IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 8, Issue 1 Ver. II (Jan. 2015), PP 56-59
www.iosrjournals.org

Progesterone Profile of Mature Nubian Goats

Adil Salim Elsheikh* [1, 2], Nawal Noureldaim Omer [3]
[1] *Department of Reproduction and Obstetrics, Faculty of Veterinary Medicine University of Khartoum, Shambat, Sudan.*
[2] *Department of Applied Medical Sciences, Community college, Najran, University, Saudi Arabia,*
[3] *AI Center, Kuku, Sudan.*

Abstract: *Two experiments were carried out to record the progesterone (P_4) profile of Nubian goats during oestrous cycle and postpartum. In experiment I, 8 cyclic does were i.m injected with 2 doses of 125µg of prostaglandin $F_{2\alpha}$ (PG $F_{2\alpha}$) 11 days apart to synchronize oestrous. Eleven serum samples, were collected from each doe at an interval of 2 days after the commencement of behavioral oestrous sings (day 0) and assayed for P_4 levels. The mean P_4 concentration (conc.) on day 0 was 0.12 ± 0.01 ng/ml, then it increased gradually to reach a peak of 6.03 ± 0.25 ng/ml on day 10 and it assumed a plateau over days 12 to 16. A sharp decline in P_4 conc. was recorded on day 18 (0.3 ± 0.01 ng/ml) and a further drop (0.19 ± 0.00 ng/ml) ended the cycle on day 20. In experiment II, 10 parturient does were employed to study P_4 profile during postpartum. Twenty one milk samples, collected from each doe at 4 days interval starting from day 3 postpartum, were assayed for P_4 levels. The milk P 4 level remained below 0.04 ng/ml until a mean of 45 days postpartum; thereafter it increased to attain values ≥ 1.0 ng/ml after the commencement of the first oestrus postpartum. It is concluded that P_4 profile of the Sudan Nubian goats during oestrous cycle and postpartum follows the normal trend of the P_4 profile of other breeds of goats with very minute differences in P_4 conc. and the timing of peak values.*
Keywords: *Progesterone profile, oestrous cycle, postpartum, Nubian goats*.

I. Introduction

The progesterone profile of the peripheral blood during oestrous cycle and postpartum period was recorded for several breeds of goats (Ugandan East African goats (Katongole and Gombe1985); Malaysian katjang goats and their crosses with the German improved Fawan goats (Thangavelu et al. 1985); West African Dwarf goats (Akusu et al. 1992). Spares information about the P_4 concentration (P_4 conc.) during oestrous cycle of Nubian goats in the Sudan is available (Badawi et al. 2014; Elsheikh et al. 2004). Also there are very few reports on P_4 conc. during postpartum in Sudan Nubian goats (Omer 2003; Elsheikh and Yagoub, 2006; Yagoub and Elsheikh 2013; Elsheikh et al. 2014).

The objective of the current study was to record the P_4 profile during oestrous cycle and postpartum in the Sudan Nubian goats.

II. Materials And Methods

1. Animals

This study was carried in Kuku goat improvement farm in Khartoum North in Sudan (Latitude 15° 36' N, Longitude 32° 32' E). A total of 18 Nubian does from a single flock were used in this study. The mean body weight of the doe is 30.68 ± 0.52 kg. Eight does were cyclic and 10 does were parturient.

2. Husbandry and management

The animals were kept in open side-sheds. The animals were fed 250 g of concentrate made at the farm and composed of 33% groundnut cakes, 33% sorghum (Sorghum vulgar, vr. Fetarita), 33% wheat bran and 1% sodium chloride and were offered Alfa alfa ad libitum.

2. Oestrous detection

From the beginning of the experiment a buck with excellent libido was kept with the does. Trained personnel observed the signs of oestrus thrice a day for 30 minutes (7: 00, 13:00, and 19: 00). The doe is considered in oestrus when it shows overt oestrous signs, such as tail waggling, bleating, mounting others and/or allowing the buck or other does to mount her (Mackenzie, 1967).

3. Serum and milk sampling

Evacuated tubes with no anticoagulant were used to collect blood samples. Five milliliters of blood were collected from the jugular veins of the cyclic does every other day. The blood samples were allowed to clot and were centrifuged, within 4 hours at approximately 2500 g for 15 minutes, to separate the serum. The

separated serum was kept frozen at -20° C. Milk samples were collected from parturient does at 4 days interval following parturition until the does were confirmed in the luteal phase of the first postpartum oestrus. Ten milliliters from evening milk is collected from each doe in plastic vials and preserved with one tablet of sodium azide (100mg/10 ml). The preserved milk samples were centrifuged, at 2500 g for 15 minutes within one hour of collection, to skim milk fat. The separated milk samples were placed in a refrigerator (4 ° C) for 15 minutes to harden the fat layer. The fat layer was pierced with a glass rod and the skim milk samples were transferred to cryogenic vials and stored at -20 ° C until assayed for progesterone.

4. Serum and milk progesterone radioimmunoassay (P_4 RIA)

P_4 conc. in the serum and milk was assayed according to FAO/IAEA progesterone RIA protocol (FAO/IAEA (199). The detection limit (minimal detectable dose) of the assay is approximately 0.02 ng/ml.

3. Experimental procedure

Experiment I

This experiment was carried out to record the progesterone profile of cyclic Sudan Nubian goats. Eight cyclic pure Nubian does were employed to achieve this goal. The does were intramuscularly injected with 2 doses of 125µg prostaglandin $F_{2\alpha}$ (PG $F_{2\alpha}$, Estrumate, Coopers, England) 11 days apart to synchronize oestrus. Eleven blood samples were collected from each doe starting from the day of commencement of oestrous signs (day 0, 72 hours after the second dose of PG $F_{2\alpha}$) and continued until day 20. The P_4 level in the serum was assayed as described above.

Experiment II

This experiment was conducted to record the P_4 profile during postpartum in the Sudan Nubian goats. Ten parturient Nubian does were employed in this experiment. Milk samples were collected at 4 days interval starting from day 3 postpartum and continued until 21 samples were collected from each doe. The P_4 in the milk was assayed as described above.

4. Statistical analysis

Data used are means ± SE. The curvilinear relation between the time of serum or milk collection and P_4 concentration was made using Cricket Graph Package.

III. Results

Experiment 1

The P_4 conc. during oestrous cycle of Nubian goats started with a mean of 0.12 ± 0.01 ng/ml on day 0. The level then increased to 4.54 ± 0.35 ng/ml on day 6 and 5.50 ± 0.33 ng/ml on day 8 of the oestrous cycle. The beak value was attained on day 10 of the cycle (6.03 ± 0.25 ng/ml). The plateau was achieved between days 12 and 16 of the cycle. A sharp drop in P_4 conc. was encountered on day 18 of the cycle (0.3 ± 0.01 ng/ml) and a further drop (0.19 ± 0.00 ng/ml) terminated the cycle on day 20 (Fig.1).

Experiment II

The P_4 conc. remained below 0.04 ng/ml until 45 days postpartum. Thereafter, it increased gradually to attain values ≥ 1.0 ng/ml (Fig. 2) after the commencement of the first postpartum oestrus. The minimum value recorded before the occurrence of the first oestrus postpartum was 0.02 ng/ml and the maximum value was 0.036 ng/ml.

IV. Discussion

Progesterone profile during oestrous cycle in most goat breeds assumes a general and common trend starting from very low concentration during oestrous phase and gradually increases to attain peak values around the middle of the luteal phase (Katongole and Gombe, 1985; Akusu et al. 1992; Thorburn and Schneider, 1972; Sharma and Mujumdar, 1999). The P_4 levels recorded during the first 4 days of oestrous cycle in the present study are comparable to those recorded by Thorburn and Shneider (Thorburn and Schneider, 1972). However, P_4 level on day 20 of the oestrous cycle is lower than that reported by Thorburn and Shneider. The difference between the two profiles at day 20 may be due to the difference in oestrous cycle length. In the current study oestrous cycle length was 20 days and that reported by Thorburn and Shneider was 21 days. Also the P_4 conc. recorded during the first 4 days of oestrous of the Sudan Nubian goats do agree with those of Ugandan East African (UEA) goats (Katongole and Gombe, 1985) and those of West African Dwarf goats (Akusu et al. 1992). In the current study peak values of P 4 were obtained on day 10 of the oestrous cycle. The timing of the peak value in this study differs from the timing of the peak values of the above mentioned studies. This difference

could be due to differences in oestrous cycle length and/or the different number of functioning corpora lutei (Sharma and Mujumdar, 1999).

The P_4 level during postpartum in the Sudan Nubian goats remained below 0.04 ng/ml until a mean of 45 days postpartum, thereafter it increased gradually to reach peak values. This value agrees with the value (0.05ng/ml) obtained in Malaysia Katjang goats (Thangavelu et al. 1985). A higher P_4 conc. of 0.94 ng/ml that continued for several months was reported in UEA goats (Katongole and Gombe, 1985). This difference seems to be a breed difference.

V. Conclusion

It is concluded that P_4 profile of the Sudan Nubian goats during oestrous cycle and postpartum follows the normal trend of the P_4 profile of other breeds of goats with very minute differences in P_4 conc. and the timing of peak values.

Acknowledgements

This research was carried out under the support of the IAEA under a Technical Co-operation Project for Goat Improvement (TCP No. SUD/5/025).

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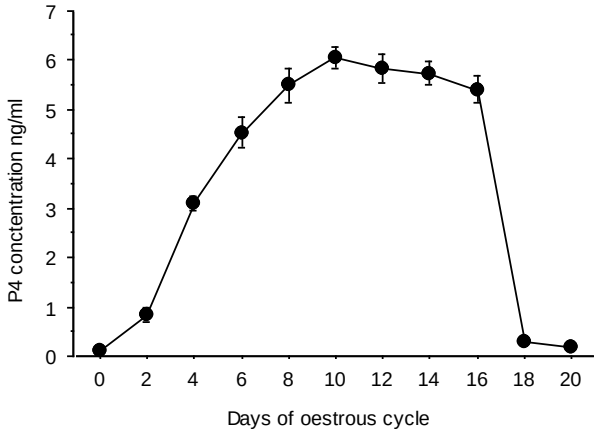

Fig.1. Progesterone profile during oestrous cycle in Sudanese Nubian goats. Each point represents a mean of 8 serum samples collected from 8 cyclic Nubian does. The vertical pars represent the SE.

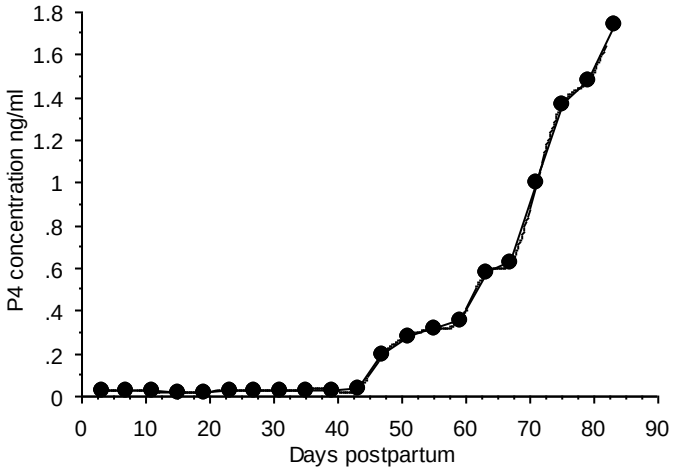

Fig.2. Progesterone profile during postpartum in Sudanese Nubian goats. Each point represents a mean of 10 samples collected from 10 parturient does.