STUDIES ON BLOOD GLUCOSE, TOTAL PROTEINS, UREA AND CHOLESTEROL LEVELS IN CYCLIC, NON-CYCLIC AND ENDOMETRITIC CROSSBRED COWS

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ABSTRACT

Seventy-five crossbred cows kept at the Livestock Experimental Station, Qadirabad, District Sahiwal were divided into three equal groups i.e. cyclic, non cyclic and endometritic. Blood samples were collected from all the experimental animals, serum was separated and stored at –20°C until assayed for glucose (g/dl), total protein (g/dl), urea (mg/dl) and cholesterol (mg/dl). The results revealed significantly ($P<0.05$) higher values of glucose (58.08 ± 2.59) and cholesterol (290.72 ± 15.95) in endometritic cows as compared to cyclic (50.72 ± 1.12, 199.12 ± 9.38) and non-cyclic cows (50.56 ± 1.12, 202.96 ± 14.84). Total protein level differed significantly ($P<0.05$) among cows of all the three groups, being highest in endometritic (19.16 ± 1.00), followed by non cyclic (15.23 ± 0.89) and lowest in cyclic (9.19 ± 0.45) cows. However, serum level of urea did not differ in cyclic (30.88 ± 2.42), non cyclic (33.80 ± 3.43) and endometritic (37.12 ± 3.45) animals, although highest value was recorded in endometritic animals.

Key words: Blood, biochemical constitutents, cows, cyclic, non cyclic, endometritic.

INTRODUCTION

The breeding efficiency of dairy cows is lowered by a number of reproductive disorders like endometritis, an-oestrus and repeat breeding, affecting adversely the productive and reproductive performance of cows, and resulting in great economic losses to dairy farmers (Dutta *et al.*, 1988). The basic causes of the reproductive problems in a herd are multiple and include managemental, nutritional and pathological factors.

The findings of many authors (El-Azab *et al*., 1993; Balakrishnan and Balagopal, 1994; Qureshi, 1998) suggest that normal blood levels of various biochemical constituent are indispensable for normal function of various systems of body including reproductive system. Changes in various biochemical constituents have been blamed for reproductive failures. Thus, serum biochemical profile might be a potential aid in characterizing these problems. Blood glucose appears to be one of the key nutrients affecting cyclicity in farm animals and a minimum level of 60-40mg/ml is required to maintain the physiological processes of the body (Duke, 1970). According to Dowine and Gelman (1976), low blood glucose may be associated with infertility. Nadiu and Rao (1982) and Dutta *et al.* (1988) reported significantly lower serum glucose level in an-oestrus than normally cycling animals.

El.Azab *et al*. (1993) reported significantly higher serum protein in cyclic cows than the non cycling one's. However, Tegegne *et al*. (1993) found inconsistent trend. Qureshi (1998) reported higher blood urea level in an-oestrus animals than those resuming cyclicity within 45 days postpartum. Burle *et al*. (1995) reported lowest serum concentration of cholesterol in an-oestrus than in cycling cows. Greatly variable reports were available on the level of these biochemical constituents, hence the present study was planned to assess the levels of selected biochemical constituents in cyclic, non-cyclic and endometritic crossbred cows.

MATERIALS AND METHODS

The study was conducted at the Livestock Experimental Station (LES) Qadirabad, District Sahiwal, Pakistan. Twenty five animals each for three groups i.e., cyclic, non-cyclic and endometritic were selected. The animals with a corpus luteum (CL) on one of the ovaries were considered as cyclic animals, while cows having no functional CL were included in non cyclic group. The animals having thick uterus and

containing pus in the oestrul mucus were placed in endometritic group

Blood samples were collected by jugular veinipuncture; serum was separated and stored at –20°C until analyzed. Serum glucose, urea, cholesterol and total proteins were determined spectrophotometrically according to the methods described by Braham and Trinder, (1972), Merck (1974), Allain *et al.* (1974) and Doumas *et al.* (1981), respectively.

The data were analyzed statistically using one way analysis of variance technique (Steel and Torrie, 1980). Significant means were compared by Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Serum biochemical constituents (mean ± SE) in cyclic, non cyclic and endometritic crossbred cows are given in Table 1. Mean concentrations of serum glucose in cyclic, non-cyclic and endometritic cows were 50.72 ± 1.12, 50.56 ± 1.13 and 58.08 ± 2.59 g/dL, respectively. The results clearly indicate that serum glucose level of endometritic cows was significantly ($P<0.01$) higher than cyclic and non-cyclic animals. Majeed *et al.* (1990) recorded higher serum glucose level in endometritic animals than healthy ones. Increased blood glucose level in endometritic animals may result from either an imbalance between hepatic output and peripheral uptake of the sugar or disturbances in the endocrine regulatory mechanisms which influence these processes. Abnormal functioning of hormone producing organs may influence glucose levels (Coles, 1986). Increased activity of the anterior pituitary, adrenal cortex and thyroid may result in increased blood glucose level. Mechanism by which hyperpitutarism resulted is incompletely understood; however it may be related to increased production of adrenocorticotrophic hormones (Coles, 1986).

Total protein level was significantly higher ($P<0.05$) in endometritic (19.16 ± 1.00 g/dL) cows as compared to cyclic (9.19 ± 0.45 g/dL) and non-cyclic (15.23 ± 0.89 g/dL) cows. The level in non cyclic cows was significantly ($P<0.05$)) higher than that of cyclic animals. Majeed *et al.* (1990) and Lyubetsky (1997) reported higher values of total serum protein in endometritic buffaloes and cows compared to cyclic buffaloes and cows, respectively. However, Burle *et al.* (1995) reported significantly higher value of total serum protein in cyclic cows. The variation could be due to differences in breeds, environment and level of nutrition. In agreement to the findings of the present study, higher level of total serum protein was associated with low fertility, as reported by Hewett (1974). Excessive intake of protein in the feed can reduce fertility and increase the number of service per conception. Fertility is impaired more by feeding excessive protein to older cows. The mechanism by which high level of protein adversely affects reproduction in dairy cows is unknown (Randel, 1990).

No significant difference in concentration of urea in cyclic (30.88 ± 2.42 mg/dL), non-cyclic (33.80 ± 3.45 mg/dL) and endometritic (37.12 ± 3.45 mg/dL) cows was observed in the present study. The values observed in endometritic cows were apparently higher but not significantly different. Zaman *et al.* (1985) and Majeed *et al.* (1990) also observed non significant ($P<0.05$) difference in blood urea among cyclic, non cyclic and endometritic animals.

Serum cholesterol level was found to be significantly ($P<0.05$) higher in endometritic (290.72 ± 15.95 mg/dL) as compared to cyclic (199.12 ± 9.38mg/dL) and non-cyclic (202.96 ± 14.84 mg/dL) cows. However, the difference between cyclic and non cyclic animals was non significant. Similarly, Zaman *et al.* (1985) reported a non significant difference in levels of plasma cholesterol of cyclic and non-cyclic

Table 1: Serum biochemical constituents (mean ± SE) in cyclic, non-cyclic and endometritic crossbred cows

Parameters	Cyclic cows	Non-cyclic cows	Endometritic cows
Glucose (g/dL)	50.72 ± 1.12 ^{b}	50.56 ± 1.13 ^{b}	58.08 ± 2.59 ^{a}
Total protein (g/dL)	9.19 ± 0.45 ^{c}	15.23 ± 0.89 ^{b}	19.16 ± 1.00 ^{a}
Urea (mg/dL)	30.88 ± 2.42 ^{a}	33.80 ± 3.45 ^{a}	37.12 ± 3.45 ^{a}
Cholesterol (mg/dL)	199.12 ± 9.38 ^{b}	202.96 ± 14.84 ^{b}	290.72 ± 15.95 ^{a}

Values with different superscripts in a row differ significantly ($P<0.05$).

buffaloes. Majeed *et al*. (1990) found a non significant difference in serum cholesterol level between endometritic and healthy buffaloes.

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Blood glucose levels change throughout the day. After eating, levels rise and then settle after about an hour. They are at their lowest point before the first meal of the day.Â Insulin is a protein that makes cells ready to receive glucose. The cells would starve without enough insulin, or if they become too resistant to its effects. After people eat, blood sugar concentrations increase. The pancreas releases insulin automatically to move glucose from the blood to the cells.Â People use blood glucose monitoring to regularly test glucose levels in the blood. It is an essential part of effective diabetes control. Many people with diabetes must check several times each day to plan for activities and meals, as well as scheduling doses of medication or insulin. Serum glucose, urea, cholesterol and total proteins were determined spectrophotometrically according to the methods described by Braham and Trinder, (1972), Merck (1974), Allain et al. (1974) and Doumas et al. (1981), respectively.Â Serum biochemical constituents (mean Â± SE) in cyclic, non cyclic and endometritic crossbred cows are given in Table 1. Mean concentrations of serum glucose in cyclic, non-cyclic and endometritic cows were 50.72 Â± 1.12, 50.56 Â± 1.13 and 58.08 Â± 2.59 g/dL, respectively. The results clearly indicate that serum glucose level of endometritic cows was significantly (P<0.01) higher than cyclic and non-cyclic animals. Majeed et al. (1990) recorded higher serum glucose level in endometritic animals than healthy ones. Cholesterol is carried through your blood, attached to proteins. This combination of proteins and cholesterol is called a lipoprotein. There are different types of cholesterol, based on what the lipoprotein carries. They are: Low-density lipoprotein (LDL). LDL, or "bad" cholesterol, transports cholesterol particles throughout your body. LDL cholesterol builds up in the walls of your arteries, making them hard and narrow.Â Factors you can control â€” such as inactivity, obesity and an unhealthy diet â€” contribute to high cholesterol and low HDL cholesterol. Factors beyond your control might play a role, too. For example, your genetic makeup might keep cells from removing LDL cholesterol from your blood efficiently or cause your liver to produce too much cholesterol.