

Serum progesterone profile in prepubertal Hampshire gilts following boar contact and hormone treatment

D BAI SHYA¹, K K BARUAH², A DUTTA³, ANUBHA BARUAH⁴ and P BORAH⁵

Assam Agricultural University, Khanapara, Guwahati, Asom 781 022 India

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The present study was conducted to monitor the serum progesterone level after induction of puberty by boar contact and hormonal treatment in Hampshire gilts of Assam.

Healthy prepubertal Hampshire gilts (18), aged 5 months and weighing between 50 to 55 kg, maintained at the Base Pig Breeding Farm, Khanapara, under intensive system of rearing were included in the study.

The experimental animals were randomly divided into 3 equal groups, viz. group 1, 2 and 3. Gilts of group 1 were allowed direct contact with rotation of 2 vasectomized boars on a daily basis from 165 days of age for 2 months or till exhibition of the oestrus, whichever was earlier. To remove the possibility of habituation and induced puberty as early as possible, the gilts were subjected to a routine in which they were tested with different males on alternate weeks. Gilts of group 2 were administered a single dose of 400 IU PMSG followed by 200 IU HCG intramuscularly at 165 days of age. The gilts under group 3 were considered as control and were administered intramuscular injection of sterile normal saline.

Oestrus was detected in experimental animals by a standing heat reflex and acceptance of intromission by a vasectomized boar (Hughes and Cole 1976) as well as by visual observations throughout the study period. The very first acceptance of male by the female was considered as the onset of oestrus and the attainment of puberty was considered as the first day of the first oestrus period.

Blood samples were collected twice at 7 days interval from all the gilts of treated and control groups before giving any treatment. Next collections were done on the day of boar introduction or PMSG injection in the treated groups and placebo treatment in control group. Subsequent samples were collected on the day of onset of oestrus and at 3 days intervals till the gilts exhibited second oestrus. Serum was separated and stored at -20°C till further analysis. Serum progesterone

concentrations were estimated by radioimmunoassay (RIA) using commercial kit using Gamma Counter following standard procedure. The intra- and inter-assay coefficient of variation were 8 and 10% respectively.

The data collected from the present experiment were analysed statistically using one-way analysis of variance and critical difference test as per Snedecor and Cochran (1967).

The mean serum progesterone concentration in the prepubertal Hampshire gilts prior to treatment, on the day of treatment and on the day of onset of oestrus was recorded to be 0.53 ± 0.04 , 0.45 ± 0.02 and 0.46 ± 0.02 ng/ml; 0.48 ± 0.06 , 0.50 ± 0.02 and 0.43 ± 0.04 ng/ml and 0.45 ± 0.04 , 0.40 ± 0.03 and 0.40 ± 0.03 ng/ml in boar contact, hormone treatment and control groups, respectively. These results corroborated with the findings of Stabenfeldt *et al.* (1969) in prepubertal gilts.

Thereafter, the mean serum progesterone concentration showed a sudden increase from 1.31 ± 0.12 , 1.86 ± 0.71 and 1.13 ± 0.03 ng/ml on day 3 of oestrus to 9.90 ± 0.03 , 11.62 ± 0.44 and 8.95 ± 0.17 ng/ml on day 15 of oestrus in gilts of boar contact, hormone treatment and control groups, respectively. Stabenfeldt *et al.* (1969) also observed an initial rise of serum progesterone concentration at day 3 or 4 of the cycle followed by rapid increase up to day 7 or 8 and slower rate of increase until day 14 or 15 of the 20 day cycle. Duncan *et al.* (1960) found the luteal progesterone concentration in the pig remain elevated until day 15 of the cycle. The mean concentration of serum progesterone on day 18 of oestrus cycle decreased from 1.72 ± 0.05 , 1.82 ± 0.17 and 1.15 ± 0.04 ng/ml to 0.48 ± 0.03 , 0.48 ± 0.03 and 0.45 ± 0.04 ng/ml on day of onset of next oestrus in boar contact, hormone treatment and control groups, respectively. The decline in progesterone level after day 15 in gilts was precipitous (Stabenfeldt *et al.* 1969), a 30-fold decrease occurring in most cases within 48 h. Progesterone levels remain low (0.5 ng/ml) for about 7 days during the phase of follicular growth and ovulation. Bjersing (1967) suggested that development of whorled endoplasmic reticulum in pig corpus luteum during the first half of the oestrus cycle (up to day 10) might be indicative of active progesterone synthesis while its lack of further development

Present address: ¹Research Associate, ^{3,4}Associate Professor, ⁵Senior Research Fellow, Department of Veterinary Physiology, College of Veterinary Sciences

²Principal Scientist, NRC on Mithun, Jhamapani, Nagaland.

(after day 10) suggested the possibility of a decline in progesterone synthesizing activity. Paterson and Martin (1981) also observed occurrence of oestrus in prepubertal gilts after gonadotropin treatment.

SUMMARY

Healthy prepubertal Hampshire gilts (18) randomly divided into 3 equal groups to monitor the serum progesterone level after induction of puberty by boar contact and hormonal treatment. Gilts of group 1 were allowed direct contact with rotation of 2 vasectomized boars for 2 months or till exhibition of the oestrus, whichever was earlier. Gilts of group 2 were administered 400 IU PMSG followed by 200 IU HCG intramuscularly at around 165 days of age. The gilts of control group (group 3) were administered with sterile normal saline solution intramuscularly. The mean serum progesterone concentrations before treatment and on the day of oestrus were 0.53 ± 0.04 and 0.46 ± 0.02 ng/ml; 0.48 ± 0.06 and 0.50 ± 0.02 ng/ml and 0.45 ± 0.04 and 0.40 ± 0.03 ng/ml in gilts of group 1, 2 and 3 respectively. The mean serum progesterone concentration increased from 1.31 ± 0.12 , 1.86 ± 0.71 and 1.13 ± 0.03 ng/ml on the day 3 of oestrous cycle to the highest level of 9.90 ± 0.33 , 11.62 ± 0.44 and 8.95 ± 0.17 ng/ml on day 15 of oestrous cycle in the 3

respective groups. Thereafter, progesterone concentration decreased sharply from 1.72 ± 0.05 , 1.82 ± 0.17 and 1.15 ± 0.04 ng/ml on day 18 to 0.48 ± 0.03 , 0.48 ± 0.03 and 0.45 ± 0.04 ng/ml on the day of onset of next oestrus in group 1, 2 and 3 gilts, respectively.

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