h of parturition, which further continued to decline till day 15, remained low until day 30 and then showed a rising profile till day 60-75 postpartum. This significant drop noted immediate postpartum could be due to stress of calving and initiation of lactation that further drained the energy during involution phase. Further, it was observed that cows of group-II and group-III (PG treated) showed relatively higher plasma glucose concentration. Decline in concentration of glucose levels up to 1 month postpartum has also been documented earlier by Dhoble and Gupta (1981). Ghosh et al. (1991) reported sudden fall in blood glucose levels one week after parturition in Jersey x Holstein cows. The blood glucose level gives an indication of the energy status of an animal. Oxenreider and Wagner (1971) found that both energy intake and lactation had a significant effect on plasma glucose levels during the first 8 weeks postpartum in cows. According to Butler et al. (2000) negative energy balance leading to low blood glucose concentration delays the time of first ovulation postpartum through inhibition of LH pulse frequency. Downie and Gelman (1976) also reported that when the body weight and plasma glucose levels were found decreasing with lowered dietary intake, the cows were infertile, and when the body weight

was falling but plasma glucose was rising the cows had normal fertility in beef cows.

The fortnightly average plasma total protein levels also varied significantly between 6.90 Ø 0.14 and 7.70 Ø 0.15 g/dl with an overall pooled mean of 7.25 Ø 0.05 g/dl in HF cows under study. Statistically, there was no significant difference between groups for this trait, but the differences were significant ($P<0.05$) between the periods. Like glucose, the values of protein on the day of parturition (0 day) were found higher in all the groups and then a declining trend was seen with the lowest values around day 15 to 30 postpartum and then rising trend till day 75 postpartum (Table 2). This drop could be associated with lochial discharge, process of uterine involution and lactation.

The mean level of total protein was slightly higher in group-III (PG + Oxytocin treated) as compared to other three groups. The total protein levels recorded in the study were slightly higher in the treatment groups than the control group, but were within the normal range. These findings were in accordance with the observation made by Jain and Pandita (1995) and Lakum (2004). The findings on trend and levels of protein observed in the present study were comparable with the report of Jordon and Swanson (1979), who documented a linear decrease in serum total protein levels in non-suckled dairy cows from day four to forth week postpartum. Protein being the building block of the body, lack or insufficient protein intake has been regarded as one of the causes of failure of or delay in resumption of estrous cycle, mainly due to retarded synthesis of sex hormones (Roberts 1971). However, Morrow (1977) opined that protein deficiency is not much important in relation to reproduction.

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