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ESTRADIOL, PROGESTERONE, THYROTROPHIC AND THYROID HORMONES CONCENTRATIOUS DURING THE POSTPARTUM PERIOD IN GOATS

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INTRODUCTION

The postpartum breeding interval begins directly after expulsion of the foetus while its end is not physiologically defined (Rosenberg and Tillman,1960). The hormonal changes during pueperium control the onset of the postpartum oestr us, conception and maintenance of pregnancy. Pelletier and Thimonier (1975) suggested that ovarian steroids particularly estrogen play an important role in sensitizing the pituitary to Gn-RH.

In ewes, the first ovulation may by chaterized by a lower oestrogen peak in lactating than in non lactating animals (Cognieo et al., 1975) with subsequent lower progesterone production by the corpus luteum (Cognie et al., 1975). Soliman et al. (1981) found that the serum level of estrogen during the postpartum period of buffaloes did not differ significantly from that of oestrus. Erb et al. (1971) reported that progesterone level was nearly constant throughout pueperium in cows.

On reference to thyrotrophic (TSH) and thyroid hormones El-Wishy et al. (1973) recorded that a gradual but slight increase in TSH concentration occurred after parturition. Soliman et al. (1981) found that TSH level increased 10 days after parturition in cows. Reproduction in farm animals is colosely linked with thyroid functions (Afiefy, 1966). Soliman et al. (1964) reported that thyroid hormones levels were low in the blood of cows 10 days after parturition. Soliman et al. (1981) found that the serum level of T_4 in buffaloes was not altered significantly throughout pueperium.

The present investigation aimed to clarify the endocrine basis of the postpartum ovarian and thyroid function in goats which is not yet fully understood.

MATERIALS AND METHODS

The present investigation was done on six female Egyptian goats in the Animal Husbandry Research Centre, Faculty of Vet. Med. Cairo Univ. Regular individual blood samples were collected from the jugular veins into vials containing anticoagulant (EDTA) 5 mg/5 ml blood. The samples were collected 1, 2, 3, 7, 14 21 and 28 days after parturition.All samples were taken at the 10,00 A. M. The blood was centrifuged, plasma was separated and kept in a deep freeze at -20°C until hormonal assay was carried out.

Blood estradiol and progesterone concentrations were determined by using radioimmunoassay technique adopted by Xing et al. (1983) and Kubasik (1984) respectively. The kits were purchased from (DCP,Diagnostic corporation, Los Angles). The coat-A-count estradiol or progesterone procedure based on antibody-coated tubes. ^{125} I-labelled estradiol or progesterone competes with estradiol or progesterone in the smaples for antibody sites. After incubation

separation of bound from free hormone was achieved by decanting; The tubes were then counted in a gamma counter and the concentration was calculated.

The concentration of TSH was measured by using enzyme-immunoassay kits obtained from Diagnostic system laboratories (inc-Webster-Texas 77598), where Anti - TSH IgG coated tubes and antibody-peroxidase conjugate were used. The absorbance in this case was related to TSH concentration in the sample (Hershiman and Pittman, 1971). Determination of T_4 was carried out by using soild phase enzyme-immunoassay according to the method of Wood (1980), where anti T_4 coated tubes were used, enzyme labelled T_4 competes for a fixed time with T_4 in the sample for sites on T_4-specific antibody in the wall of the coated tubes. The tube, following decanting and rinsing was treated with enzyme substrate and allowed to form colored end-product. The absorbance of which was inversely relates to the T_4 concentration in the sample. Measurement of T_3 concentration was done by using enzyme-immunoassay kit obtained from Boehringer Manheim G-mbH manheim (West Germany). The test was based also on the competition principle as in case of T_4 assay (Pfannestiel, 1983)

RESULTS

Data presented in **Table (1)** indicated that blood estradiol decreased 2-21 days after parturition but after 28 days it was simialr to that after one day. In addition, progesterone decreased 2-14 days after parturition and increased after that.

It is clear from **Table (2)** that the concentration of blood TSH decreased 14 days alter parturitions and later on, while T_4 concentration increased after 21 days. Blood T_3 concentration decreased significantly during pueperium.

Table (1): Estradiol and progesterone concentrations in the blood of goats during the postpartum period.

Days after parturition	Estradiol (pg/ml)	Progesterone (ng/ml)
1	113.74± 4.57	0.33±9.05
2	96.15± 5.63[a]	0.18±0.04[a]
3	7.76± 1.15[c]	0.04±0.004[c]
7	14.34± 2.29[c]	0.07±0.006[c]
14	18.63± 1.82[c]	0.17 ±0.02[a]
21	53.14± 3.60[c]	0.23±0.04
28	106.68±12.20	0.31±0.04

Mean ± standard error

a : means significantly different from that after one day at $P < 0.05$.

c : means significantly different from that after one day at $P < 0.001$.

Table (2): Blood thyrotrophic and thyroid hormones concentrations during pueperium in goats

Days after parturition	Thyrotrophic µIU/ml	Thyroxine ug/dl	Triiodothyronine (ng/ml)
1	2.09±0.17	64.08± 7.95	4.10±0.25
2	2.87±0.31	90.99±11.09	2.77±0.03^{c}
3	2.43±0.28	88.96± 9.47	3.43±0.12^{a}
7	1.63±0.19	81.83± 8.03	3.34±0.28
14	1.45±0.14^{a}	63.92± 3.56	2.31±0.29^{c}
21	1.06±0.05^{c}	99.56± 3.73^{b}	2.20±0.12^{c}
28	1.54±0.05^{a}	152.96±13.98^{c}	2.35±0.21^{c}

Mean ± standard error

a : means significantly different form that after one day at $P < 0.05$.

b : means significantly different from that after one day at $P < 0.01$.

c : means significantly different from that after one day at $P < 0.001$.

DISCUSSION

Events in the postpartum goats become of great importance in any consideration of frequent lambings. Therefore, the endocrinological basis of postpartum anoestrus must be clarified. Results of the present investigation revealed that estradiol concentration decreased at 2-21 days after parturition in comparison with its level at one day, after 28 days estradiol increased till it became similar to that at one day. This may be due to follicle development in the ovary promoted by FSH which results in an increase in estrogen secretion, the elevated estrogen concentration at the later stage of pueperium leads to increased tonic LH by way of a positive feedback effect to initiate the pre-ovulatory surge of LH, which brings about the first ovulation (Stevenson and Britt, 1979, 1980). Concerning progesterone concentration during the postpartum period of goats, the present data revealed that its level decreased 2-14 days after parturition, after that it begin to increase which seems to be contradictory to the data previously reported in cows by Erb et al. (1971). In most postpartum animals, it would appear that the first complete ovarian cycle is preceeded by a short period in which blood levels of progesterone are elevated (Lamming and Bulman, 1976 and Webb et al., 1980) and that the developing follicles are the most likely source of progesterone (Webb et al., 1980).

Reproduction in farm animals is closely linked with dynamic activity of the thyroid gland (Afiefy, 1966) Thyrotrophic hormone concentration remained unchanged 2-7 days after parturition, which was foldowed by a decrease in its level later on . On the other hand, thyroxine concentration increased 21 days after parturition and later on, the negative feedback mechanism of TSH and T_4 may be the cause of these findings. Meanwhile, triiodothyronine concentration

decreased significantly during pueperium which may be due to lack of interconversion of thyroxine into triiodothyronine.

SUMMARY

Six female goats from the Animal Husbandry Research Centre, Faculty of Vet. Med. Cairo University were used in the present study. Blood was collected regularly 1, 2, 3, 7, 14, 21 and 28 days after parturition to investigate the hormonal profile during this period. The results of assays reveled that: Estradiol concentration decreased significantly at 21 days after parturition in comparison with its level at one day. After 28 days the concentration did not differ significantly than that at one day; progesterone concentration decreased 2-14 days after parturition then it returned to its level at one day after parturition; thyrotrophic hormons (TSH) concentration remained unchanged (2-7) days after parturition then decreased after that; concentration of thyroxine (T_4) increased 21 days after parturition while tridoothyronine (T_3) level decreased significantly throughout pueperium in goats.

Thus, the present investigation may clarify the endocrine basis of postpartum ovarian and thyroid function which may help in reducing the lambing interval and increasing reproductive performance.

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