

Effect of Prolonged Treatment with Melengestrol Acetate (MGA) on the Persistence or Non-Persistence of Ovarian Follicles in Ewes

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Abstract—The aim of this study was to evaluate whether prolonged treatment with acetate of melengestrol (MGA) influence or not, the ovarian follicular persistence in the ewe. We used 20 ewes with BCS 3.2 ± 0.3 (scale 1-5), 40.18 ± 5.8 kg BW and 3.25 ± 0.6 old years. All were confirmed by ultrasound, not pregnant. Treatment consisted of 0.22 mg of MGA daily during 17 days and follicular development was observed. The follicles were identified as an echogenic structures. The persistence or not follicular persistence was determined from changes in the size of dominant follicles in the days observed. During treatment, none of the ewes presented the dominant follicle persistent development. It is concluded that administration of prolonged treatment with MGA, not generates persistent follicle development in ewes.

Index Terms—Ewes, follicular persistence, melengestrol acetate.

I. INTRODUCTION

Knowledge of the mechanisms regulating follicular dynamics in sheep, has received special attention, mainly because of the interest in improving estrus synchronization and fertility, in seeking to obtain a more precise time of ovulation [1].

The use of ultrasound as a research tool has provided a significant change in the current concepts of physiology and particularly ovarian follicular dynamics. A follicular wave is characterized by synchronous growth of a group of follicles (emerging), that initially increases in size during a common growth phase and subsequently is difference in a single dominant follicle that continues to grow, while multiple subordinate follicles ceases your growths during its static phase [2], [3].

The development of more effective methods for synchronization and induction of estrus and ovulation depends on greater understanding the mechanisms responsible for follicular development and differentiation, as well as the mechanisms of action of chemical or biological agents used for this purpose [4].

Within the methods of synchronization of estrus and

ovulation induction, are found the hormonal treatments based in synthetic progestin, among them, it melengestrol acetate (MGA), which is a synthetic pro-gestational steroid of oral administration used by their ability to inhibit the estrous behavior in small ruminants, as inductor and/or estrus synchronizer and ovulation [5].

It is known that prolonged treatments (12-14 days) in ewes with progestin can efficiently control the estrus and ovulation, but it is believed that the fertility decreases when the estrus is synchronized [6]. This may be due to the types of progestin used and their dosages, which often are less effective than endogenous progesterone in suppressing LH secretion, that influence in: follicular development, increasing age of the ovulatory follicle, delayed of ovulation, oocyte aging and follicular persistence [7]. So the aim of this study was to evaluate whether prolonged treatment with MGA, influences or not in the ovarian follicular persistence of the female sheep.

II. MATERIAL AND METHODS

The study was conducted in the municipality of *Contepec Michoacán, México*; coordinates $19^{\circ}55'$ north latitude and $100^{\circ}11'$ west longitude, at an altitude of 2490 masl in a temperate climate with summer rains, rainfall of 1168.0 mm and temperatures ranging between 8.6 and 22.4°C [8]. During the month of July (in full breeding season) were used 20 ewes of *Dorper* and *Dorper* crossed with *Pelibuey*, not pregnant a, with BCS of 3.2 ± 0.3 (scale 1-5), 40.18 ± 5.8 kg BW and 3.25 ± 0.6 old years. All sheep remained housed in an area of 72.0 m² were individually identified with a earring, 30 previous days the MGA treatment received vitamins and treatment against parasites. The ewes had the same handling and were fed corn stubble, oat, barley grain and water *ad libitum*.

To start study was realized a gynecological evaluation on all ewes using a B-mode ultrasound (Draminski, Animal Profi model) equipped with a transducer sectorial of 3.5 and 5.0 MHz trans-rectal, to confirm that was not pregnant. The ewes were found in different days of the estrous cycle. Treatment consisted of 0.22 mg of MGA per ewe continuous seventeen days to ensure your intake daily, were administered individually via oral. During treatment with MGA was gave follow at ovarian by via trans-rectal using the ultrasound with lineal transducer 7.5 MHz, to observe follicular development; this observation were made with the ewes on standing position. The rectal manure was manually

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removed to introduce 20 ml of hydro-soluble gel with a syringe, in order to avoid damage the rectal mucosa and improve the quality of transmission and image of the ultrasound. The follicles were identified as an echogenic structures (black on the ultrasound screen) located at the boundary between the follicle wall and the stromal ovarian. The persistence or non-persistence follicular was determined from changes in the size of dominant follicles in the observed days.

III. RESULTS AND DISCUSSION

None of the 20 ewes showed development of follicles persistent, this is because the dose of MGA was sufficient to suppress surge LH pre-ovulatory and prevent ovulation [9], without suppressing the secretion of FSH, therefore continued emerging the follicular waves. These results differ from some reports [10], Garcia et al., 2009), where found that the administration of synthetic progestin per intervals longer than the life of a corpus luteum (CL) in cattle, are usually less effective in the suppression of LH secretion than endogenous progesterone; generating a high pulsatile frequency of this hormone than result in development of persistent follicles. A report [11] indicates that peripheral levels of progesterone regulate follicle growth patterns across of negative feedback on pulsatile secretion of LH and than the increase in the frequency of pulses LH favors the persistence of the dominant follicle, while that decreasing of the pulse LH is associated with the loss of the follicle.

In cattle when was used a progestin therapy for extended periods in advanced stage of the estrous cycle [12], was observed that can produce dominant follicles persistent, but in ewes treated with MGA during 17 days was not affected follicular dynamics, even though some of they were in an advanced stage of the estrous cycle.

However, in sheep is says that in females cycling the progestin administration must be long enough to allow that lyse of CL is of natural form [13], and should be independent of the stage of estrous cycle in the which is realized. The use of prolonged treatment would block ovulation when this is starting in follicular phase (pro-estrus and estrus), preventing the formation of a CL; if the treatment is starting in the meta-estrus, the formation of CL is altered shortening its half-life; and if the treatment started coinciding with di-estrus, the CL is degrades naturally without be affected by the treatment. Of this form, it would be getting a greater response to estrus synchronization.

In this study, the prolonged treatment with MGA used was similar duration to that of estrus cycle, such that blockade of ovulation observed was independent of the stage of the cycle in that were, even in 3 of 20 ewes in which existed the presence of a CL at start the study.

When administration of progestin coincides with the presence of CL is achieved properly inhibit LH pulsations [14], which prevents the elevation of the frequency of LH pulsatile thus preventing the development of persistent follicles. In goats (n=38), follicular dynamics and fertility neither was observed altered by the presence or absence of a CL, during the estrous synchronization for 11 days with vaginal sponges impregnated with progestin [15].

To evaluate the effect of the presence or absence of a CL on follicular dynamic and conception rate, a study was conducted [16] in 79 goats cyclical synchronized with intra-vaginal sponges impregnated with 45 mg of acetate fluorogestone (FGA) during 11 days, whose estrus were pre-synchronized with two intramuscular injections of 7.5 mg of luprostiol with 11 days apart. 41 goats received on the eight and nine day, 7.5 mg luprostiol (in order of eliminate the present CL), in the remaining 38 goats was applied the luprostiol finished the treatment with progestin. It was found don't there evidence to affirm that the presence or absence of a CL can modify follicular dynamics or affect fertility in goats synchronized with FGA.

In another study [17] evaluated the ovulatory follicle growth during early the lysis of CL in an estrus synchronization program by treatment with progesterone for 19 days. In 8 ewes was placed a vaginal sponge with 20 mg of medroxyprogesterone, from the five to nineteen day after estrus; in other 8 ewes the sponge were placed the day five of cycle estrous and was replaced by new, in the days ten and fifteen of the same cycle; 5 ewes were used as control. The treated ewes, received 0.5 ml of prostaglandin the six and seven day of the cycle, to lyse the CL. It was found that the effectiveness of one sponge on negative feedback during fourteen days decreases with time, resulting in an increase in LH the pulsatile frequency and the presence of persistent follicles. This may explain why that prolonged treatment with MGA dosed and controlled individually, suppresses pulsatile LH secretion, without affecting follicular dynamics and without generating persistent follicles.

Finally, to evaluate the effect of a low dose progesterone on follicular dynamics and LH pulsation during postpartum anestrus in primiparous cows [18], was placed to 8 Jersey cows a CIDR recycled for ten days, and a new CIDR to 20 Friesian cows for six days. 9 cows that received the new CIDR, additionally were injected with 2 mg of estradiol benzoate (EB). The study concluded that the administration of low doses of progesterone (CIDR recycled) increases the release of LH without inducing development of persistent follicles and that the combination of progesterone (CIDR) with BE not induce development of persistent dominant follicles. These results could be determined by the short period of treatment with progestin and the state of anestrus in the cows.

IV. CONCLUSION

The prolonged treatment with acetate of melengestrol (MGA) not generated development of persistent follicles in ewes.

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