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احداث التبويض بأستخدام الهرمونات وتأثير ذلك على الخصوبة فى النعـــاج

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حقنت النعاج بهرمونات PMSG + Progestrone, LHRH لدراسة تأثير ذلك على سرعة التبويض وسلوك الدورة والأخصاب فى النعاج .

ولقد لوحظ احباط التبويض فى جميع الحالات المحقونة بالهرمونات وتـــراوح زمن التبويض منذ بداية الدورة ـ ما بين ٤٧ ، ٥١ ساعة ولم يحدث ازدياد عدد البويضات فى أى من المجموعات المعالجة .

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*HORMONAL INDUCTION OF OVULATION AND SUBSEQUENT FERTILITY IN ADULT CYCLING EWES**

(With 2 Tables)

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SUMMARY

Adult cycling ewes of Nali breed were treated with LHRH and Progesterone + PMSG to see their effects on ovulation rate, estrous behaviour and fertility. 4 ewes out of 12 from the control group were laparotomized and the remaining 8 were subjected to natural breeding. The second group of 12 ewes was treated with 300 ug of LHRH on day 16 of the estrous cycle and 11 were laparotomized and 8 were bred. In the third group, 8 ewes were treated with 10 mg. Progesterone daily for 14 days and 1000 I.U. of PMSG on progesterone withdrawal and three ewes were laparotomized and four naturally bred. In the fourth group, 8 ewes were treated with 25 mg. progesterone on day 0,7 and 14 of the estrous cycle and 750 I.U. PMSG was administered on day 7 or 14 with two laparotomized and four bred. A repeat trial was conducted in group 3 with 12 ewes half of which received 1000 I.U. and the rest half 1500 I.U. PMSG. All the 12 ewes in this group were naturally bred including the 6 laparotomized ones. There was suppression of overt oestrus in all the treated groups, the maximum suppression being observed in group 3. Ovulation was 100% in the progesterone treated group (3 & 4) and 81.8% in the LHRH treated group but there was no lambing in group 3 and only 50% in group 4 against 62% in group 2 and 66.7 in group 1. Oestrous duration and cycle length was decreased in LHRH treated group and increased in progesterone treated group in comparison to control. Ovulation time from onset of oestrus was 47 and 51 hours respectively in group 3 and 4 in comparison to similar values of 28 hours in group 1 and 2. Superovulation was not detected in any of the treated groups.

INTRODUCTION

The administration of synthetic preparation of luteinizing hormone releasing hormone (LHRH) has revealed that it will induce release of LH in anoestrous (REEVES, et al. 1972) and cycling ewes (SCHALLY, et al. 1973). The result of LHRH treatment in progesterone primed cycling ewes indicated that although ovulation can be induced, fertility of released ova may be impaired if ovulation is induced prematurely.

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HONMODE (1971) observed that despite satisfactory oestrus synchronization and multiple ovulation lambing performance was poor in ewes treated with progesterone and PMSG. SENGUPTA, et al. (1976) reported that a dose of 750 I.U. PMSG was satisfactory in respect of superovulation, conception rate and lambing performance of ewes. The present investigation was carried out to study the effect of LHRH and progesterone + PMSG on ovulation, oestrous behaviour and fertility of adult cycling ewes of Nali breed.

MATERIAL and METHODS

Fourty cycling ewes of 25.9 kg average body weight selected for the experiment were divided into 4 groups of which group 2 consisting of 12 ewes received hormone treatment on day 16th of their cycle. The animals in the rest two groups each having 8 ewes were selected for treatment irrespective of day of their cycle. The ewes in group 1 served as control. Luteinizing hormone releasing hormone (LHRH) obtained from National Institute of Health (About lot 26-306 AI) was dissolved in NSS so as to contain 200 ug LHRH per ml. Each ewe in group 2 received 300 ug LHRH (1.5 ml) on day 16th of the cycle and same quantity of NSS was given to each control animal. The treatment of 10 mg progesterone (Pregnen (4) dion-beta 20) in propylene glycol to each ewe in group 3 for 14 days was followed by administration of 1000 I.U. PMSG (ICN Pharmaceutical IMC Cleveland USA) after withdrawal of progesterone. Each ewe in group 4 received 25 mg progesterone on day 0,7 and 14 and 750 I.U. PMSG either on day 7th or 14th of progesterone treatment. A repeat trial was conducted in another group of 12 ewes with 10 mg progesterone treatment for 14 days in which half of the ewes received 1000 I.U. PMSG and the rest half 1500 I.U. PMSG each on withdrawal of progesterone treatment. Laparotomy was performed in each group at an interval of 30-36 hours from onset of oestrus. The ewes in group 1 and 2 were slaughtered between 96-120 hours after treatment and 96-168 hours after PMSG administration in group 3 and 4. A teaser ram with good libido was used for oestrus detection till 24 hours after treatment and 4 hourly till end of oestrus. The ewes in heat were bred between 12 to 20 hours of onset of oestrus.

RESULTS

The result pertaining to the effect of hormone administration on onset of oestrus, oestrus duration cycle length and breeding behaviour have been presented in Table 1 and 2.

The overall incidence of overt oestrus in hormone induced ewes (Table 1) was 33.3, 12.5 and 37.5 percent in group 2,3 and 4 respectively whereas the incidence in control group was cent percent. Except LHRH (group 2) the ovulation in all other groups was 100 percent. The mean ovulation time from onset of oestrus based on 4 hourly oestrus detection and laparotomy (Table 1) was 28.00h, and 27.6±0.30h in the control and LHRH group respectively. But in the progesterone treated ewes (group 3 & 4) it was 47.00±13.00 and 51.00±4.00h which was significantly higher than the other two groups. The difference in mean ovulation time from commencement of the treatment between control and LHRH (group 2) was minimum (8.00h) but both the groups differed significantly from either group of progesterone treated ewes.

The conception rate at first and second oestrus in LHRH group was 12.5 and 75.0% respectively against 25.00% at each oestrus in group 4 with failure of oestrus and conception in group

3 in its entirety. Despite cent percent ewes in heat in control group at first oestrus the conception rate was 66.71 percent only.

The overall lambing rate in the control, LHRH and progesterone treated ewes (group 4) was 66.00, 62.20 and 50.00 percent respectively. The ewes in group 3 (10 mg progesterone did not respond to the treatment at all.

The mean interval hour between treatment and commencement of oestrus (Table 2) was 68.33±8.41 and 83.66±14.15h in LHRH (group 2) and progesterone (group 3 & 4) respectively which was significantly higher than the control group (48.75±1.75h). The oestrus duration was much shorter (20.50±1.52h) with a range of 16 to 24h in LHRH group as compared to control and progesterone (group 3 & 4) which was 33.50±1.84h and 49.66±3.28h respectively. There was significant difference between the groups. The mean cycle length was 17.60±1.88 and 18.66±0.33 days between LHRH and progesterone groups in comparision to 17.62±0.37 days in the control. There was no significnat difference with respect to cycle length between the groups.

Table (1)

Hormone induced oestrus and breeding behaviour in cycling ewes

Parameters	GROUPS			
	1	2	3	4
Overt oestrus %	100 (4)	33.3 (12)	12.5 (8)	37.5 (8)
Ovulation %	100 (1)	81.8 (11)	100 (3)	100 (2)
Ovulation time from onset of oestrus (hr)	28.00 (1)	27.6± .30 (3)	47.0±13. (2)	51.0±4.00 (2)
Ovulation time from beginning of treatment (hr)	75.00 (1)	67.2±17.4 (3)	125.6±14.2 (2)	125.5±25.5 (2)
Conception %				
1st oestrus	66.71 (3)	12.5 (8)	0.00 (4)	25 (4)
2nd oestrus	0.00 (3)	75.00 (8)	0.00 (4)	25 (4)
Lambing %	66.71 (3)	62.25 (8)	0.00 (4)	50 (4)

Figures in parenthesis are no. of animals under observations.

Table (2)
Effect of hormone administration on onset of oestrus, oestrus duration and cycle length in cycling ewes

Group	Interval of onset of oestrus from treatment (hr)	Oestrus duration (hr)	Cycle length (days)
1 (4)	48.75± 1.750^{b}	33.50±1.848^{ab}	17.62±0.378
2 (12)	68.33± 8.413^{ab}	20.50±1.527^{b}	15.60±1.886
3 & 4 (16)	83.66±14.151^{a}	49.66±3.283^{a}	18.66±0.33

Note: The value with samesuperscripts eithin each parameter did not differ significantly from each other.
Figures in parenthesis are no. of animals under observation.

DISCUSSION

Persual of Table 1 indicated that LHRH treatment (group 2) did not modify the expresion of oestrus favourably in relation to control (group 1). SEGERSON, et al. (1974) observed that only 69.2% of the progesterone primed ewes treated with luteinizing releasing factor (LRF) exhibited oestrus, whereas in another group with similar treatmnet only 30% exhibited oestrus. A time lag between hormone administration and behavioural oestrus, was observed by RIPPEL, et al. (1974) in which 75% of the GnRH treated ewes came in oestrus but not until 8 to 10 days after treatment. The findings of SYMONS, et al. (1974) further corrobrated that GnRH treated ewes did not show behavioural oestrus. In light of these observations, it is, therefore, apparent that the poor response of LHRH to expression of behavioural oestrus would be due to lack of adequate oestrogen support as was evident from the poor follicular growth in the laparotomized ewes.

The positive ovulatory response as a result of LHRH treatment was found in 9 out of 11 animals (Table 1). In the progesterone + PMSG treated groups (groups 3 & 4), out of the animals which were laparotomized, ovulation was found to have occurred in all ewes. In the repeat trial with 10 mg dose of progesterone + PMSG the ovulation rate was very poor (33.20%). In the present study in all the ewes in group 2 the treatment was started on day 16 of the cycle, which was about 2 days ahead of normally expected pre-ovulatory surge of LH as evidenced by the onset of oestrus in the control group. However, ovulation in LHRH treated ewes took place earlier in relation to the time of start of treatment as compared to control. It appears that the ovulatory surge of LH release, which may be caused, in part, by greater sensitivity of pituitary gland to LHRH in addition to an increased release of endogenous LHRH at that time (SCHALLY, et al. 1973), was fully reflected in response to the given treatment which led to precocious ovulation in 9 out of 11 ewes (81.8%).

The results obtained in this study showed that although ovulation can be induced by LHRH, the fertility was poor (62.25%). It further indicates that induction of precocious ovulation during follicular phase of the cycle, but before onset of oestrus, lacks estrogen for behavioural expression of oestrus, resulting in poor mating incidence with consequent low conception rate.

This aspect of the response may be considered for set-time A.I. programme and if LHRH treatment has to be used for increasing rate of fertility and lambing, the treatment must coincide with normal release of LH.

In groups 3 & 4 (Progesterone + PMSG) aimed at superovulation, behavioural estrus was much less satisfactory as compared to control (Table 1). Laparotomy observations revealed incidence of silent heat in the treated ewes as evidenced by ovulations. Such incidence are not uncommon in Progesterone + PMSG therapy. This is supported by the evidence of GORDON (1963) who observed 10% silent heat in progesterone primed ewes receiving 750 I.U. PMSG and by similar other reports (CALL, et al. 1976). The low incidence of overt oestrus in group 3 & 4 may therefore be attributed to lack of optimum level of oestrogen.

The objective of inducing superovulation with different doses of progesterone + PMSG could not be achieved although single ovulations did occur. Because of the failure of progesterone + PMSG treatment to induce superovulations in group 3, the experiment was repeated during breeding season to ascertain the sensitivity of the gonad to PMSG at high doses. But, surprisingly. ewes receiving 1000 I.U. and 1500 I.U. of PMSG, too, on observational laparotomy showed similar response as in the previous trial except that only a solitary ewe receiving 1000 I.U. had her both overies ovulated while another one with 1500 I.U. PMSG had a single quiet ovulation. In the present experiment the three different (750, 1000, 1500 I.U.) dosage of PMSG coverd a wide range used by LASTER and HUDSON (1974) and SENGUPTA, et al. (1972) but could not be effective in inducing superovulation. The failure of the ewes to superovulation even with higher doses of PMSG may be attributed to breed specificity with explicit lack of sensitivity to the exogenous therapy of gonadotrophin which needs further probe.

Progesterone + PMSG treatment also delayed the ovulation time significantly as compared to control, both from the onset of oestrus as well as when considered from the beginning of treatment (Table 2). The conception rate was also less under progesterone + PMSG treatments. The 10 mg dose progesterone group failed to conceive completely whereas ewes in group 4 receiving 25 mg dose progesterone had 50% lambing. Cycle length was also increased by a day as compared to control and by about 3 days as compared to LHRH group but these differences were, found to be non-significant.

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