STUDIES ON CHANGES IN HEMATO-BIOCHEMICAL AND ENZYMATIC PROFILE IN POSTPARTUM ANESTRUS MURRAH BUFFALOES WITH HORMONAL PROTOCOLS

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ABSTRACT

Twenty four anestrus postpartum Murrah buffaloes were randomly selected and equally divided into four groups. Animals were subjected to treatment with CIDR implant + $PGF_2\alpha$ (Lutalyse), Hydroxyprogesterone + $PGF_2\alpha$ (Lutalyse), Buseralin (Receptal) in group I, II and III respectively. The values of Hemoglobin (Hb), Packed cell volume (PCV) and Erythrocyte Sedimentation Rate (ESR) were significantly lower ($P<0.05$) on day of treatment compared to day of estrus in Group I, II and III. The levels of total proteins, Hb, Cholesterol and Blood-glucose increased significantly ($P<0.01$) in Group I, II and III. The levels of PCV, ESR, albumin, SGPT and SGOT also increased significantly ($P<0.05$) in Group I, II and III. The value of globulin and A/G ratio increased non-significantly ($P>0.05$) on day of estrus.

Keywords: anestrus buffalo, hemato-biochemical and enzymatic profile, hormone

INTRODUCTION

Anoestrus is most prevalent form of infertility encountered in buffaloes and is the most frustrating and challenging problem. Several treatments have been attempted to treat the prolonged postpartum anestrus in buffaloes by using hormonal treatments such as Gonadotropin Releasing Hormone (GnRH), Gonadotropins (Gn), Estrogen, $PGF_{2\alpha}$ and Progesterone (Metwelly, 2006). Hemato-biochemical and enzymatic profiles are important in diagnosis of healthy and diseased conditions of the animals. The blood picture may vary in normal cycling and anoestrus animals. Reduced haemoglobin concentrations were observed in anoestrus buffaloes as compared to normal cyclic buffaloes (Kumar *et al*., 1991). Cholesterol acts as precursor of steroid hormones and its level can indicate circulatory adequacy of these hormones responsible for normal oestrus (Ramakrishna, 1997). This experiment was planned to study the hemato-biochemical and enzymatic status of animal which may help in understanding the anestrus condition in Murrah buffalo.

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MATERIALS AND METHODS

Twenty four anestrus postpartum Murrah buffaloes (over 90 days) located in different villages of R.S. Pura region of Jammu district were randomly selected and equally divided into four groups. Animals were subjected to treatment with CIDR implant+$PGF_2\alpha$ (Lutalyse), Hydroxyprogesterone (P-Depot) + $PGF_2\alpha$ (Lutalyse), Buseralin (Receptal) administration and control as group I, II, III and IV respectively. In group I, animals were subjected to treatment with CIDR implant on day 0, followed by administration of PGF2α (Lutalyse) 25 mg i.m on the day of removal of CIDR on day 7. In group II, animals were subjected to treatment with Hydroxyprogesterone (P-Depot) 500 mg intramuscularly on Day 0, 4 and 7 and 25 mg PGF2α (Lutalyse) was administered on Day 7 only. While in group III, animals were treated with Buseralin (Receptal) 20 µg intramuscularly on Day 0 and animals of Group IV were not given any treatment and served as control. About 10ml blood was collected in clean, dry test tubes containing Ethylene Diamine Tetra Acetic acid (EDTA) as anticoagulant for haematological studies. For biochemical and enzymatic profile 10ml blood was collected in clean, dry test tubes and serum was separated for estimation on the day of beginning of treatment and day of induced estrus by using biochemical kits.

RESULTS AND DISCUSSION

The Hb concentration was lower on the day of treatment and increased significantly ($P<0.01$) on the day of estrus in Group I, II and III (Table I). Similar, results were obtained by Rathour *et al*. (2005b) and Narnaware and Sirothia (2010). The low level of Hb indicates long term protein deficiency and influences tissue oxygenation of reproductive tract which in turn affects the cyclicity (Ramakrishna, 1997). Lack of sufficient quantities of Hb in blood is responsible for reduced oxygen transport to the vital tissues, causes reduced oxidation of nutrients, which in turn affects the whole cellular metabolism in gonadal cells which is metabolically more active (Swenson and Reece, 1993).

The mean values of PCV were lower on the day of treatment and increased significantly ($P<0.05$) on the day of estrus in Group I, II and III (Table I). These findings were in agreement with the earlier reports of Narnaware and Sirothia (2010). However, Ahmad *et al*. (2003) reported non-significant lower values in non-cyclic cows than cyclic cows.The values of ESR were lower on the day of treatment and increased significantly ($P<0.05$) on the day of estrus in Group I, II and III (Table 1) which were in concurrence with Ahmad *et al*. (2003). On the contrary, the present findings differ from the findings of Rathour *et al*. (2005b) who reported higher values of ESR in anestrus as compared to estrus animals.

The mean plasma total protein, albumin, globulin, cholesterol, levels (Mean±SE) in anestrus and induced estrus buffaloes on day of treatment and day of estrus are given in Table I. The levels of total proteins increased significantly ($P<0.01$) in anestrus buffaloes on the day of estrus than on the day of treatment in Group I, II and III. Similar, results were also reported by Singh *et al*. (2005) and Akhtar *et al*. (2010). Kumar *et al.* (2010) also reported significantly higher level of total protein in cyclic than anestrus buffaloes. However, Narnaware and Sirothia (2010) did not find any change in the levels of total proteins in cyclic and anestrus buffaloes. Deficiency of protein (hypoproteinemia)

retards the development of sex organs and body growth in young animals and affects the subsequent reproductive performance. Low levels of serum proteins may lead to deficiency of certain amino acids that are required for gonadotropin synthesis thereby impairing the reproduction (Vhora *et al*., 1995).

The mean albumin levels were significantly (P<0.05) increased on the day of estrus from the day of treatment in Group I, II and III. These finding was in accordance with the report of Singh *et al*. (2005) while Narnaware and Sirothia (2010) reported non-significant increase in the values of albumin in cyclic than anestrus buffaloes.The mean globulin levels increased non-significantly (P>0.05) in Group I, II and III on the day of estrus from the day of treatment. These findings were in agreement with Singh *et al*. (2005), who also reported non-significant increase in the levels of globulin on the day of estrus. On the contrary, Singh and Singh (2006) in anestrus heifers reported significant decrease in the values of globulin as compared to estrus heifers.

The mean A/G ratio was lower on the day of treatment and increased non-significantly (P>0.05) in Group I, II and III on the day of estrus .These findings are in collaboration with Singh and Singh (2006) in heifers who reported low A/G ratio in anestrus than heifers at estrus.

The mean cholesterol level was significantly (P>0.01) higher on the day of estrus as compared to the day of treatment in Group I, II and III. Comparable results were reported by Akhtar *et al*. (2010) while Narnaware and Sirothia (2010) reported non-significant increase in the values of cholesterol. On the contrary, Shrivastava and Kharche (1986) observed higher cholesterol level in anestrus buffaloes which declined at estrus. This increased level of cholesterol at estrus may be due to withdrawal of stored tissue cholesterol in the blood for estradiol 17-β synthesis (Honnappagol and Patil, 1991).

The mean blood glucose levels were significantly (P<0.01) higher on the day of estrus than on the day of treatment in Group I, II and III (Table 1). Similar, results were obtained by Akhtar *et al.* (2010), however, Chandolia and Verma (1987) did not find any significant difference in the values of glucose in anestrus animals on the day of estrus. Arthur *et al.* (1989) reported that pituitary function appears to be adversely influenced by lower glucose levels. Glucose appears to be necessary for reproductive function because the metabolic inhibitor, 2-deoxy-D-glucose, prevents occurrence of estrus and formation of corpora lutea (McClure *et al*., 1978). The mean SGPT concentration was lower on the day of treatment and increased significantly (P<0.05) on the day of estrus in Group I, II and III (Table 2). Similar, results were obtained by Das *et al*. (2005) and Singh and Singh (2006) in heifers. The mean SGOT concentration was lower on the day of treatment and increased significantly (P<0.05) on the day of estrus. Similar results were observed by Paul *et al*. (1991) in cows and Das *et al*. (2005) in heifers. On the other hand, Singh and Singh (2006) reported significantly higher values of SGOT in anestrus heifers. Hormonal imbalance and deranged enzymatic activity affect the normal reproductive behavior of the animal and cause physiological alterations (Paul *et al*., 1991). The alterations of the different serum enzymatic activities are indicatives of physiological activity of the tissues (Das *et al*., 2005). In this study, the reduced activities of these (SGPT and SGOT) serum enzyme activities might be due to reduced physiological activities of reproductive organ in anestrus animal.

Table 1. Effect of various treatments on Heamato-biochemical attributes in post-partum anestrus buffaloes.

Attributes	Group I		Group II		Group III		Group IV	
	Day of Treatment	Day of Estrus	Day of Treatment	Day of Estrus	Day of Treatment	Day of Estrus	Day of Treatment	Day of Estrus
Hemoglobin (g/dl)	8.86±0.84	9.81±0.94**	9.60±0.78	10.40±0.81**	8.80±0.76	9.62±0.98**	8.98±0.55	None of the animal came to estrus
PCV (%)	31.35±0.77	35.28±0.77*	30.27±1.91	34.00±1.68*	29.80±0.95	32.45±0.61*	28.70±1.46	
ESR (mm/h)	2.50±0.34	3.50±0.22*	2.75±0.48	4.00±0.41*	2.25±0.25	3.50±0.29*	3.00±0.51	
Total protein (g/dl)	7.49±0.63	8.35±0.63**	7.98±0.22	8.80±0.18**	6.61±0.45	7.50±0.39**	7.28±0.36	
Albumin (g/dl)	3.38±0.22	4.21±0.35*	3.91±0.55	4.59±0.35*	3.32±0.50	4.07±0.39*	3.29±0.18	
Globulin (g/dl)	4.11±0.62	4.14±0.40^{NS}	4.07±0.69	4.20±0.47^{NS}	3.28±0.63	3.42±0.65^{NS}	3.99±0.43	
A/G ratio	0.86±0.12	1.04±0.11^{NS}	1.12±0.32	1.15±0.21^{NS}	1.22±0.44	1.39±0.39^{NS}	0.90±0.16	
Cholesterol (mg/dl)	107.27±4.21	123.34±5.29**	105.29±4.92	124.03±6.14**	93.91±5.59	112.00±5.07**	111.36±8.52	
Glucose (mg/dl)	54.98±5.63	58.94±5.63**	55.28±3.36	59.21±3.55**	52.25±3.24	55.76±4.83**	53.95±4.35	

** Means within a row differ significantly (P<0.01).

* Means within a row differ significantly (P<0.05).

^{NS} Means within a row do not differ significantly (P>0.05).

Table 2. Effect of various treatments on enzymatic attributes in post-partum anestrus buffaloes.

Attributes	Group I		Group II		Group III		Group IV	
	Day of Treatment	Day of Estrus	Day of Treatment	Day of Estrus	Day of Treatment	Day of Estrus	Day of Treatment	Day of Estrus
SGPT (I.U./L)	54.73±4.58	59.29±4.99*	47.88±1.58	50.80±1.13*	53.07±4.57	60.52±4.78*	58.78±1.94	None of the animal came to estrus
SGOT (I.U./L)	125.69±3.14	131.21±4.66*	140.39±2.38	143.62±2.88*	129.25±2.22	137.91±2.19*	136.74±4.73	

* Means within a row differ significantly (P<0.05).

CONCLUSION

In this experiment, hemato-biochemical and enzymatic profile were studied and their status in response to hormonal treatment in postpartum anestrus buffaloes correlated. It is concluded that levels of hemoglobin, PCV and ESR, total protein, albumin, SGOT, SGPT, cholesterol and blood-glucose increased on the day of induced estrus in post-partum anestrus buffaloes and their concentration could be_responsible for anestrus condition in field buffaloes. While the values of Globulin and A/G ratio did not show any significant changes.

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