International Journal of Animal Science (1996) 11: 361-363 ISSN No. 0970-2857

Augmentation of early reproduction through hormonal therapy in camel heifers

S.P. Agarwal, A.K. Rai, S.Vyas and N.D. Khanna
National Research Centre on Camel, Post Box No. 07, BIKANER- 334 001. INDIA

Abstract

Twelve prepubertal female camels of two to two and a half years of age were divided into three groups. Group I and II were administered 250 mg Duraprogen (A progesterone derivative) intramuscularly for two consecutive days followed by 2000 IU Trophovet (A FSH predominant preparation) on the third day. The animals were periodically examined per rectum and those having mature follicles on their ovaries and expressing sexual interest were mated with a virile stud on two successive days. Following first mating, Group I and II received 3000 IU Chorulon (A hCG preparation) and 30 mcg Receptal (A GnRH analogue), respectively to ensure ovulation. Animals which failed to conceive were again mated and observed for pregnancy. Periodic blood samples were collected and analysed for progesterone concentration by RIA. Animals in group III were injected with sterile solution and served as control. All the animals in treated groups responded to treatment. A total of 10 follicles in Group I and 9 in Group II and 8 corpora lutea in each of these groups were detected indicating multiple ovulations but none of the animals conceived in the first service. In the subsequent service, one animal each in groups I and II became pregnant. None of the animals in control group expressed any sexual activity.

Key words: early reproduction, hormonal therapy, heifers, *Camelus dromedaries*

Introduction

In camels, the age at puberty has been reported to be 4-6 years (Matharu, 1966; Williamson and Payne, 1978; Khanna et al., 1990). Late puberty reduces the life time production. It has been shown that the prepubertal gonads and the genital tract can respond to exogenous gonadotrophic hormones and this property was exploited for reducing age at puberty. In this investigation, the effect of combination of different hormones was observed on induction of ovarian activity and fertility in prepubertal camels.

Materials and Methods

The camels (*Camelus dromedarius*) belonging to National Research Centre onCamel, Bikaner were used for this study. Twelve prepubertal female camel of two to two and a half years of age and weighing 270 to 310 kG, which had never expressed any sign of sexual activity were selected. The camels were maintained under standard conditions of feeding and management and were clinicallyhealthy. The animals were examined per

rectum to ascertain the condition of the ovaries and the genital tract. All animals had small inactive ovaries without any structures (follicles or CL) on them and the genital tract was small and flabby. The animals were randomly divided into three groups, each group having four animals. All animals were injected with 250 mg 17 ?-hydroxyprogesterone caproate (Duraprogen, Unichem laboratories, Ltd., Bombay) i.m. for two consecutive days. In addition, groups I and II were administered 2000 IU PMSG (Trophovet, Indian Immunologicals, Hyderabad) i.m. on the third day. Group II served as control and received saline injection. The animals were examined retally on the 4^{th} and 5^{th} day after PMSG injection for the presence of follicles on the ovaries and those exhibiting sexual interest were mated on two consecutive days with a virile stud. Following first mating, the animals in Groups I and II were injected i.m. 3000 IU hCG (Chorulon, Intervet International. Holland) and 40 mcg GnRH (Receptal, Hoechst Veterinary, Germany), respectively in a single dose to stimulate ovulation. Thereafter, the animals were rectally examined at different occasions to explore the status of ovaries and genital organs. Blood samples were collected from all animals on days before and after administration of progesterone, day of mating and on day 7, 13 and 19 post-mating.

The animals were tested for pregnancy by "Cocking of tail" method and those showing failure of conception were mated again between day 25 and 30 after first mating and the blood samples were collected on day 1, 10, 20 and 40 post mating. The animals were frequently observed for pregnancy. Blood sera were analysed for progesterone concentration using specific RIA kits supplied by Diagnostic Products Corporation, los Angeles, USA.

Results

All animals in group I and II responded to treatment as expressed by development of follicles, expression of sexual behaviour, acceptance of the male and ovulations.The ovarian activity and reproductive performance following treatment in different groups is presented in Table 1. The rectal examination revealed that a total of 10 large and medium sized follicles were present in group I and 9 in group II with an average of 2.5 follicles per animal. All the camles in both groups could be mated successfully. The copulation time varied from 95 to 728 seconds with an average of 279?23 seconds. Three of the four animals (75%) in each of these groups ovulated followed by luteinization resulting in development of 8 corpora lutea (CL) in each group. The response clearly indicated superovulation in these animals. The progesterone profiles of these animals (Table 2) showed higher values ranging from 1.0 to 7.5 ng/ml on day 7 post-mating which substantiated ovulations and development of CL. The levels declined to basal values by day 19 indicating failure of conception. This was also supported by the absence of raising of tail when approached by a male. None of the animals in control group (Group III) showed ovarian activity or interest in the male.

After 25 days of first mating, all the four animals in group I and three animals in group II expressed signs of heat and could be mated. The blood progesterone levels (Table 2) and the tail test for pregnancy revealed that one animal in each group conceived giving a conception rate of 25 and 33.3%, respectively.

Discussion

It was observed that the schedule of hormonal therapy adopted in this study was effective in triggering sexual activity in prepubertal sexually quiescent female camels. All the treated animals developed multiple follicles on their ovaries, expressed sexual interest in the male and allowed successful mating which indicated genital activation alongwith neuro-psychological changes in their behaviour. The average mating time was found to be in close approximation with that reported by Rai et al., (1988).

Successful ovulations in 75% of the treated animals suggested activation of hypothalamo-pituitary-gonadal axis. The progesterone profiles confirmed these findings and were in agreement with those reported for ovarian cycle in camel (Agarwal et al., 1991). Development of multiple corpora lutea in treated animlas indicated multiple ovulations as observed in adult animals during synchronization and superovulations for embryo transfer technology (Anouaasi and Ali, 1990; Yagil and Vancreveld, 1990; Cooper et al., 1992; Mckinnon et al., 1994). However failure of conception after the first service suggested that the uterus was not prepared for nidation of the conceptus. During the following heat, one animal became pregnant in each of the treated group showing that there is a time gap between activation of ovaries and development of uterus for successful implantation. Similarly Yail and Etzoin (1984) and rai et al., (1991) also found that the prepubertal camels failed to conceive in the first service after induction of heat. The results suggested that the animals should be persued for 8 to 12 weeks after induction of ovarian activity to obtain satisfactory rate of pregnancy.

References

Agarwal, S.P., Rai,A.K. and Khanna, N.D. (1991). Serum progesterone levels in female camels during oestrous cycle. Indian J. Anim. Sci. 61: 37-39

Anouassi, A. and Ali, A. (1990). Embryo transfer in camels during oestrous cycle. “Is it possible to improve the reproductive performane of the camel?” Proc. UCDEC Workshop Sept.10-12, Paris pp 327-334

Cooper, M.J., Skidmore, J.A., Allen, W.R., Wensvoort, S., Billah, M., Chaudhary, M.A. and Billah, A.M. (1992). Attempts to stimulate and synchronise ovulation and superovulation in dromedary camels for embryo transfer. Proc. Ist Intl. Camel Conf, Feb. 2-6, Dubai, pp. 185-191.

Khanna, N.D., Tandon, S.N. and rai, A.K. (1990). Breeding parameters of Indian camels. Indian J. Anim. Sci. 60: 1347-1354.

Matharu, B.S. (1966). Management production and reproduction in dromedary. Indian Farming 16: 1922.

Mckinnon, A.O., Tinson, A.H. and nation, G. (1994). Embryo transfer in dromedary camels. Theriogenology 41:145-150.

Rai, A.K., Agarwal, S.P., Agarwal, V.K. and Khanna, N.D. (1991). Induction of early puberty in female camels. Indian J. Anim. Sci. 61: 1265-1268.

Rai, A.K., Tandon, S.N. and Khanna, N.D. (1988). Copulation time in Bikaneri male camels. 58:1202-1203.

Yagil, R. and Etzoin, Z. (1984). Enhanced reproduction in camel (*Camelus dromedarius*). Comp. Biochem. Physiol 79: 201-204.

Yagil, R. and Van creveld, C. (1990). Embryo transfer in camels (*Camelus dromedarius*) why and how?" Is it possible to improve the reproductive performance of the camel/".Proc. UCDEC workshop Sept. 10-12, Paris. Pp. 293-310.

Williamson, G. and payne, W.J.A. (1978). An Introduction to Animal Husbandry in the Tropics. 3rd edn. Tropical series in Agriculture, Longman, London.

Table1: Reproductive performance of prepubertal female camels following hormonal treatment

Group	Treatment	Animal No.	Animals served	Follicles detected	Animal ovulated		CL detected	Animals conceived	Subsequent mating	Animals conceived	
					No.	%				No.	%
I	PMT +hCG	4	4	10	3	75.0	8	0	4	1	25.0
II	PMT+ M+GnRH	4	4	9	3	75.0	8	0	3	1	33.3
III	Control	4	0	0	0	0	0	0	0	0	0

Table 2: Progesterone concentration (ng/ml) in prepubertal camels following induction of ovarian activity

Table 2: Progesterone concentration (ng/ml) in prepubertal camels following induction of ovarian activity

Group	Treatment	Animal No.	Days progesterone administration		Day mating	Days post 1st mating			Days post 2nd mating				Physiological status
			-1	+1	0	7	13	19	1	10	20	40	
I	PMT+M+hCG	1	0.260	0.210	0.170	0.145	0.040	0.052	0.055	4.750	5.000	4.250	P
		3	0.045	0.065	0.205	7.500	0.700	0.040	0.040	0.060	0.080	0.030	NP
		4	0.140	0.035	0.180	4.200	0.145	0.060	0.065	0.190	0.155	0.060	NP
		10	0.120	0.130	0040	4.500	4.500	0.095	0.040	0.205	0.060	0.080	NP
II	PMT+M+GnRH	2	0.220	0.085	0.150	6.00	0.240	0.035	0.037	0.700	0.115	0.205	NP
		7	0.160	0.180	0.160	2.00	0.105	0.045	0.035	0.040	0.125	0.110	NP
		8	0.180	0.155	0.160	0.065	0.052	0.065	0.060	3.300	1.900	2.500	P
		12	0.117	0.185	0.205	1.050	0.105	0.080	0.080	0.160	0.155	0.170	NP
III	Control	5	0.090	0.115	0.060	0.060	0.095	0.065	0.105	0.145	0.095	0.095	NP
		6	0.140	0.060	0.070	0.095	0.095	0.065	0.065	0.100	0.090	0.105	NP
		9	0.065	0.160	0.040	0.045	0.040	0.040	0.040	0.120	0.145	0.095	NP
		11	0.185	0.180	0.180	0.115	0.080	0.030	0.70	0.055	0.090	0.100	NP

PMT= Pre mating treatment, consists of i.m. injection of 250 mg of 17-alpha hydroxy -progesterone caproate (Duraprogen) on two consecutive days followed by 2000 IU of PMSG (Trophovet) in a single dose.
M= Mating P=Pregnant, NP= Non-pregnant