THE EFFECT OF THE LAPAROSCOPIC INSEMINATION TECHNIQUE ON THE OESTROUS CYCLE OF THE EWE

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ABSTRACT

This investigation was designed to determine whether or not the technique of intrauterine insemination affects the length of the subsequent oestrous cycle. Dorper ewes (n=31) were divided into treatment and control groups. All the ewes were synchronised using 40 mg fluorogestone acetate intravaginal sponges for 14 d and 300 IU pregnant mare serum gonadotrophin on the day of sponge removal. A standard semen diluent was deposited laparoscopically in each uterine horn of ewes in the treatment group. Teaser rams were used to detect oestrus. Progesterone profiles were used to confirm oestrus. The mean oestrous cycle length of 17,83 ± 0,69 d for the group in which the diluent was deposited by laparoscopy did not differ significantly ($P < 0,1$) from the 18,36 ± 2,11 d of the control group. The technique of laparoscopic insemination did not influence the length of subsequent oestrous cycles.

Key words: Laparoscopic insemination technique, ewes, oestrous cycle.

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INTRODUCTION

The intra-uterine laparoscopic insemination of sheep with frozen semen has become a widely-used technique[5 8 9 10]. Ewes that fail to conceive to laparoscopic insemination at synchronised oestrus, are usually bred to rams in the subsequent oestrus. In South Africa many farmers allege that ewes show prolonged inter-oestrous intervals following laparoscopic insemination (J. Steyn, Taurus, Bloemfontein - unpublished results). According to Maxwell[8], the manipulation and resulting stress associated with the intra-uterine insemination technique close to the time of ovulation, interferes with the passage of ova from the ovarian surface to the oviduct as well as with oviduct transport. Furthermore, ovarian examination may be detrimental to sperm transport and future embryonic survival[9].

It has also been shown that the additional manipulation associated with insemination into the tip of the horns rather than into the middle, reduces the lambing percentage[9]. The purpose of this study was to determine whether or not the technique of intra-uterine insemination affects the length of the first inter-oestrus period after insemination.

MATERIALS AND METHODS

Dorper ewes (n=31) of mixed ages with an average mass of 50,8 ± 7,4 kg and with a condition score[15] of 2 were used. They were kept in a small camp and fed ca 1,4 kg lucerne hay per day and a commercial sheep lick (Pascor F, Silgro) ad lib from 6 weeks before the start and throughout the duration of the experiment (July - August 1988). The ewes were randomly divided into 2 groups. Although 71% of the ewes were two-tooth, an even distribution of age was maintained. Group A (n=15) was the treatment group and Group B (n=16) served as controls.

Sponges impregnated with 40 mg fluorogestone acetate (Chronogest, Intervet, Kempton Park, SA) were inserted intravaginally into all ewes on Day -16 and subsequently removed on Day -3 at 23:30. PMSG (Folligon, Intervet, Kempton Park, SA) was administered intramuscularly at the same time at a rate of 300 IU per ewe. On Day -1 both groups were starved and exposed to 2 testosterone-treated wethers (200 mg testosterone cypionate intramuscularly every 2 weeks for the duration of the experiment; Testan, Centaur, Johannesburg, SA) fitted with harnesses containing marking crayons. The teasers were removed on Day 0, reintroduced on Day 3 and left with the ewes until the end of the experiment. The colour of the crayons was changed every 2 weeks. Marking of ewes was recorded daily.

On Day 0 (08:00), semen diluent[2] was deposited laparoscopically[3 6] in each uterine horn of sheep in Group A using a transcap and an aspic (IMV, France). All ewes were sedated with 0,25 ml xylazine (Rompun, Bayer, Isando, SA) 20 min prior to laparoscopy. The laparoscopic sites were infiltrated with local anaesthetic (Lignocaine 2%, Centaur, Johannesburg, SA) after disinfection. With the exception of blood sampling, Group B ewes were not handled during oestrus.

Blood samples were collected by jugular venipuncture into 10 ml heparinised vacuum tubes on Days 0, 7, 18, 25 and 36 of the trial. Additonal blood samples of ewes were collected on days when they were marked by the teaser rams if these did not coincide with the days mentioned above. Progesterone concentrations were determined by means of radio-immunoassay (Progesterone Coat-A-Count, DPC, Los Angeles, USA). Progesterone profiles were used to determine ovarian activity and the occurrence of silent oestrus.

Results were compared statistically using Student's *t* test.

RESULTS

Nine of 15(60%) ewes in Group A and 10 of 16 (63%) ewes in Group B were marked. One ewe in Group A and one in

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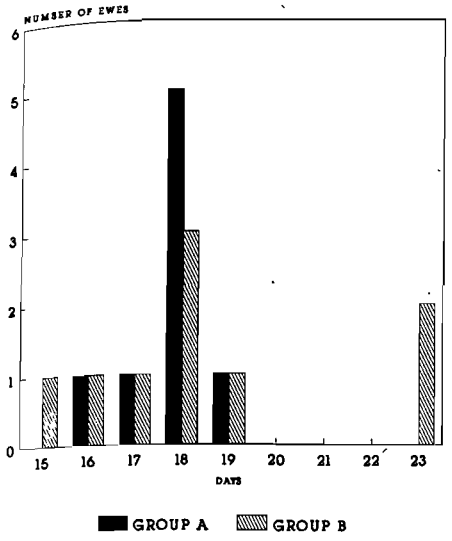

Fig. 1: **The distribution of the oestrous cycle length after synchronised heat of Group A and Group B ewes based on the number of ewes marked by the teaser rams**

Group B were excluded from the calculations because they were marked on Day 5 and Day 6 respectively. Fig. 1 shows the distribution of oestrous cycle length after synchronised heat in each of the 2 groups. The mean oestrous cycle length for Groups A and B were respectively 17,7 ± 0,83 and 18,56 ± 2,63 d. The difference was not statistically significant (P > 0,01).

Teaser rams only marked 57% (8/14) and 60% (9/15) of the ewes in each group. Serum progesterone concentrations suggested that a further 4 of 14 (29%) and 5 of 15 (33%) ewes in Groups A and B respectively, that had not been marked at the end of the first post-synchronisation cycle, had basal concentrations on Day 18, with subsequent rises to mid-cyclic concentrations. These ewes had indeed cycled with ovulation on about Day 19. Thus, using the progesterone profiles, the number of ewes cycling and the mean corrected cycle length of Groups A and B were 12 of 14 (86%) and 17,83 ± 0,69 and 14 of 15 (93%) and 18,36 ± 2,11 days respectively (Fig. 2). This difference was also not statistically significant (P > 0,1).

DISCUSSION

The mean cycle lengths in this trial were in agreement with results recorded by Boshoff[1] who found a mean oestrous cycle length of 17,7 ± 3 d post synchronisation. According to progesterone profiles, the percentage ewes cycling between 15 and 23 days after the synchronised oestrus, was comparable with results reported by various authors[2 3 11 14]. However, teaser rams only marked a low percentage of ewes. Failure of teasers to mark ewes during oestrus is well-documented[4 6 13] and progesterone profiles showed that silent oestrus occurred during this trial. Silent oestrus is a common phenomenon in sheep and occurs particularly at certain times of the year, in young animals, during lactation or with poor nutrition[12 14]. Most of the sheep used in this trial, were two-tooth ewes and the experiment was carried out during July and August. These factors could therefore explain the high incidence of silent oestrus in both treated and control ewes.

In our trial, the laparoscopic insemination technique did not result in a lengthening of the oestrous cycle. However, silent oestrus or lack of marking of some ewes in both groups, could have been interpreted as a lengthening of the cycle. Other factors that may cause lengthening of the cycle, include PMSG dosage and embryonal death. High doses of PMSG may stimulate follicular development and luteinisation without ovulation, which can lengthen the inter-oestrus period[2 16]. Laparoscopic insemination in ewes with high ovulation rates as a result of PMSG stimulation, can result in a higher than normal incidence of embryonal death[7 8 10], which, in turn, could lead to a late return to oestrus and thus prolonged inter-oestrous intervals[12]. Neither of these factors were applicable during our trial, but they are still relevant to field laparoscopic exercises.

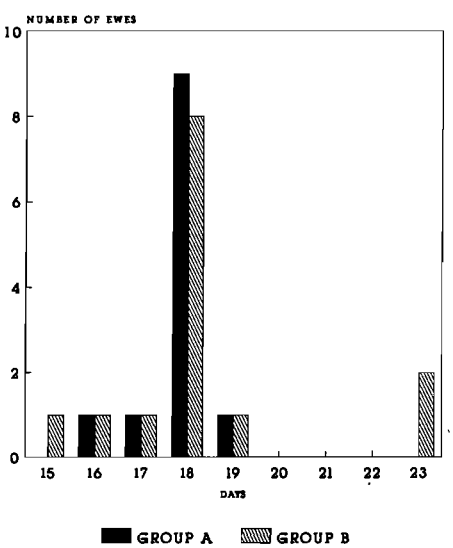

Fig. 2: **The distribution of the oestrous cycle length after synchronised heat of Group A and Group B ewes based on progesterone profiles**

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