EFFECT OF ADMINISTRATION OF hCG AT THE TIME OF MATING ON THE CONCEPTION AND LITTER SIZE IN LABRADOR FEMALE DOGS

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A clinical study was conducted to document the effect of administration of hCG at the time of mating on the conception and litter size in Labrador female dogs. A total of 50 Labrador female dogs were used for this study and were assigned to five different groups, each group contained 10 animals. The conception rate, litter size and gestational period of control group were 60 per cent, 5.83 ± 0.70 and 66.67 ± 0.33 days respectively. The conception rate in group 2, 4 and 5 was 70 per cent and group 3 was 80 per cent. The litter size in group 2, 3, 4 and 5 were 6.28 ± 0.47, 6.75 ± 0.45, 6.42 ± 0.64 and 6.57 ± 0.57 respectively. The gestational period in group 2, 3, 4 and 5 were 65.14 ± 0.34, 64.88 ± 0.40, 64.71 ± 0.29 and 64.86 ± 0.46 respectively. There was no significant difference in the conception rate and litter size between the control group and group 2, 3, 4 and 5 ($p>0.05$). Significant difference ($p<0.05$) was observed in the gestational period between control group and group 3, 4 and 5.

Key words: Labrador female dog, hCG, conception rate, litter size, gestational period

Introduction

Domestic dog *(Canis lupus familiaris)* has unique reproductive physiological characteristics that make extrapolation from farm animals unsuccessful in this species. Domestication and rearing of the dog as a companion animal has invariably resulted in confinement and segregation of the sexes during their fertile period resulting in limited accessibility to each other for breeding purpose. Further, a majority of the owners of the male dogs only provide a limited number of services.

Ovulation induction is clinically useful in conjunction with routine breeding management or following conception failure and also in therapeutic management of primary anestrus (Christie *et al.*, 1972). Human chorionic gonadotropin (hCG), and human menopausal gonadotropin (hMG) have been used for ovulation induction in female dogs. Wright (1972) reported that ovulation in the female dog occurs at 26 to 30 hours following the administration of hCG. Therefore, the present study was designed to document the effect of administration of hCG at the time of mating on the conception and litter size in Labrador female dogs.

Human chorionic gonadotropin (hCG) is used to promote the ovulation of developed follicles in the treatment of human amaenorrhea (Brown *et al.*, 1969). Further it has been used for many years to induce ovulation in mares because of its luteninizing hormone (LH) - like activity (Vanderwall *et al.*, 2001).

Use of an ovulation inducing agent reduces the number of matings necessary and results in predictable gestation lengths in female dogs (Sudson, 2011).

Materials and Methods

Fifty healthy Labrador female dogs presented to the small animal outpatient division of the department of Veterinary Gynaecology and Obstetrics, Veterinary College, Bangalore by the pet owners with a specific request to examine reproductive health and to recommend the optimum time for mating were utilized for the present investigation.

The selected Labrador female dogs were then randomly allotted into five groups.

Group I: This group comprised of 10 Labrador female dogs in which breeding was recommended based on exfoliative vaginal cytology and served as control group.

Group 2: This group comprised of 10 Labrador female dogs, with an optimum vaginal cornification were injected with single intravenous injection of 500 IU of human Chorionic Gonadotrophin (CHORULON(R), Intervet) and the mating was recommended once at 48 hours and again a second mating at 96 hours following hCG administration.

Group 3: This group comprised of 10 Labrador female dogs were injected with single

intravenous injection of 1000 IU of human Chorionic Gonadotrophin (CHORULON(R), Intervet) and the mating was recommended at 48 hours and at 96 hours following hCG administration.

Group 4:- This group consisted of 10 labrador female dogs in which the mating was recommended on the basis of serum progesterone concentrations. Once the serum progesterone concentration reached at least 3 ng/ml, two matings were recommended at two days interval.

Group 5: This group comprised of 10 Labrador female dogs with minimum serum progesterone concentration of 3 ng/ml were selected and injected with single intravenous injection of 500 IU of human Chorionic Gonadotrophin (CHORULON(R), Intervet). Mating was recommended once at 48 hours and again a second mating at 96 hours following hCG administration.

Following mating, the female dogs in all groups were subjected for pregnancy diagnosis on the basis of abdominal palpation and ultrasonography after 30 days. Further, pregnant animals were followed up until the whelping. The duration of gestation was calculated from the first day of recommended mating to the date of delivery. Information on the litter size was also obtained after whelping for assessing the influence of Human chorionic gonadotropin (hCG) administration on conception rate and litter size.

The data generated for control and treatment groups were tabulated. Mean and standard error were computed. The comparisons between the two groups or for different days and litter size were made by one way analysis of variance as per the procedure detailed by Snedecor and Cochran (1989). Chi – square test was performed to compare the pregnancy status of all the groups.

Results and Discussion

The mean conception rate in control group was 60.00 per cent, where as 70.00 per cent in group 2,4 and 5 and 80.00 percent in group 3. The mean ± SE of litter size in control group was 5.83 ± 0.70, where as they were 6.28 ± 0.47, 6.75 ± 0.45, 6.42 ± 0.64 and 6.57 ± 0.57 in group 2, 3, 4 and 5 respectively. The mean ± SE of gestational length in control group was 66.66 ± 0.33 days and 65.14 ± 0.34, 64.88 ± 0.40*, 64.71 ± 0.29* and 64.86 ± 0.46* days in group 2, 3, 4 and 5, respectively.

Table. 1: Comparison of mean conception rate, litter size and gestational period of all groups

Groups	Age (Years)	Conception rate (%)	Litter size	Gestational period (Days)
Group 1	2.25 ± 0.37	60.00	5.83 ± 0.70	66.66 ± 0.33
Group 2	2.30 ± 0.40	70.00	6.28 ± 0.47	65.14 ± 0.34
Group 3	2.50 ± 0.27	80.00	6.75 ± 0.45	64.88 ± 0.40*
Group 4	2.65 ± 0.23	70.00	6.42 ± 0.64	64.71 ± 0.29*
Group 5	2.35 ± 0.21	70.00	6.57 ± 0.57	64.86 ± 0.46*

Values are expressed as Mean ± SE, n=10.

* Significant difference with Group 1 ($P < 0.05$)

The use of hCG to induce ovulation in female dogs is quite controversial because they are spontaneous ovulators (Kutzler, 2007). Most of the studies for ovulation induction in female dogs have used hCG at a dose of 500 IU SID IM, IV or SC to time ovulation at the second day of oestrus (Archbald *et al.*, 1980).

The conception rate was recorded as 70 per cent in Group 2 and 5 and 80 per cent in Group 3. This was similar to 75 per cent conception rate reported by Umut *et al*. (2007) and 80 per cent conception documented by Stornelli *et al.* (2012) after administering 500 IU of hCG. Authors concluded from their study that there was no significant difference ($p>0.05$) in conception rate compared with control group. However, in the present study also there was no significant difference ($p>0.05$) in conception rate between control group and groups 2, 3 and 5 of Labrador female dogs.

The mean ± SE value of litter size recorded in the present study was 6.28 ± 0.47, 6.75 ± 0.45 and 6.57 ± 0.57 in Group 2, 3 and 5 respectively. This was clearly higher than mean ± SE of 5.5 ± 2.59 reported by Umut *et al.* (2007) and mean ± SE of 3.62 ± 0.41 reported by Stornelli *et al*. (2012). But, these authors documented from their study that there was no significant difference ($p>0.05$) in mean ± SE of

litter size of treatment group compared with control group. Further, in the present study also there was no significant difference ($p>0.05$) in mean ± SE of litter size between control group and groups 2, 3 and 5.

The mean ± SE of gestation period in Labrador female dogs recorded in the present study was 65.14 ± 0.34, 64.88 ± 0.40 and 64.86 ± 0.46 in Group 2, 3 and 5, respectively. There was significant difference ($p<0.05$) in mean ± SE of gestational period of Labrador female dogs between control group and groups 3 and 5. Similar results in terms of ovulation rate of 88.6 per cent was reported by Wright (1980) and the author documented that the ovulation occurred 27 to 30 hours after the administration of hCG. Hundred per cent ovulation rate was reported by Umut *et al*. (2007). Stornelli *et al*. (2012) found the LH peak approximately on 1.64 days after the administration of hCG.

Summary

On the basis of observations and documentations made during the present study, it could be concluded that there was no effect of administration of hCG at the time of mating on the conception rate and litter size in Labrador female dogs. Programmed ovulation in the female dogs occurs following the administration of hCG was useful for predicting the day of whelping in female dogs. Otherwise, ovulation induction with administration of hCG was clinically not useful in conjunction with routine breeding management of female dogs.

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