GONADOTROPHIN-INDUCED OVULATION IN MELENGESTROL ACETATE TREATED FEMALE GOAT

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Summary : Adult, Black Bengal goats synchronized to oestrus with Melengestrol Acetate (MGA) could be subjected to supervulation with 1000 IU of the Pregnant Mare Serum Gonadotrophin (PMSG) However, with 500 IU of PMSG higher rate of ovulation observed only in goats above one year age was not significant. Results indicate that the successful superovulation in MGA synchronized goats depend both on the dosage of the PMSG, as well as upon the age of the treated animal.

Key words : melengestrol acetate, gonadotrophin, ovulation, synchronization of oestrus, goat, superovulation

INTRODUCTION

With the objective of augmentation of livestock production, the tool of transfer of zygote from donor to recipient animals has currently gained much importance. Synchronization of oestrus and induction of superovulation in the donor animal, forms the basis of this procedure. Superovulation means shedding of larger number of ova than found during natural ovulation. Administration of the progestational compounds, like Fluorogestone Acetate used as impregnated vaginal sponges and melengestrol acetate (MGA) fed orally have been found useful for synchronization of oestrus and ovulation in goats (1, 2, 3, 4, 7). Fewer attempts have been made to standardise the technique of superovulation in goats than those made in other species. Preliminary studies in goat, however, indicate that gonadotrophin alone could induce an increase in the number of ovulation (6). Dhinsa, Hoversland and Mitcalfe (3) observed superovulation in goats

treated with different doses of gonadotrophin in conjuction with Fluorogestone Acetate. The present investigation was undertaken to study the superovulatory response to Pregnant Mare Serum Gonadotrophin (PMSG) in goats synchronized to oestrus, with MGA. This study was conducted during October-December.

MATERIAL AND METHODS

Thirty-three mature female Black Bengal goats, were randomly selected for this study. The age of these animals varied from 8 months to about 7 years (Table I). They were housed in well-ventilated sheds and maintained on standard rations containing concentrates, greens and water *ad libitum* (5). Twelve goats were given no treatment (group 1) and served as "Controls", and the remaining 21 goats were fed, 0.15 *mg*. of MGA (Up John & Co., USA) per animal per day, continuously for 16 days. No PMSG (Sigma, U.S.A.) was administered to six MGA treated goats (group II); 12 goats received 500 IU of the PMSG; (Group III); and three received 1000 IU of the PMSG (Group IV), as single subcutaneous injection, on the last day of the MGA feeding. All goats exhibited oestrus within five days following withdrawal of the MGA treatment. Goats in oestrus (natural or induced) were subjected to mid-ventral laparotomy on fifth to seventh day post oestrus, to enumerate corpora lutea or developed follicles.

RESULTS

Table I shows that the average number of ovulations in the control group I, was 2.25 ± 1.21/goat. Curiously, the number of ovulations amongst the individual goats of control group, was comparable inspite of the much wider variations in their age. The number of ovulations in goats fed with MGA (group II) was 3.00 ± 0.89, which was not significantly higher than that observed in the controls. The MGA fed goats treated with 500 IU of the PMSG (group III), however, presented two types of response *viz.*, first adults goats exhibiting higher (non-significant) rate of (5.42 ± 2.82) ovulation than group II; and secondly, younger (than 1 year old except one female) goats which failed to ovulate, but exhibited large unruptured follicles. In contrast, all the adult (MGA fed) female goats receiving 1000 IU (group IV) of PMSG, exhibited significantly ($P<0.5$) higher rate of ovulation (8.66 ± 1.58) than either the control (group I) or goats fed with MGA alone (group II). However, the rate of ovulation in this group (IV) did not differ significantly from the rate of ovulation found in the adult goats treated with 500 IU of the PMSG (group III).

TABLE I : The rate of ovulation in MGA fed goats subjected to PMSG treatment.

Group	S. No.	Age (month years)	Treatment	Number of ovulations	Number of large follicles (tending to ovulate)
	1	4.5 years	No treatment	3	—
	2	3.5 ,,	,,	2	—
	3	2.7 ,,	,,	3	—
	4	4.5 ,,	,,	2	—
	5	4.0 ,,	,,	2	—
I	6	4.5 ,,	,,	4	—
	7	2.0 ,,	,,	2	—
	8	1.3 month	,,	2	—
	9	8 ,,	,,	2	—
	10	9 ,,	,,	2	—
	11	1.4 years	,,	2	—
	12	1.3 ,,	,,	1	—
	Mean±SE			2.25±1.21	
	1	6.8 years	MGA only	4	—
	2	5.8 ,,	,,	3	—
II	3	5.0 ,,	,,	4	—
	4	3.8 ,,	,,	3	—
	5	3.5 ,,	,,	2	—
	6	3.0 ,,	,,	2	—
	Mean±SE			3.0±0.89	
	1	5.0 years	MGA+500 IU PMSG	3	—
	2	5.0 ,,	,,	8	—
	3	3.7 ,,	,,	10	—
III	4	1.4 ,,	,,	5	—
	5	2.2 ,,	,,	2	—
	6	1.5 ,,	,,	6	—
	7	1.3 ,,	,,	4	—
	Mean±SE			5.42±2.82	
	8	1.1 years	MGA+500 IU PMSG	—	4
	9	11 months	,,	—	1
	10	11 ,,	,,	—	1
	11	9 ,,	,,	—	7
	12	9 ,,	,,	—	2
	Mean±SE				3.0±2.54
	1	3 years	MGA+1000 IU PMSG	10	—
IV	2	3 ,,	,,	9	—
	3	1.4 ,,	,,	7	—
	Mean±SE			8.66±1.58	

DISCUSSION

The above results indicate that, while PMSG could stimulate the ovulatory response in the MGA-fed female goats, the superovulatory response was better expressed when dose higher than 500 IU, in this study 1000 IU, was given. Dhinsa *et al.* (3) reported that mean ovulation rate in pigmy goats (dwarf breed) treated with 500 and 1000 IU of PMSG alone or with HCG wearing progestogen impregnated vaginal sponges was consistently higher (although not significant) than that of animals wearing sponges alone (control).

Results further indicate that, apart from the dosage of the PMSG, the ovulatory response even towards a lower dosage of the gonadotrophin was better in the adults (above 1 year age) than in the younger females. This is apparent since, while the rate of ovulation in the younger females compared well, with that found in the controls (group I), the younger females in MGA-synchronized group III, treated with 500 IU of the PMSG failed to ovulate in contrast to the adults under the same treatment, which ovulated successfully. It was further of interest to note in the younger MGA fed females treated with 500 IU of PMSG the presence of large number of unruptured follicles which failed to ovulate. Appearance of large unruptured follicles following the gonodotrophin treatment has also been reported in sheep (6) and in goats treated with progestogen, PMSG and HCG (3). This reflects failure of the follicles to ovulate ultimately, after their initial stimulation by the exogenons gonadotrophin, as observed in the present experiment and, as reported by others (3,6). Apparently it seems to be due to the subsequent non-availability of the L.H. in quantities optimum for inducing ovulation.

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