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DETECTION OF EARLY PREGNANCY IN AWASSI EWES BY MEASUREMENT OF BLOOD PROGESTERONE LEVELS

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SUMMARY

Twenty Awassi ewes aged 2-3 years were used in this experiment. Estrus was synchronized in these ewes by using intravaginal sponges containing 60 mg of Medroxy Progoesterone Acetate (MAP) which was kept for 9 days followed by intramuscular injection of 500 IU of Pregnant Mares Serum Gonadotrophin (PMSG) immediately after withdrawal of the sponges. Ewes were monitored for signs of estrus by means of an apronized detector ram, those which came into estrus were hand-mated to a known fertility rams. Following the service, blood was drawn from the jugular vein of each ewe at days 0 (before sevice), 12, 16,24,28,35,42 and 50 . Serum was isolated and utilized for progesterone assay. Progesterone was assayed by RIA method. Mean progesterone concentrations for the fore mentioned periods were: 0.263, 4.909 , 5.290, 5.21, 5.1 , 5,18, 5.59 and 5.17 ng/ml, respectively.

Mean progesterone concentration in ewes bearing single fetus for the above mentioned periods were : 3.64, 3.48, 3.78, 3.7, 3.84 , and 3.74 ng/ml, respectively. While in those bearing twin were : 6.58, 6.58, 6.64, 6.7, 6.66, 7.34 and 6.6 ng/ml, respectively.

The conclusion was that progesterone assay proved to be a reliable method for early detection of pregnancy in Awassi ewes and can be used to differentiate between single and twin pregnancies.

INTRODUCTION

An early detection of pregnancy is necessary for efficeint sheep production. An accurate method for pregnancy diagnosis of single and multiple fetuses may increase management level and culling of nonpregnant ewes at an early time of the breeding season (1,2).

Pregnancy diagnosis in women can be made as early as 21 days after conception by detecting placental gonadotrping in urine (3).

Cole and Hart (4) detected the presence of pregnant mare gonadotrpin in the blood at 37 days of pregnancy and developed an early pregnancy test for mares. Such attempts in ewes have failed. A reliable method to detect pregnancy factor was established on measuring progesterone level at fixed times during pregnancy in which peripheral blood progesterone level remains elevated at the expected return to estrus between 15-18 days after mating (5,6,7,8).

Robertson and Sarda (7) found that ewes in estrus had very low progesterone level and this level increased after day fourth of the cycle then dropped sharply at day 14 of the cycle in nonpregnant ewes while remained elevated in pregnant ewes. Shemesh et al (9) used progesterone determination for accurate pregnancy diagnosis at 16-21 days or 32-35 days after mating. Progesterone determination can also be used to detect barren ewes with comparatively low level of progesterone (10). Progesterone level, however, did not indicate a significant change in single or multiple pregnancies until after day 50 of pregnancy (11).

This experiment was designed to measure progesterone levels during early pregnancy in Awassi ewes and to detect multiple pregnancies.

MATERIALS & METHODS

Twenty Awassi ewes were randomly selcted from a stockyard in Baghdad. These ewes were without a previous breeding history or reproductive performance. Their ages ranged between 2-3 years.

The ewes were housed in large stalls, in groups of five ewes each. They were flushed and recieved green feed of alfalalfa. Each ewe was examined thoroughly for apparent reproductive problems and pregnancy . All ewes recieved two injections of Prostaglndin F2 alpha analogue (7.0 mg of Luprostiole*) at 10 days interval and a single injection fo 35 mg of Dexamethasone (Decadrone **) to terminate pregnancy. Ewes were checked for signs of estrus by a teaser appronized ram for three times daily and inspected for any vaginal discharge.

Estrus was synchronized by using intravaginal sponges impregnated in 60 mg of Medroxy Acetate Progesterone (MAP)*** kept for 9 days and recieved an intramuscular injection of 500 IU of Prgenant Mare's Serum Gonadotrophin (PMSG)**** immediately after removal of sponges.

Ewes that showed estrous signs with cloudy vaginal discharge were selected for mating with two rams of known fertility.

Blood samples obtained from the jugular vein of the ewes at days 0 (before mating), 12, 16, 24, 28, 35, 42, and 50 after mating .
Serum was isolated and frozen at -20 °C then assayed for Progesterone ****
All ewes remained under diserention for return to estrus and pregnancy until parturition.

RESULTS

Treatment with Dexamethasone and prostaglandin revealed that non of the treated animals were pregnant, since no signs of abortion or parturition were observed. Estrus was observed in 10 ewes within 4 days after synchronization. None of the ewes returned to estrus after mating.

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* Intervet Int. B.V., Boxmeer, Holland.
** Merck-Sharp & Dohme, Raway, N.J., USA.
*** Veramix, Upjohn Co., Kalamzo, Michigan, USA.
**** Amerix-M, Progesterone RIA kit, Amersham.

Progesterone levels as depicted in Fig. (1), was low during estrus and with significant rise after estrus, the progesterone remained elevated from days 12 to 50 after mating. There were no significant differences in the mean values of progesterone levels during this period and all ewes were considered to be pergnant.

Pregnancy was confirmed by lambing at the end of the experiment when half of the froup (5 ewes), had sigle births and the other half (5 ewes) had twin births. Accordingly, progesterone levesl, as shown in Fig. (2) reflected significant differences between single and twin pregnancies for the period assayed.

The results of this experiment indicted that measurement of blood progesterone levels in ewes can be used for detection of early pregnancy, also it can be used to discrimenate between single and twin pregnancies. Furthermore, these results also showed that synchronization of estrus by application of hormones to ewes improved fertility and twining rate.

DISCUSSION

The results of this experiment showed that Awassi sheep production requires flushing before breeding. Exposure to ram in this experiment, helped to overcome the anestrus condition of ewes. This view was also expressed by Ott and Memon (12). These results confirmed previous reports that synchronization of estrus in the ewes can be successfully achieved and with high fertility and twining rates by the use of intravaginal sponges containing progesterone and PMSG injection (13,14,15,16).

Progesterone measurement proved to be an efficient mehtod for early detection of pregnancy in Awassi ewes and it was possible to distinguish the single pregnancy from twin. Robertson and Sarda (7) were also able to detct early pregnancy by measuring blood progesterone levels in ewe .

Similarly, Emady et al (17) were able to detect early pregnancy and to differentialte between single and twin after day 50.

Fig.1: Progesterone profile during early pregnancy.

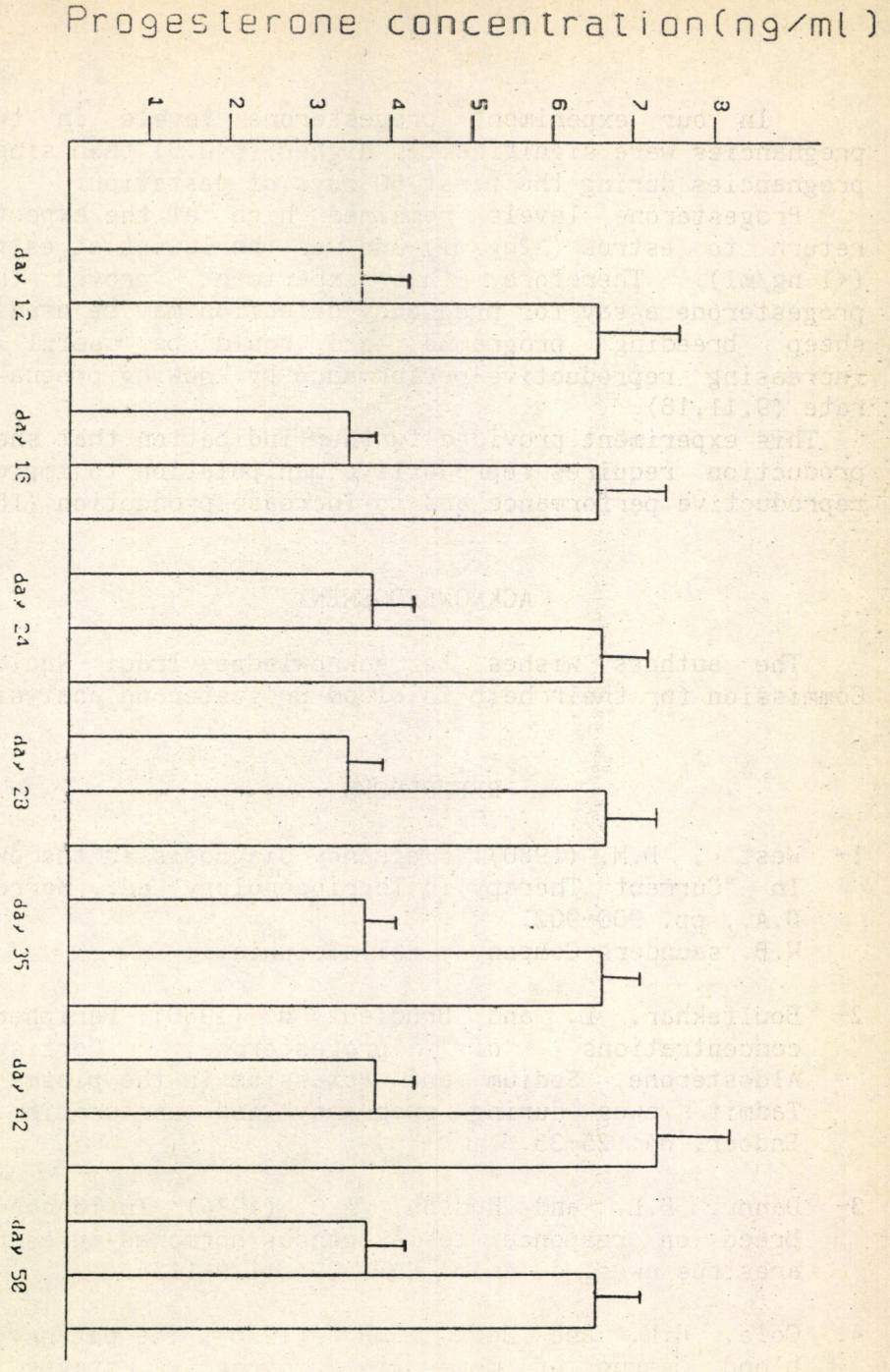

Fig.2: The effect of single or twin pregnancy on Progesterone level in ewes

In our experiment progesterone levels in twin pregnancies were significantly higher ($p<0.5$) than single pregnancies during the first 50 days of gestation.

Progesterone levels remained high at the expected return to estrus (>2ng/ml) and was the lowest at estrus (<1 ng/ml). Therefore, this experiment proved that progesterone assay for pregnancy detection may be used in sheep breeding programme and could be useful in increasing reproductive performance by knowing pregnancy rate (9,11,18).

This experiment provided further indication that sheep production requires reproductive manipulation to improve reproductive performance and to increase production (18).

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REFERENCES

1- West , D.M. (1980): Pregnancy diagnosis in the ewe. In "Current Therapy in Theriogenology" ed., Morrow, D.A., pp. 900-902.
W.B. saunders Company , Philadelphia.

2- Boulfekhar, L. and Brudieux, R. (1980): Peripheral concentrations of progesterone, Cortisol, Aldosterone, Sodium and Potassium in the plasma of Tadmit ewes during pregnancy and parturition.J. Endocr. 84: 25-33.

3- Danny, B.L. and Hudson, A.G. (1974): Influence of breed on responce to exogenous hormones in estrus anestrus ewes. J. Anim. Sci. 39: 1129-1134.

4. Cole, H.H. and Hart, G.H. (1930): The potency of blood serum of mares in progressive stages of pregnancy in effecting sexual maturity of the immature rat. Amer. J. Physiol. 39: 57-68.

5- Roberts, E.M. and Edgar, D.G. (1966): The stimulation of fertile estrus in anesturs Rmney ewes. J. Reprod . Fert. 12:561-566.

6- Webb, R.; Mitchell, M.D.; Falconer, J. and Robinson, J.S. (1981): Temporal relationships between peripheral plasma concentrations of oxytocin, Progesterone and 13, 14-dihydro-15-keto prostaglandin din F2 alpha during the estrous cycle and early pregnancy in the ewe. Prostaglandins. 22: 443-451.

7. Emady, M.; Hadley, J.C.; Noakes, D.E. and Arthur , G.H. (1974): Progesterone level in the peripheral blood of pregnant ewes. Vet.

8. Robertson, H.A. and Sarda, I.R. (1971): A very early pregnancy test for mammals. Its aplication to the cows, ewes and saw.
J. Endocr. 49: 407-419.

9. Arthur, G.H.; Noakes, D.E. and Pearson, H. (1985): Veterinary Reproduction and Obstetrics. %th Edit., Baillere-Tidall, London.

10. Shemesh, M.; Ayalon, N. and Linder, H.R. (1973): Early pregnancy diagnosis based upon plasma progesterone levels in the cow and ewe. J. Anim. Sci. 36; 726-729.

11. Kasztelan, R.; stupincki, R. and Zebrack, A. (1985): plasma LH and progesterone in ewes with estrus induced outside the breeding season. Medycyna Weterynaryjna. 41:497-498.
Vet . Bull. 56: 1986, Abst. No. 2477.

12. Ott, R.S. and Memon, M.A. (1980): Sheep and goat manual. Society for Theriogenology 10: 1-44.

13. Stabenfeldt, G.H.; Drost, M. and Franti, C.E. (1971): Peripheral plasma progesterone levels in the ewe during pregnancy and parturition. Endocr. 90: 144-150.

14. Fylling, F. (1970): The effect of pregnancy , ovariectomy and parturition on plasma progesterone level in sheep. Acta Endocr. 65: 273-283.

15. Gadaby , J.E. and Heap, R.B. 91972): Diagnosis of pregnancy and of the number of fetuses in sheep from plasma progesterone concentrations. Vet. Rec. 90: 339-342.

16. MacDonnell, H. (1976): peripheral plasma progesterone in the ewe.
The application to the diagnosis of early pregnancy following estrous synchronization. Irish Vet. J. 30: 11-15.

17. Faure, A.S.; Boshoff, A.D. and Burger, F.J.L. 91979): a comparison between intravaginal sponges and subcutaneous implants for synchronization of estrus in karakul ewes. Agronimalia.
11:29-32. Vet. Bull, 50: 1980. Abst. No. 5250.

18- Aschheim, S. and Zondek, B. (1927): Hypophysen vor der lappen hormon under ovarial hormon in harn von schwangeren. Cited by Robertson, H.A. and Sarda, I.R. (1971): J. Endocr. 49: 407-419.

كشف الحمل المبكر بقياس تركيز البروجستون في دم النعاج العواسي

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الخلاصة

تم توحيد الشبق في ٢٠ نعجة عواسية باستخدام اسفنجات مهبلية حاوية على البروجسترون وحقنها الهرومون المحفز للقند مباشرة بعد سحب الاسفنجات. تم تشخيص الشبق بعد ذلك بكبش كاشف.
النعاج التي كانت تبدي علامات شبق واضحة سفدت يدويا باستعمال كبشين معروفين الخصوبة.
اخذت عينات الدم من النعاج قبل التسفيد وفي الايام ١٢، ١٦، ٢٤، ٢٨، ٣٥، ٤٢، ٥٠ بعد التسفيد . تم تحليل الدم لقياس تركيز البروجتسرون بالطريقة الشعاعية المناعية. كانت معدلات تركيز البروجسترون للايام المذكورة : ٠ر٤٦٣ و ٤ر٩٠٩ و ٤ر٢٩٠و ٥ر٢١ و ١ر٥ و ١٨ر٥ و ٥٩ر٩ و ١٧ر٥ للغم/ملتر دم بالتعاقب.
وقد كان معدل تركيز البروجسترون في النعاج التي تحمل جنينا احاديا للايام المذكورة : ٦٤ر٣ و ٤٨ر٣ و ٧٨ر٣ و ٤٨ر٣ و ٧ر٣و ٨٤ر٣و ٧٤ر٣ للغم /ملليلتر دم بالتعاقب بينما كان التركيز في تلك التي تحمل توأما كالاتي : ٥٨ر٦ و ٥٨ر٦و ٦٤ر٦و ٦٦ر٦و ٣٤ر٧ و٦ر٦ للغم/ملليلتر دم بالتعاقب،نستنتج من هذا بان قياس تركيز البروجسترون في الدم اثبت كفاءته في تشخيص الحمل المبكر في النعاج العواسي ومن الممكن استخدامه للتمييز بين الحمل الاحادي والتوأم.