INDUCED OESTRUS AND PROGESTERONE PROFILE ON CONCEPTION RATE IN REPEAT BREEDER COWS

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ABSTRACT

A total of 16 crossbred repeat breeder cows were treated with norgestomet (Syncromate-B) ear implants for 9 days. At the time of implant insertion, 2ml of SMB injection was administrated to all the cows intramuscularly on day 10 of the oestrous cycle to induce oestrus. AI was done at 48 (first AI) and 72 hours (Second AI) after implant removal. At the time of implant removal 0.750 mg of tiaprost was administrated to all the cows. Pregnancy diagnosis was done at 60 days following AI to assess the first service conception rate and it was 37.50 per cent. The mean progesterone level at the time of natural oestrus, day of implant insertion, implant removal and at first AI and at second, fourth and sixth day following first AI in cows which became pregnant (n=6) was 0.36±0.08, 7.19±0.46, 1.45±0.24, 0.18±0.05, 1.05±0.20, 1.70±0.22 and 3.37±0.77 ng/ml, respectively and the corresponding values in cows which did not conceive (n=10) at induced oestrus were 0.51±0.09, 5.24±0.43, 1.29±0.20, 0.23±0.03, 0.57±0.15, 0.99±0.27 and 1.62±0.26 ng/ml, respectively. It is concluded that serum progesterone at various stages following Syncromate-B plus PGF2α therapy influenced the conception in repeat breeder cows.

Key words: Oestrus, Syncromate-B, PGF2α, Conception, Progesterone, Repeat breeder cows.

INTRODUCTION

More investigations should be done on the progesterone levels before, during and a few days after oestrus as a cause of the repeat breeder syndrome in cattle (Peters, 1996). Based on this view, the present investigation was undertaken to study the relationship of serum progesterone profiles before, during and after Syncromate-B plus PGF2α induced oestrus on the establishment of pregnancy in repeat breeder crossbred cows.
time of ear implant insertion, 2 ml of SMB injection (Sanofi, Animal Health Inc., USA) containing 5 mg oestradiol valerate and 3 mg norgestomet was administered intramuscularly to all the cows. The implants were removed after 9 days and all the cows were injected with 0.750 mg Tiaprost (Iliren, Tiaprost, Hoechest India Ltd., India) intramuscularly. AI was done at 48 (first AI) and 72 (second AI) hours of implant removal. Pregnancy diagnosis was done at 60 days following AI at induced oestrus and first service conception rate was calculated in percentage. Blood samples were collected from all
the cows at natural oestrus, at the time of implant insertion, implant removal, at the time of first AI and at second, fourth and sixth day following first AI for progesterone assay. Serum was separated by centrifuging the clotted blood at 3000 rpm for 10 minutes. The serum samples were stored at -80°C until progesterone assay which was carried out using progesterone RIA kit (PROG-CTK-4; DiaSorin, s.r.l. Saluggia (vc), Italy) by employing solid phase Radioimmunoassay technique. The radio activity was measured in 1^{25}\text{gamma} counter.

RESULTS AND DISCUSSION

In the present investigation, 100 per cent oestrus response was obtained following implant removal and PGF2\(\alpha\) treatment. This was in agreement with the finding of Odde (1990) in norgestomet and oestradiol valerate treated cows. In buffaloes, 100 per cent oestrus response was obtained with crest ear implant (Utage et al., 2010) The effectiveness of norgestomet in this study might be attributed to the combined effects of progestagen priming on the brain and the direct effect on the hypothalamus by both exogenously administered oestrogen and the high concentration of oestrogen that occurred in association with use of norgestomet-oestradiol (Cavaliere and Fitzpatrick, 1995). Following norgestomet plus PGF2\(\alpha\) treatment, the first service conception rate obtained was 37.50 per cent in this study. This was more or less similar to the conception rate obtained in cows in earlier study with norgestomet (Hixon et al., 1981). However, Patel et al. (2010) obtained 66.66 and 55.55 per cent conception rates in repeat breeder cows with GnRH and PGF2\(\alpha\) plus GnRH therapy, respectively. The mean progesterone level (ng/ml) at the time of natural oestrus, day of initiation of oestrus induction treatment, implant removal at first AI and at second, fourth and sixth day following first AI in cows which became pregnant (n=6) at induced oestrus was 0.36±0.08, 7.19±0.46, 1.45±0.24, 0.18±0.05, 1.05±0.20, 1.70±0.22 and 3.37±0.77 respectively and the corresponding values in cows which did not conceive (n=10) at induced oestrus were 0.51±0.09, 5.24±0.43, 1.29±0.20, 0.23±0.03, 0.57±0.15, 0.99±0.27 and 1.62±0.26 ng/ml.

In this study, the level of progesterone at natural oestrus (0.36±0.08 ng/ml) and induced oestrus (0.18±0.05 ng/ml) was less than 0.5 ng/ml in cows which conceived and in those which did not conceive. The level progesterone observed at natural and induced oestrus in these cows was in accordance with the finding of Agarwal et al. (1989) in repeat breeder cows. In the present study, the marginal reduction in progesterone level was noticed in induced oestrus when compared to natural oestrus both in cows which became pregnant and in cows which did not conceive after AI at induced oestrus.

The higher concentration of progesterone observed on the day of oestrus induction (day 10 of the previous cycle) in pregnant cows (7.19±0.46) compared to non pregnant cows (5.24±0.43 ng/ml) was in accordance with the finding of Breuel et al. (1989). Folman et al. (1973) reported that the progesterone level during the oestrous cycle preceding insemination was closely related to the occurrence of conception. The level of progesterone (6.31±0.32) noticed at the time of initiation of treatment in animals studied was significantly reduced to a lower level (1.38±0.16 ng/ml) by the time of implant removal in pregnant and non-pregnant cows. Further, none of the cows in this
study exhibited oestrus during the implant period. Norgestomet was found to have approximately 300 folds more biological activity than natural progesterone in the dairy cows (Barnes et al., 1981). This might be the reason for the effective control of oestrus during the implant period in norgestomet treated cows. In the present study, both natural oestrus and induced oestrus in pregnant cows showed marginally lower progesterone profile when compared to non-pregnant cows. Higher progesterone level at the time of oestrus might affect sperm and ovum transport as well as the fertilization process and subsequent embryo passage to the uterus (De Silva et al., 1981). Duchens et al. (1995) stated that suprabasal progesterone level delayed the ovulation and lead to retention of Graafian follicle for an extended period and damage of the oocyte to such an extent that even inseminating close to the time of ovulation did not ensure conception. Thus, the marginally higher concentration of progesterone at natural and induced oestrus recorded in non-pregnant cows might have been one of the contributing factors for the failure of conception in this study.

In the present investigation, from day 2 to 6 post AI, the concentration of progesterone was higher in pregnant cows than in non-pregnant cows. Further, the difference was statistically significant (P<0.01) on day 6 after AI which agrees with the findings of Bugalia and Sharma, (1990). Similar trend was observed by Deshmukh et al. (2010) in postpartum Red Kandhari cows. Peters (1996) suggested that progesterone secretion could be a limiting factor to embryonic development during the first few days of pregnancy in bovines. The more rapid increase in progesterone level from day 2 to 6 post insemination in pregnant cows compared to non-pregnant cows in this study indicated a higher level of luteal activity which might have resulted in conception.

Hence, from this study it can be concluded that levels of progesterone during natural oestrus (0.36±0.08 ng/ml), induced oestrus (0.18±0.05 ng/ml) and implant removal (1.45±0.24 ng/ml), on the day of oestrus induction (7.19±0.46 ng/ml) and levels of progesterone at second, fourth and sixth day following induced AI viz 1.05±0.20, 1.70±0.22 and 3.37±0.77 ng/ml respectively ensured conception in repeat breeder cows.

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