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Sustained Luteal Function Following Treatment with Bovine Somatotropin in Pregnant Camels

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Abstract: Intramuscular administration of buserlin at a dose of 20 mg to camels caused estrus in all animals 3 days after injection. Significant increase in the concentration of progesterone occurred in these animals compared to those treated with saline. But the corpora lutea formed were short lived. Subcutaneous injection of somatotropin at a dose of 25 mg in these animals, caused sustained luteal function. It is concluded that one way to overcome luteal failure in camel is to administer somatotropin.

Key words: Intramuscular, progesterone, somattoropin

INTRODUCTION

The camel is a reflex ovulator with a follicular type of estrous cycle and mating is necessary for ovulation and corpus luteum formation[1,2]. Neuroendocrine events triggered by mating are channeled through a hypothalamic-preoptic pituitary-ovarian system controlling both a tonic operation, possibly responsible for continuous follicular development and the transient events leading to ovulation. Gonadotrophin Releasing Hormone(GnRH) is believed to play a pivotal role in transforming the diverse sensory and neuroendocrine chemical signals into the preovulatory Luteinizing Hormone (LH) surge[3].

Treatment of female camels with GnRH resulted in increased LH and progesterone secretion[2]. The corpus luteum formed was only short lived. Similar findings have been reported by Elias *et al*.,[4] after induction of ovulation with PMSG in camels and after ovulation induction with GnRH during seasonal anestrus in ewes[5].

Numerous stimulatory actions of bovine Somatotropin (bST) are found within the ovary of cow. For example, increase in weight of corpus luteum and progesterone concentration[6]. The objective of this study was to determine the possible action of bST on corpus luteum function in non pregnant camel.

MATERIALS AND METHODS

Animals and treatments: Ten mature (4-5 years) female camels were kept in outdoor pens at King Faisal Camel Research Center during the breeding season. They were given hay and water ad libitum. Rectal palpation was perfumed daily as described by Homeida[2]. All animals received intramuscular injection of 20 mg GnRH analogue, buserelin (Receptal; Hoechst Animal Health, Milton Keynes, UK). When animals were in estrus, they were then divided into two groups. Group 1 (5 animals) received 25 ml saline (control group). Group 2 (5 animals) received daily subcutaneous injection of 25 mg bST (Sometribore; recombinant-derived bovine s omatotropin in 25 ml saline , Mosanto Co, St louis, Mo, USA). Both injections of bST were given 5 days after buserelin treatment and continued for 5 days thereafter show in Table 1.

Collection of blood samples: Jugular vein blood was taken daily during the treatment period. Blood was obtained by venipuncture and collected in heparinized syringes, chilled on ice and immediately centrifuged. Plasma was kept frozen (-20°C) until analysis.

Hormone assays: Plasma progesterone was Estimated by Radioimmunoassay (RIA) as previously described and validated[2]. Extraction recovery was 86±5.0% and the minimal detectable concentration was 48 pg ml^{-1}. Intra- and inter-assay coefficients of variation were 4.6% and 11.1%, respectively. Total oestrogens were estimated by the RIA method of Cooke and Knifton[7] validated by Homeida *et al*.,[2]. The intra- and inter-assay Coefficients of Variation (CV) were 12.0% (n=14) and 12.5% (n-12) for oesterone, 6.7% (n=14) and 7.8% (n=16) for oestradiol-17 and 7.0% (n=9) and 9.9% (n=14) for oestradiol-17 β. Results for oestrogens were corrected for r ecovery values which were 82.6 ± 4.0% (n=30) for oesterone, 85.1 ± 3.3% (n=22) for oestradiol-17 and 88.3±3.3% (n=26) for oestradiol-17 β. The results were compared by Student t-test.

RESULTS

Administration of buserlin to camels caused estrus in all animals 3 days after the injection, corpora lutea continued to be palpated until 16 days after estrus in Group 2 but not in Group 1. Significant ($p<0.001$) increase

Table 1: Number of follicles and mean (± SD) plasma concentration of progesterone and estrogens during saline (group1) or somatotropin (group2) treatment of camels

	Group 1Saline treated				Group 2Somatotrpin trated			
Days of Experiment	No. of Lutea	No. of follicles	Progesterone (ng mL^{-1})	Estrogen (pg mL^{-1})	No. of Lutea	No. of Follicles	Progesterone (ng mL^{-1})	Estrogen (pgmL^{-1})
0 (estrus)	0	2 ±0.2	0	40±3	0	2±0.2	0	55±3
2	0	2±0.1	0	55±2	0	2±0.1	0	50±3
4	0	2±0.2	0.5	60±3	0	2±0.1	0.6±0.06	60±3
6	2±0.1	3±0.2	2.2±0.1	65±2	2±0.2	4±0.3	2.3±0.1	55±2
8	1±0.1	4±0.3	1.6±0.1	60±3	2±0.2	3±0.3	2.4±0.1	60±4
10	0	3±0.2	0.6±0.06	55±2	2±0.2	3±0.2	2.2±0.1	55±3
12	0	4±0.3	0.2±0.01	60±3	2±0.3	2±0.2	2.3±0.1	56±3
14	0	3±0.2	0.2±0.01	55±3	2±0.2	3±0.2	2.3±0.1	54±3
16	0	3±0.2	0.1±0.01	45±2	1±0.1	3±0.2	1.6±0.1	50±3
18	0	4±0.4	0	55±4	0	3±0.2	0.4±0.06	52±3

in concentration of progesterone occurred at the same period in animals of Group 2 compared to those of Group 1. Greater number of follicles were palpated and higher ($p<0.001$) concentrations of estrogen were found in animals of Group 2 compared to those of Group 1 on day a-16 after estrus.

DISCUSSION

Treatment of female camels with GnRH resulted in a presumed ovulation as a corpus luteum was formed and progesterone concentrations increased after treatment. Similar treatment have been shown to induce ovulation in camels[8-10].

Treatment of Camels with bST delayed luteal regression and extended luteal function. Similar luteotrophic effects bST on corpus lutem functions and progesterone secretion have been reported in cattle[6,11].

These may be direct effects of bST on corpus luteum since mRNA for bST receptor is found in larger luteal cells[11-13]. Therefore bST may alter responses associated with luteolysis since smaller luteal cells are believed to initiate luteal regression and larger cells may lead to slower luteolysis[14,15].

The effect of bST on follicle number and increared estrogen secretion is surprising sice there in no receptors for bST in follicles[11]. An indirect effect of bST on estrogen secretion may be possible via its effect on insulin-like growth factor IGF secretion[15-17].

CONCLUSION

It seems likely that one way to overcome the problem of sustained luteal support in camels after treatment with GnRH is to adminminster bST.

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