

Follicular Dynamic in Ewes during Melengestrol Acetate (MGA) Treatment

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Abstract—The aim of this study was to evaluate the follicular dynamics in ewes during a prolonged treatment with melengestrol acetate (MGA). Twenty non-pregnant ewes with 3.2 ± 0.3 BCS (scale 1-5), 40.18 ± 5.8 kg BW, and 3.25 ± 0.6 years old were supplemented daily with 0.22 mg of MGA for 17 days, and observed their follicular development. The follicles were identified as an echogenic structures. The two largest follicles observed were identified, monitored and measured daily until they reach its maximum size (> 5 mm) and their consequent follicular atresia at the end of each wave. The most of the ewes (85%) treated with MGA showed three follicular waves and the remaining 15% only show two waves. None of the ewes was observed ovulating during the period of treatment. The diameter of dominant ovulatory follicles observed had a variation from 5.5 ± 0.8 to 6.6 ± 0.5 mm. The duration of follicular waves was similar to those reported else. It's concluded that using this doses of MGA is suppressed the ovulation without effect on the follicular dynamics in ewes, allowing normal development of dominant follicles and the manifestation of ovulatory follicular waves.

Index Term—Ewes, follicular dynamic, melengestrol acetate.

I. INTRODUCTION

The various treatments conceptive have a general problem on fertility rate, closely related to the great variability of duration treatment, the moment when are implement, and the time when occurs ovulation [1]-[3]. Knowledge of follicular dynamics on any of these treatments, ago possible understand the ovarian mechanisms and helping design strategies what improve fertility in ewes [4]. The use of melengestrol acetate (MGA) in ewes during a period similar to or greater than the duration of estrus cycle, may be an alternative to mitigate the effect of this variability; for also have effect ovulation suppressor, allowing to occur lysis of corpus luteum naturally, regardless of the stage of the estrous cycle [5]. Therefore the aim of this study was to assess follicular dynamics in the ewes during a prolonged treatment with melengestrol acetate (MGA).

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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 [6]. 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 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. *Two largest follicles were identified, monitored and measured daily, detecting that they reach its maximum size (> 5 mm) and then reduces quickly to follicular atresic state at the end of each wave.*

III. RESULTS AND DISCUSSION

85% of the ewes treated with MGA showed three follicular waves and the remaining 15% only two waves, none was observed ovulating during treatment. The dispensed dose of MGA in this study was sufficient to suppress the ovulation, because the appropriate dose of this progestin inhibits LH pre-ovulatory without suppressing FSH secretion [7] that is why follicular waves continue emerging during the treatment period.

The number of follicular waves in ewes during the estrous

cycle is variable, because it seems to be influenced by factors genetic, nutritional, and environmental heat stress [8]. In ewes there were observed one to four follicular waves during the estrous cycle [9], the most common being three waves. In a similar study [4], to evaluate follicular dynamics in 14 ewes of the breed Bergamacia during natural oestrus cycle and during oestrus cycle prostaglandin-induced was observed that 92% had three follicular waves and the remaining 8% only two waves, whereby the treatment of MGA used in this study showed similar results to those of a normal estrous cycle.

The extreme diameter of dominant ovulatory follicle observed, were different in each wave (Fig. 1 and Fig. 2), with variations from 5.5 ± 0.8 to 6.6 ± 0.5 mm. These results are within the ranges described: 4.7 ± 0.4 mm in ewes synchronized with prostaglandins [10], 5.4 ± 0.2 mm in ewes synchronized with 500 IU of equine chorionic gonadotropin [11], 5.42 ± 0.30 mm in ewes with natural lysis of corpus luteum and lysis induced by prostaglandins [8], 6.2 ± 0.2 mm in ewes with progesterone intravaginal device [12], and 6.9 ± 0.1 mm in ewes during a normal estrous cycle [13].

In this study, the diameter of dominant ovulatory follicles, were similar to those reported. During a normal estrous cycle in 14 ewes of the Bergamacia breed [4], the found follicular diameter was 5.83 ± 0.3 , 5.42 ± 0.1 and 5.42 ± 0.4 mm in the first, second and third wave, respectively; and in this same order during a estrous cycle induced with prostaglandin the follicular diameter was 5.0 ± 0.1 , 4.5 ± 0.8 and 5.0 ± 0.2 mm, respectively. In 19 ewes [14] the maximum follicular diameter of the first wave and the ovulatory wave was 6.72 ± 0.3 mm during a normal estrous cycle of three and four follicular waves, while in ewes with two and three follicular waves [13] the maximum diameter of the ovulatory follicle found was 6.9 ± 0.1 mm.

The duration of first, second and third wave follicular, were different in ewes with three waves (Fig. 1); whereas in the ewes with two follicular waves the duration was similar (Fig. 2). The observation of follicles larger than 2 mm, indicate that this is time at which they become totally dependent of the gonadotropins for his follicular growth, and are visible by ultrasound [8]; criterion used to determine

the onset and duration of follicular waves.

At the beginning of this study the ewes were on different moments of their oestrous cycle, therefore in 50% of the cases it was not possible to observe the first follicular wave initiation; however, the tendency was the same compared with the ewes where it was observed completely the first follicular wave.

The duration of follicular waves observed during treatment with MGA are within the ranges reported: [15] 6-7 days in Suffolk ewes with three waves during a normal estrous cycle at the beginning, middle and end of the reproductive stage; [4] 3-6 days in Bergamacia ewes with two and three follicular waves during a normal estrous cycle and a cycle induced by prostaglandin; and [16] 10 days in Texel ewes with two follicular waves during a normal estrous cycle.

During treatment with MGA, the follicular diameter and length of the wave was reducing in the second and third wave; maybe due the time that takes the inhibitory effect of MGA, on release the peak pre-ovulatory LH, allowing greater follicle development and increasing the length his wave; or well, that the increase the amount of the follicles recruited, increase the maximum diameter and the growth rate of follicles large in the first follicular wave, as well as their length [17].

For his effect efficient in suppression of ovulation and by normal development of follicular dynamics observed, the administration of MGA in ewes during a treatment of prolonged duration similar to the one oestrous cycle, represents an effective strategy to mitigate the resulting variability of various treatments conceptive.

IV. CONCLUSION

Using melengestrol acetate (MGA) suppresses ovulation without affecting follicular dynamics in ewes, allowing normal development of dominant follicles and the ovulatory follicular waves.

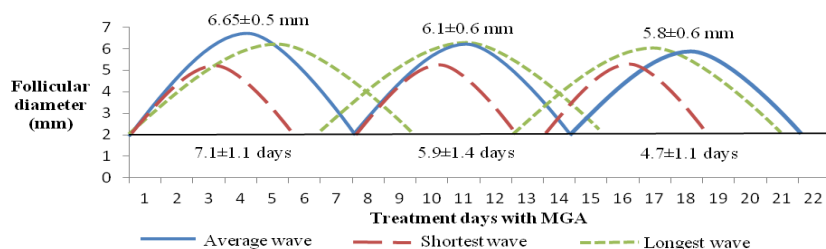


Fig. 1. Representation of the follicular dynamics observed in ewes with three follicular waves during a treatment with MGA.

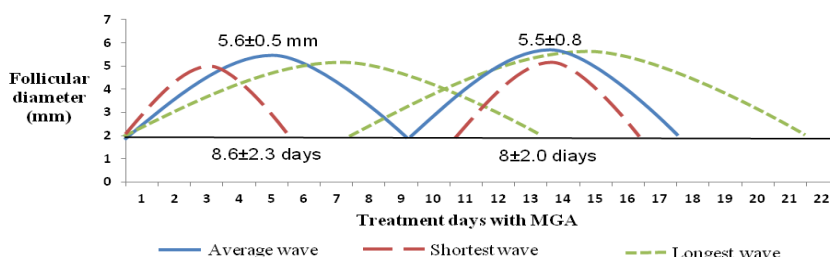


Fig. 2. Representation of the follicular dynamics observed in ewes with two follicular waves during a treatment with MGA.

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