SERUM PROGESTERONE BEFORE LAMBING IN MERINO,OSIMI AND THEIR CROSSES

By

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ABSTRACT

Blood samples were collected 3 times a week starting 20 days before the expected lambing of sexteen ewes (6 Merino, 5 Osimi and 5 Merino x Osimi). Serum progeserone concentration was determined for the samples of the last two weeks prior to parturition plus the sample of the lambing day (collected just after lambing). Double antibody RIA technique was used for hormonal assessment.

The overall mean of progesterone level was almost stable during the second pre-lambing week (ranging between 19.17 and 20.87 ng/ml). A week before lambing, progesterone decreased gradually to 13.93 ng/ml at two days before labour followed by abrupt drop to 1.98 ng/ml after lambing.

In general, Osimi ewes had the lowest progesterone level throughout the experimental period while Osimi x Merino crosses had the highest level. Progesterone ranged from 12.0 to 19.74 and from 15.24 to 22.49 ng/ml in Ossimi and crossbred ewes, respectively. Ewes delivering male lambs had lower levels than those giving females (ranging from 13.33 to 18.65 vs. 14.54 to 23.09 ng/ml, resp.).Differences in progesterone level due to either breed or sex of fetus were insignificant.

INTRODUCTION

The importance of progesterone in the maintenance of pregnancy is now accepted for all species. Disturbance in

its level causes difficulties in pregnancy maintenance and parturition. Progesterone is known to act during pregnancy by blocking myometrial activity which would lead to expulsion of the fetus. Removal of this blockade is associated with parturition (Hindson et al. 1969). During the last two thirds of pregnancy in sheep the contribution of CL in progesterone secretion is small relative to that of placenta (Short and Moor , 1959 and Mattner and Thorburn 1971).Thus, ewes can be ovarictomized after 50 days grom mating without disturbing pregnancy (Casida et al. 1945 and Denamur and Martinet 1955). A gradual decrease in pregesterone concentration throughout one to two weeks preceding lambing was usually but not always observed. Immediatly after parturition, progesterone almost disappeard from the placenta (Bassett et al. 1969, Obst et al. 1971 and stabenfeldt et al. 1972).

Numerous investigations studying the relation between progesterone level during pregnancy and some environmental factors are available. Nutrion (Obst et al. 1971 and Shevah et al. 1975) and number of fetuses (Bassett et al. 1969 , Staben feldt et al. 1972 and Shovah et al. 1975) had a clear effect on the progesterone concentration in ewes blood. Little information are available about other effects.

The present work aimed to study the prelambing progesterone profile of two differents breeds of sheep and their crosses under Egyptian conditions beside the effect of sex of embryo on its dam's progesterone concentration.

MATERIAL AND METHODS

Sixteen ewes (6 Merino, 5 Osimi and 5 Merino x Osimi) belonging to the experimental farm of Faculty of Agriculture, Cairo University were used in this study during December 1984. The animals were housed in a semi-open shed and were fed a concentrate mixture according to their body weight and reproductive status. The concentrate mixture contained 16% crude protein, 16.5% crude fiber and 2% fat. Rice straw was offered ad-lib., and Egyptian Clover (Trifolium alexandrinum) was fed when available.

About 20 days before expected lambing, ewes were bled from the jugular vein (about 3 ml) three times a week until the delivary had been occurred. The samples of the last 2 weeks of pregnancy plus the sample of the lambing day (collected just after delivary) were used for progesterone determination. Blood was collected without adding any anticoagulate material. Throughout 1/2 hr. after collection, samples were centrifuged and serum was separated. Serum was stored at - 18°C till the assay was carried out.

Double antibody radioimmunoassay technique was used for progesterone determination. Assessment of progesterone was performed according to Abdelaal and Dobson (1986) using ovine antiserum. Antiserum was a gift from Dr.Hilary Dobson (Mrs.) University of Liverpool, United Kingdom. I^{125} progesterone tracer was produced by Farmos Diagnostica, Finland. The cross reaction of progesterone antiserum was 1% with II deoxy corticosterone and below 0.5% with all other steroids (at approximatly 50% binding). Intra and inter assay variation coefficients were 3.9% (n=10) and 9.3% (n=27), respectively). The standard curve of progesterone (prepared in male sheep serum) ranged between 0.0 and 28.0 ng/ml. Sensitivity value when assaying 25 µl of serum was 0.27 ng/ml.

Statistical analysis was carried out by the least squares mehtod (Harvy, 1980).

RESULTS

Least squares overal means presented in table (1) indicate that progesterone concentration during the second week pre-lambing was almost constant (ranged between 19.17 and 20.87 ng/ml). From the 4 th day pre-lambing a gradual decline was observed reaching a lower level two days prior to parturition (13.93 ng/ml). After lambing, abrupt decrease was found in blood progesterone level (1.98 ng/ml) (Fig.1).

Values of progesterone level in the present study are higher than the corresponding averages reported by Bassett et al. (1969), Obst et al (1971) and Stabenfeldt et al. (1972). Those authors reported values not exceeding 10 ng/ml. These differences

may be due to the different methods used in hormonal assay (comptative binding protein vs. RIA) and/or the breed of sheep used in the study and natural condition in different locations. The very high level found by Mattner and Thorburn (1971) (72.0 ng/ml) is due to assaying progesterone in the blood of utero-ovarian venous (before progesterone metabolism in the body).

The trend of change in progesterone concentration found in this study resembles that reported by Bassett et al. (1969) and Obst et al, (1971).

Osimi ewes had always the lowest level of prgesterone, whereas Merino x Osimi corsses, in general, had the highest ones (Table 1). However, differences in progesterone level due to breed of ewes were insignificant (Table 2).During the second week pre-lambing, serum progesterone concentrations were close in both Merino and crossbred ewes. The differences between the two breed classes became more pronounced during the last week of gestation. Breeds showed different patterns in the trend of change in progesterone level. Where Merino started to exeret obvious decrease in the 7th day pre-lambing, Crossbreds and Osimi ewes respectively started to decrease their progesterone levels 5 and 3 days later (Table 1).

Figure 2 shows that individual ewes possessed different trends in the time of decline in their progesterone level. In most of the animals, progesterone began to decrease during the last week of gestation, while in some others it remained high until the day of lambing.

In the whole experimental period, ewes which bore male lambs had a lower progesterone concentration than those bearing females (Table 1 and Figure 1). As the differences in progesterone level between these two cases varied from 0.94 to 5.77 ng/ml it was found to be statistically insignificant (Table 1 and 2).

Limited information are available about the effect of fetus sex on the gonadal hormones of its dam. In buffaloes, male fetus possessed a reverse trend to that obtained in the present study (Barkawi, et al. 1986). Erb, et al. (1982)found a clear trend for oestrogen with the sex of Holestein embryo

than that for progesterone. Dams which bore male fetuses had higher oestrogen levels than those bearing female ones.

DISCUSSION

Species such as sheep which do not require a CL for pregnancy maintenance during the last two-thirds of gestation do not express a progesterone decline prior to parturition (Stabenfeldt et al. 1970). The continuation of progesterone in high levels until parturition is due the function of placenta (Casida et al. 1945, Denamur and Martinet 1955, Fevre and Rombauts 1966 and Mattner and Thorburn,1971). Bassett et al.(1969) and Obst et al(1971)found that progesterone began to fall 4 days before birth followed by rapid decrease 16-24 hr prior to parturition. Plasma estrogen levels rise sharply within 2 days prior to lambing. Fetal cortisol may be responsible for both the decrease in progesterone and the increase in estrogen production rate (Jainudeen and Hafez 1980). The increase of fetal cortisol is due to the rapid growth of the fetal adrenal during the last 10 to 15 days of gestation (Liggins et al. 1973). Changes in steroid levels particularly the increase in estrogen level stimulate PGF 2 synthesis and release from the maternal cotyledons during the last 24 hr. of gestation. The decline of progesterone level at the end of pregnancy is essential before the output of PGF_2 from placenta. On the lambing day, the abrupt decrease in past.lambing progesterone level is due to a decline in placental roduction rate and/or increase in metablic clearance (Jainudeen and Hafez 1980).

The role of fetus sex on the maternal hormonal concentration is still obscure, so, this point needs further studies.

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Table (1): Least squares means (± S.E.) of progesterone level in the different determinations classified by breed of ewe and sex of the fetus.

Items	Number	Days Pre-Lambing						Lambing
		- 14	- 11	- 9	- 7	- 4	- 2	
Overall	16	20.87	20.79	19.47	19.17	17.95	13.93	1.98
		1.58	1.52	1.52	1.53	1.12	1.65	0.30
Breed								
Merino	6	20.39	22.95	20.76	18.83	16.99	14.56	1.67
		2.72	2.70	2.59	2.73	2.31	3.41	0.62
Cross	5	22.49	21.96	19.75	20.82	20.44	15.24	2.79
		2.72	2.71	2.87	2.74	1.89	2.79	0.51
Osimi	5	19.74	17.36	17.90	17.88	16.40	12.00	1.47
		3.03	2.71	2.59	2.74	1.89	2.79	0.51
Sex.								
Female	9	23.09	22.11	21.46	22.06	19.65	14.54	2.45
		2.50	2.14	2.05	2.17	1.53	2.26	0.41
Male	6	18.65	19.47	17.48	16.29	16.24	13.33	1.51
		2.21	2.36	2.42	2.39	1.95	2.88	0.52

Mean do not differ significantly from each other at the 5% level.

Table (2): Mean squares (MS) of progesterone level in the different determinations.

S.V.	df	MS.						Lambing
		-14	-11	- 9	- 7	- 4	- 2	
Breed	2	7.13	41.47	9.78	11.22	22.66	14.09	2.41
Sex	1	42.76	22.52	48.13	27.88	27.88	3.50	2.09
Error	12	26.49	36.16	361.82	17.56	17.56	38.26	1.26

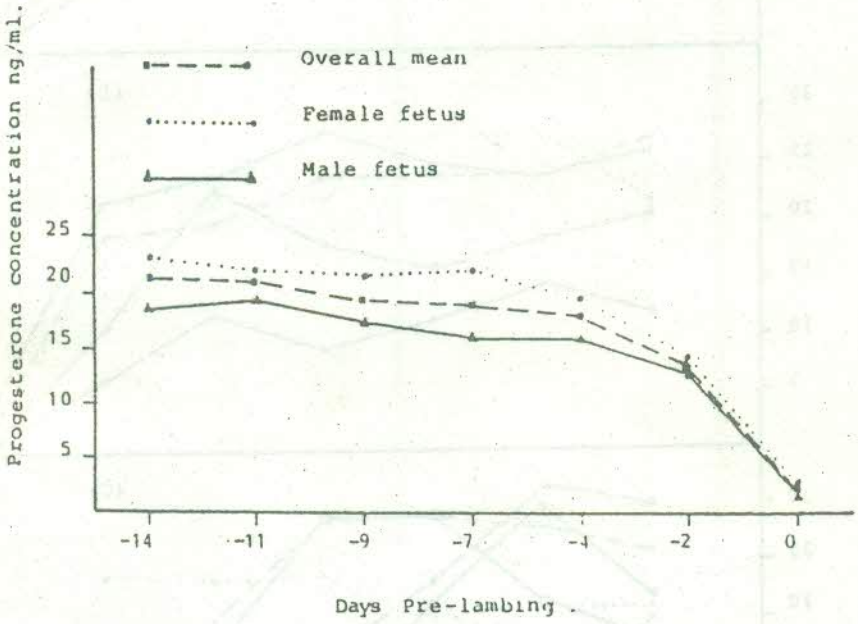

Fig. 1 Least squares means of serum progesterone concentration in ewes which bearing male and female fetuses and its overall mean during the last 2 weeks of pregnancy(0 day= day of lambing).

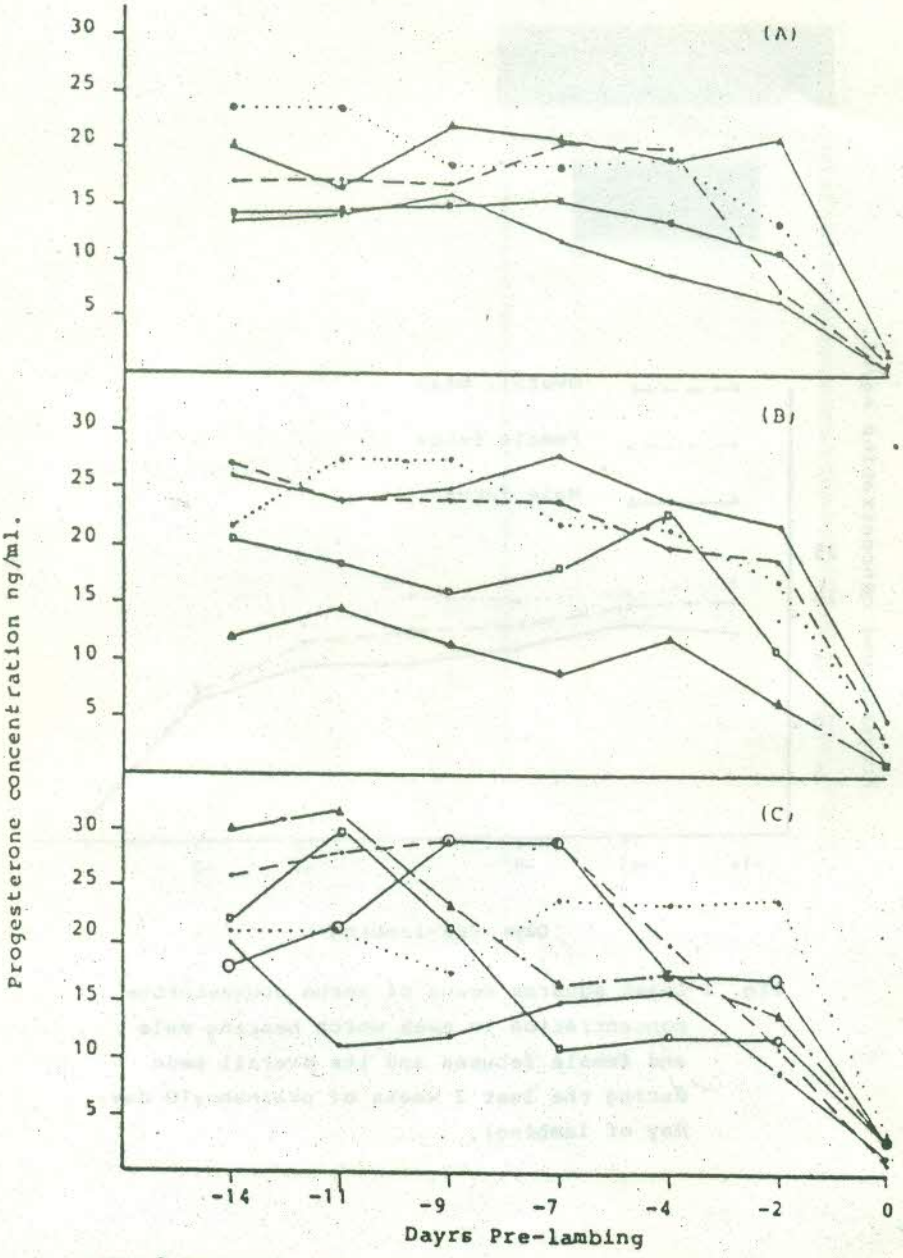

Fig.2 Ptogesterone level in individual ewes of Osimi (A),Osimi X Merino Crosses (B) and Merino (C) throughout the last two weeks of gestation period.

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تركيز البروجسترون قبل الولادة فى سيرم الدم لأغنام المرينو والاوسيمى وخلطانهما

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الملخص

تم جمع عينات من ١٦ نعجة (٨مرينو ، ٥ أوسيمى ، ٥ مرينو x أوسيمى) بداية من اليوم العشرين قبل الولادة بمعدل ٣ مرات أسبوعيا وقد تم تقدير تركيز البروجسترون فى سيرم الدم بطريقة المناعة الاشعاعية خلال الاسبوعين الاخيرين من فترة الحمل بالاضافة الى عينة يوم الولادة .

وقد كان متوسط تركيز البروجسترون فى الدم ثابتا خلال الأسبوع الثانى قبل الولادة حيث تراوح بين ١٩ر١٧ ، ٢٠ر٨٧ نانوجرام/سم٣ من الدم . وفى الأسبوع الأخير من الحمل بدأ البروجسترون فى الانخفاض حيث بلغ تركيزه ١٣ر٩٣ نانوجرام / سم٣ من الدم فى اليوم الثانى قبل الولادة ثم انخفض بصورة مفاجئة الى ١ر٩٨ نانوجرام /سم٣ من الدم بعد الولادة مباشرة .

وخلال فترة التجربة كان مستوى البروجسترون بصفة عامة أقل فى دم الأوسيمى عنه فى دم المرينو والخليط بينما بلغ أعلى تركيز له فى دم الخليط . وقد تراوح تركيز البروجسترون فى دم كل من الأوسيمى والخليط من ١٢ر - ١٩ر٧٤ ومن ١٥ر٢٤ - ٢٢ر٤٩ نانوجرام/سم٣ سيرم على التوالى . وكان تركيز البروجسترون فى دم الأمهات التى أعطت حملانا ذكورا أقل منه فى تلك التى أعطت حملانا أناثا حيث تراوح تركيزه من ١٣ر٣٣ - ١٨ر٦٥ مقابل ١٤ر٥٤ - ٢٣ر٠٩ نانوجرام / سم٣ دم فى المجموعتين على التوالى . وكانت الفروق فى مستوى البروجسترون الراجعة الى تأثير النوع وجنس المولود غير معنوية .

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