Estrus response and conception rate in non-descript goats synchronized with TRIU C and $PGF_2\alpha$

B.Indhumathi[1], Cecilia Joseph[2]*, K. Kulasekar[3], S. N. Sivaselvam [4] and T. Sarath[5]

Department of Veterinary Gynecology and Obstetrics
Madras Veterinary College,
Tamil Nadu Veterinary and Animal Sciences University, Chennai - 7

ABSTRACT

In the present study thirty parous, healthy does were selected from Goat Breeding unit, Post Graduate Research Institute in Animal Sciences, Kattupakkam, Kanchipuram district, Tamil Nadu and randomly divided into three groups of ten each. Group I does were treated with 125 microgram of $PGF_{2\alpha}$ intramuscularly and Group II does were kept with intravaginal progesterone device TRIU C for seven days and an intramuscular injection of 50 microgram of $PGF_{2\alpha}$ on the sixth day of treatment and ten does served as control. The mean ± SE estrus onset interval in control and treatment groups were 207±55.35, 55 ± 0.50 and 36.40 ± 0.40 hours respectively and significant difference was observed between treatment groups. The mean ± SE duration of estrus and estrus response in the groups were non- significant. The present study concluded that the use of progesterone device (TRIU C and $PGF_{2\alpha}$) enhanced the estrus response, shortened the duration for onset of estrus, high estrus intensity score and well pronounced estrus behavior as compared to $PGF_2\alpha$ alone treated goats. The conception rate was higher in group II (60 %) as compare to other groups even though it was non-significant. The present study concluded that the progesterone device (TRIU C and $PGF_{2\alpha}$) treated group has shown better estrus response, higher estrus intensity score and improved conception rate in non-descript goats.

Key words: Estrus synchronization, Goats, $PGF_{2\alpha,}$ Progesterone device, TRIU C

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[1] Part of M.V. Sc., thesis submitted to Tamil Nadu Veterinary and Animal Sciences University, M.V. Sc Scholar

[2] Professor and Head, Department of Veterinary Gynecology and Obstetrics, Madras Veterinary College, Chennai-07

[3]Professor and Head, Department of Clinics, Madras Veterinary College, Chennai-7

[4]Department of Animal Genetics and Breeding, Madras Veterinary College, Chennai-7

[5] Assistant Professor, Department of Clinics, Madras Veterinary College, Chennai-7

*Corresponding author: drceciliajoseph@yahoo.com

INTRODUCTION

Estrus synchronization (ES) plays a key role in fixed time breeding, Artificial Insemination (AI), Multiple Ovulation-Embryo Transfer (MOET), Laparoscopic Ovum Pick-up (LOPU) for oocyte or embryo collection and Embryo Transfer (ET) in farm animals (Rahman *et al.,* 2008). ES in livestock focuses on the manipulation of either the luteal or the follicular phase of the estrous cycle. In does and ewes, the opportunity for control of estrous cycle is greater during the luteal phase, which is of longer duration and more responsive to manipulation by using hormones. A considerable amount of information was produced and published on ES in sheep, however meager in goats. Progesterone or synthetic progestin can be administered by using an intra vaginal-releasing device or by feeding. Intravaginal sponges have been the treatment of choice for ES in small ruminants. Intravaginal sponges with progestogens are effective at lower dose levels than natural progesterone (Wildeus 1999). A Controlled Internal Drug Releasing device (CIDR) is another form of implant contains 0.3 mg of progesterone and it can inserted in to the vagina of doe for 8 to 17 days followed by the injection of $PGF_2\alpha$ 24 h before withdrawal. CIDR implants can be used in association with GnRH and prostaglandin $F_2\alpha$ to induce estrus (Robin *et al*., 1994). However, reports on intra-vaginal devices and its synchronization efficacy and conception rate in goats are inadequate in nature. Hence, the present study has been designed with objectives to study the efficacy of intra-vaginal progesterone implant (TRIU C) and $PGF_2\alpha$ in synchronization of estrus and conception rate in non-descript goats.

MATERIALS AND METHODS

Thirty parous, healthy does maintained at Goat Breeding Unit, Post Graduate Research Institute in Animal Sciences, TANUVAS, Kattupakkam, Kanchipuram district, Tamil Nadu weighing between 20-30 kg were selected for the study. All the goats were maintained under semi-intensive system and uniform feeding and managmental conditions. Transrectal ultrasonography using B-mode, Real time scanner (Mindray Biomedicals Ltd, China) equipped with 7.5 MHz linear transducer was carried out to eliminate pregnancy and to assess the ovarian status of non-pregnant does. Animals were kept off-feed for 12 h prior to ultrasonographic scanning. Goats with evidence of CL in the ovary were divided into three groups of ten each. Group I does were treated with 125 µg of PGF2α (Pragma, Intas pharmaceuticals, India) and Group II does were subjected to Intravaginal insertion of progesterone device (TRIU C) for seven days (Fig 1 and 2) and I/M injection of 50µg of $PGF_{2\alpha}$ on sixth day of treatment.

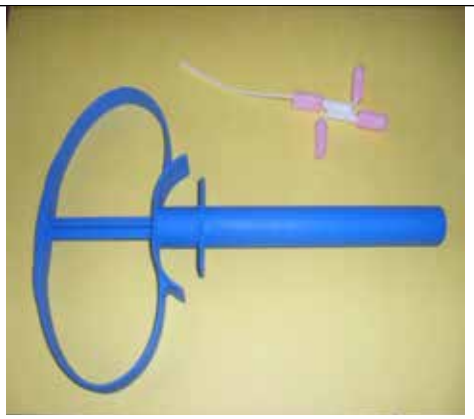

Figure 1. TRIU C (Intra vaginal Progesterone device) with applicator

Figure 2. Intra-vaginal insertion of TRIU C (Progesterone device) by using applicator

The remaining ten does were kept as untreated control. Experimental does were observed for onset of estrus, duration of estrus, estrus behavior and intensity of estrus based on behavioral, physiological signs and vaginal exfoliative cytology as per the study conducted by Selvaraju (1994). The experimental does were allowed for natural service after exhibition of estrus. The pregnancy was confirmed on 30 – 35 days of post breeding by trans-rectal ultrasonography using a real time B-mode scanner equipped with 7.5 MHz linear array transducer. The data collected were subjected to statistical analysis as per Snedecor and Cohran (1989).

RESULTS

The estrus response in control, group I and group II was 80, 70 and 100 per cent, respectively. In group II, all the does treated with TRIU C exhibited estrus (Table. 1). There was a significant difference in the estrus onset interval between group I and group II. The group II does treated with TRIU C showed earlier onset of estrus when compared to group I.

Table 1. Estrus response, onset and duration of estrus in does in control and treatment groups

Groups	Estrus response (%)	Estrus onset interval (h) Mean ± SE	Duration of Estrus (h) Mean ± SE
Control (n =10)	80 (8)	207 ± 55.35	46.62 ± 0.67
Group I ($PGF_{2\alpha}$) (n=10)	70 (7)	55.50 ± 0.50^{a}	47.85 ± 1.48
Group II TRIU-C®) (n =10)	100 (10)	36.40 ± 0.40^{b}	44.00 ± 1.85

Means with different superscript differed significantly - $P< 0.01$
Figures in parenthesis indicate number of animals

The intensity scores of behavioral signs exhibited in the control, group I and group II were 5.75, 6.85 and 8.80, respectively. The intensity scores of physiological signs exhibited in the control, group I and group II were 6.62, 6.57 and 8.30, respectively.

The conception rate in the control, group I and group II was 50, 57 and 60 per cent, respectively. In the present study, the conception rate was higher in TRIU C group when compared to other groups even though the difference was non- significant.

DISCUSSION

Exogenous administration of $PGF_2\alpha$ analogue elucidated 87.5 per cent estrus response at a dose of 125µg. The variation in estrus response observed in group II could be due to the difference in the age of the corpus luteum at the start of the experiment which could have resulted in refractoriness to $PGF_2\alpha$ (Greyling and Van Niekerk 1986). All the does treated with the intravaginal progesterone device TRIU C responded to the estrus synchronization treatment and exhibited estrus signs. This is in agreement with the findings of Oliveria *et al* (2001) in Saanen goats; Romano (2004) in Nubian goats who also observed similar response elucidated by the progesterone device.

The onset interval of 55.70 ± 15.46 h recorded in $PGF_2\alpha$ treated group is in accordance with Karikari *et al* (2009) who similar results in West African Dwarf does and further, Khanum *et al* (2006) reported that 19 out of 20 animals treated with 125µg of $PGF_2\alpha$ analogue exhibited estrus after 56-72 h. In the present study, the variation in the estrus onset interval with $PGF_2\alpha$ treatment may be related to the size or maturity of the largest non-atretic ovarian follicle during the mid-cycle that continue to mature and ovulate after the corpus luteum regression by prostaglandin in cattle (Scramuzzi *et al*., 1980). The estrus onset interval of 36.40 ± 0.40 h was observed in the progesterone treated group was similar to the findings of Selvaraju (1994) who reported 32-42, 32-54 and 34-48 h with a mean of 36.71 ± 0.80, 38.71± 1.71 and 38.17±1.36 h in Tellichery goats treated with FGA, MAP and CIDR and 600 IU of PMSG intramuscularly on the day of progesterone withdrawal.

The shorter duration of estrus interval in group II observed in the study could be due to the effect of TRIU C on follicular dynamics resulting in early initiation of new follicular wave and subsequent reduction in progesterone level followed by administration of 50µg of luteolytic dose of $PGF_2\alpha$ analogue prior to withdrawal of implant followed in this study. The difference in duration of estrus in control and both the treatment group was found to be non-significant, however, small variation was observed in the Group I and Group II. The individual variability inherent in the events following estradiol peak during estrus which is beyond the capacity of synchronization may be responsible for the differences in the estrus duration with prostaglandin treatment (Frietas *et al*., 1996b).

The estrus intensity score was maximum in group II which clearly reflected the effect of progesterone in psychic expression of estrus. In the present study the intensity score was maximum in TRIU C treated group which is similar

to the results observed by Selvaraju (1994). This could be due to the effect of progesterone in modulating the follicular wave (Menchaca and Rubianes 2002) and increased quantity of estrogen secreted by the follicle (Armstrong *et al*., 1982).

Greyling and Van Niekerk (1986) reported mean conception rate of 58 per cent with prostaglandin treatment and Romano (2004) obtained 63 per cent with CIDR which concurred with the present finding. Therefore, the present study concluded that the use of progesterone device enhances the estrus response, shorter duration for onset of estrus, high estrus intensity score and well pronounced estrus behavior and improved conception rate as compared to $PGF_2\alpha$ treated goats. Hence, the present study concluded that the progesterone device may be used to synchronize estrus in non-descript goats for better estrus response and conception rate.

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