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SOME METABOLIC PROFILES AT LATE PREGNANCY AND PARTURITION IN EWES AT ASSIUT GOVERNORATE

(With 2 Tables & 2 Figs.)

By

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بعض مؤشرات التمثيل الغذائي المرتبطة بالفترة الأخير من الحمل والولادة
في النعـــاج بمحافظـة أســـيوط

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أجريت هذه الدراسة على عدد ١٧٥ رأس من النعاج في محطة الحواتكة للأغنام بمحافظة أسيوط وقسمت الحيوانات الى مجموعات من حيث فترة ماقبل الولادة (ثلاثة ـ اثنين ـ اسبوع ـ يوم الولادة) ومابعـــد الولادة باسبوع وأثنين وثلاثة أسابيع وشملت كل مجموعة ٢٥ رأس من النعاج ، وتم فحص الحيوانـــات اكلينيكيا ومعمليا للتأكد من حالتها الصحية. وتم جمع عينات من مصل الدم في الفترات الموضحة وتم تعيين كمية البروتين الكلي والجلوكوز والكلسترول والنحاس والكالسيوم والصوديوم والبوتاسيوم في هذا المصل وتم اجراء الاختبارات الاحصائية والمقارنات لمعرفة مدى تأثير فترة الحمل والولادة وعدد الأجنة علـــى المركبات البيوكيمائيـــة.

SUMMARY

This study was conducted on 175 Balady ewes from El-Hawatka sheep Farm at Assiut Governorate to investigate the influence of pregnancy and parturition on some organic and inorganic biochemical constituents of blood serum. Biochemical estimated parameters included total protein, cholestrol; glucose; calcium; copper; sodium and potassium. Statistical analysis of data was Carried out to declare the influence of reproductive stage; number of giving birth and numbers of previous Parturitions upon studied parameters.

INTRODUCTION

Biochemical analysis of blood serum can provide a remarkable and valuable information about animal metabolic profiles. Furthermore, the concentration of minerals and metabolities in the blood varies with different periods of pregnancy; parturition and puperium (HARAZTI, et al. 1980 and PARKER and BLOWEY, 1976).

The effect of pregnancy and parturition on blood glucose level was widely discussed (KCHLER, 1953; ROSSOW, 1962 and TETTENBORN, 1963). Meanwhile MANUNTA, et al. (1984) pointed that blood glucosa level was decreased with advanced pregnancy.

Blood serum proteins in cows depressed at parturition but rapidly increased to constant level after calving (MCADOM and O'DELL, 1982). Meanwhile MANUNTA, et al. (1984) reported that pregnant ewes usually behaved elimintary nitrogeneous deficiencies. There are many different factors which influenced the concentration of total protein as age, species of animals and lactation period (GARTENER, et al. 1966 and SOMMER and MOAREX, 1969; DHOBLE and GRUPTA, 1981).

Pregnancy and Paturition were considered as stress factor in dairy management so they affect the level of blood serum cholestrol (AMER, et al. 1977; MURTUZA, et al. 1978; SHARMA, 1980 and SINHA, et al. 1981). Meanwhile the influence of reproductive status on the blood serum copper, sodium and potassium levels in buffaloes were studied by EL-NAGAR and MOTTELIB (1976).

The objective of this studies was to throw light on the influence of pregnancy, parturition and number of parturitions upon some metabolic profiles in blood sera of ewes.

MATERIAL and METHODS

Blood samples were collected from 175 Balady ewes-age varied from 3-6 years-through vein puncture. Blood serum samples were collected at three, two and one week before parturition, at day of parturition and after parturition by one, two and three weeks. Each group contained 25 ewes. Regarding number of giving birth in each group-at time of experiment animals were classified into 18 ewes giving one birth and 7 ewes given two births.

Based on number of previous pregnancies in each groups ewes were subdivided into : 5 ewes with two previous pregnancies 10 ewes with three previous pregnancies 10 ewes with four previous pregnancies.

The obtained clear sera were analysed biochemically for blood serum glucose (mmol/L) cholestrol (mmol/L); total protein (gm/L) and calcium (mmol/L) using test kits supplied from Biomerieux (Bains/France) and after the methods of TRINDER (1969); WATSON (1960); WEICHSELBAUM (1946) and GINDLER and KING (1972) respectively.

Blood serum copper level was determined using test kits supplied from Boehringer and after the method of ZAK (1958). Blood serum sodium and potassium level were determined using flame-photometer (Corning-400). Statistical analysis of the obtained data was performed according to the method of KALTON (1967) using T-test.

RESULTS

Mean value of biochemical parameters and standard deviation were mentioned in tables (1 & 2) and Figs. (1 & 2).

DISCUSSION

During pregnancy, the faetus depends entirely upon its mother for the supply of nutrients. The progressive increase in faetal weight especially during last trimester of pregnancy imposes a large demand upon the mother and after parturition. The formation of colostrum and the begining of lactation produced a heavy load on animal body, so analysis of blood serum parameters reflect the requirements of the dam (HARAZTI, et al. 1980).

Hypoglycaemia ($P/ 0.01$) appeared before parturition that returned again after parturition. Regarding number of given births, it is clear that ewes which gave one birth had decreased glucose level ($P/ 0.01$) if compared with those given two birth. The obtained results were similar to those previously obtained by MANUNTA, et al. (1984) which attributed the hypoglycaemic state at the end of pregnancy to relative poor diet and or high energy requirement for faetal anabolism and or the progressive appearance of foetal insulin.

Non significant variations in blood serum total proteins either due to reproductive stage or due to number of given birth were evident. The obtained data was similar to those previously obtained by ROWLANDS, et al. 1975; AWAD, et al. (1978); McADAM and O'DELL (1982) and PANDIT (1982).

A significant variations ($P/ 0.05$) in serum cholestrol was associated with number of given births and hypercholestraemia associated with reproductive stage were evident. Our results were in agreement with those obtained by LUKTUKE, et al. (1979) and SINHA, et al. (1981). They attributed their results to either stage of pregnancy or age factor. AMER, et al. (1977) and SINHA, et al. (1981) atributed these results to environmental and seasonal factor.

Blood sodium level showed significant variations ($P/ 0.01$) either due to reproductive state or number of given births. These variations can be attributed either to amount of water intake and losses during that period (EL-NAGGAR and MOTTELIB, 1976) or due to the influence of thermo-environmental factors (MANUNTA, et al. 1984).

A non-significant variations in blood serum potassium level could be attributed either to reproductive stage or number of given births. This was similar to those previously obtained by BELYEA, et al. (1975). Transient hypocalcaemia ($P/ 0.01$) during

both last stage of pregnancy and at the day of parturition was followed again, by increased levels. Similar results were obtained by TWARDOCK, et al. (1973) and SAMSON, et al. (1982) They attributed such decrease to demand of faetal skeleton formation and begining of lactation.

The observed fluctuations in blood serum copper is either due to reproductive stage or to number of given births. This can be attributed to hormonal factor associated with pregnancy (STUDITZ and BEREZIN, 1958).

Finally the study declared the influence of pregnancy and number of given births on studied parameters. The study also their importance to avoid uncontrolled variations under the effect of pregnancy and parturition to save both the dam and foetus life.

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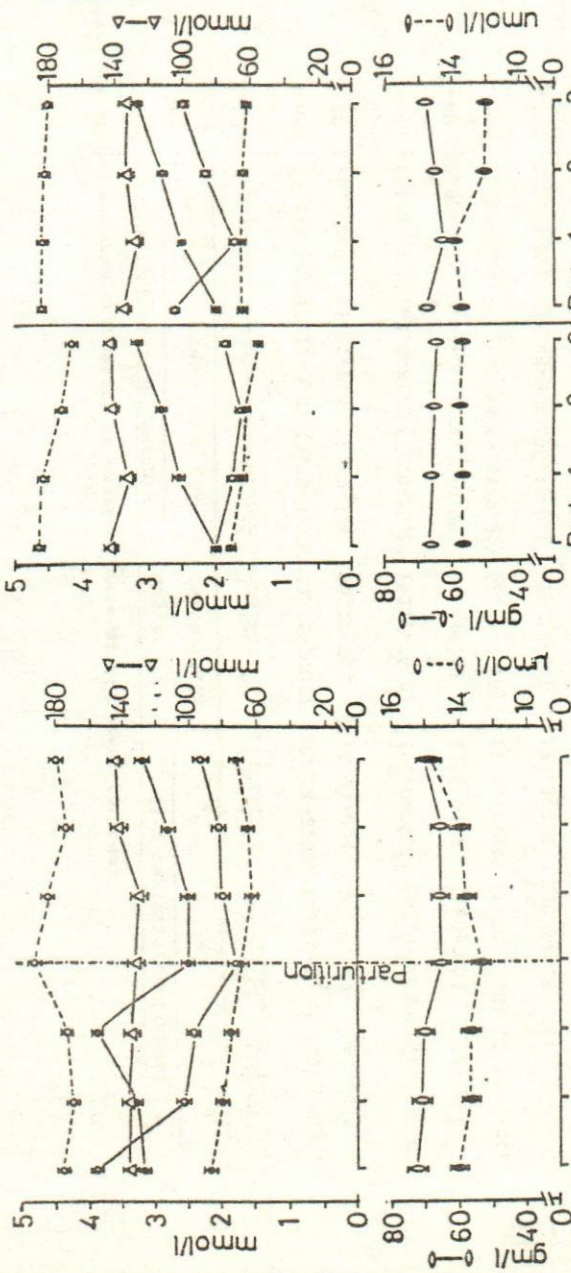

Fig. 1. Mean values of some blood serum parameters in examined ewes before and after parturition.
Ca •—•, Cl •---•, glucose o—o, P o---o
Na △—△, T. protein ◊—◊, Cu ◊---◊

Fig. 2. Variation in some blood serum parameters in relation to the number of Lambing in ewes.

Table (1): Mean values of blood serum parameters in examined ewes at different periods.

Parameters	Units	Items	Before parturition (weeks)			Day of parturition	After parturition (weeks)		
			Three	Two	One		One	Two	Three
Glucose	mmol/L	X±SD	3.99±0.12**	2.63±0.16	2.46±0.16	1.75±0.09	2.03±0.13	2.10±0.13	2.37±0.12
		Range	(3.1-5.99)	(1.71-3.83)	(1.78-3.23)	(1.50-2.82)	(1.54-2.09)	(1.23-2.77)	(1.74-2.97)
Total Protein	gm/L	X±SD	72.2±0.5	71.12±0.4	70.72±0.4	66.20±0.4	66.04±0.4	66.08±0.4	68.4±0.5
		Range	(61.0-84.0)	(63.0-81.0)	(62.0-76.0)	(61.0-76.0)	(62.0-76.0)	(62.0-80.0)	(62.0-77.0)
Cholestrol	mmol/L	X±SD	2.22±0.07**	2.09±0.01*	1.90±0.09	1.70±0.12	1.56±0.12	1.60±0.11	1.77±0.11
		Range	(1.94-2.39)	(1.91-2.35)	(1.43-2.22)	(1.24-2.26)	(1.15-2.84)	(1.10-2.18)	(1.15-2.24)
Sodium	mmol/L	X±SD	137.79±0.7	138.45±0.7	136.32±0.7	135.72±0.7	129.3±0.8	140.4±0.8**	142.3±0.6*
		Range	(105-178)	(115-153)	(112-147)	(108 - 153)	(104-144)	(101-149)	(100-153)
Potassium	mmol/L	X±SD	4.43±0.15	4.32±0.17	4.39±0.19	4.80±0.15	4.68±0.18	4.44±0.17	4.54±0.16
		Range	(3.4-5.6)	(3.4-5.6)	(3.4-5.6)	(3.4-5.6)	(3.4-5.6)	(3.4-5.6)	(3.4-5.6)
Calcium	mmol/L	X±SD	3.16±0.11*	3.34±0.11*	3.9±0.11*	2.50±0.09	2.50±0.10	2.86±0.10	3.22±0.12*
		Range	(2.6-3.7)	(2.5-3.9)	(3.6-4.2)	(1.52-2.39)	(2.17-3.04)	(2.5-3.4)	(2.6-3.8)
Copper	mmol/L	X±SD	14.09±0.26*	13.5±0.24	13.6±0.21	12.8±0.21	(13.9±0.12	14.07±0.18*	14.8±0.17*
		Range	(11.02-22)	(9.4-22)	(12.5-24.7)	(13.0-19.8)	(11.9-14.9)	(11.8-15.1)	(11.9-20.9)

Table (2): Variations in blood serum parameters in relation to number of giving birth in ewes.

Parameters	Units	Items	Giving one birth				Giving two birth			
			Day of part.	After parturition (weeks)			Day of Parturition	After parturition (weeks)		
				One	Two	Three		One	Two	Three
Serum Glucose	mmol/L	$\bar{X}\pm SD$	1.93±0.16	1.7±0.1	1.66±0.1	1.96±0.1	2.6 ± 0.1	1.76±0.08	2.22±1.01	2.5±0.11
		Range	(1.5-2.7)	(1.2-2.2)	(1.1-2.2)	(1.4-2.5)	(1.6-2.8)	(1.4-2.2)	(1.7-2.7)	(1.9-3.03)
Total Protein	gm/L	$\bar{X}\pm SD$	66.14±0.4	66.8±0.4	66.8±0.5	65.0±0.4	67.0	62.72	65.77	69.38
		Range	(64.4-77.9)	(64 - 68)	(63 - 69)	(63 - 67)	(65 - 69)	(62-65)	(64-67)	(67-71)
Cholestrol	mmol/L	$\bar{X}\pm SD$	1.82±0.1	1.66±0.09	1.55±0.12	1.4±0.16	1.67±0.17	1.69±0.11	1.61±0.11	1.57±0.11
		Range	(1.2-2.47)	(1.2-2.1)	(1 -2.14)	(0.8-2.1)	(1.09-2.69)	(1.13-2.25)	(1.13-2.25)	(1 - 2.04)
Sodium	mmol/L	$\bar{X}\pm SD$	141.3±0.4	(131)9±0.7	140.8±0.5	140.1±1.1	134.0±0.7	127.±0.7	136.9±0.8	135.1±0.7
		Range	(139-143)	(129-134)	(142-158)	(135 - 145)	(131-137)	(124-151)	(119-146)	(133-140)
Potassium	mmol/L	$\bar{X}\pm SD$	4.7±0.2	4.7±0.19	4.37±0.17	4.2±0.16	4.63±0.14	4.65±0.16	4.6±0.16	4.54±0.15
		Range	(3.4-5.6)	(3.4-5.6)	(3.2-4.3)	(3.4-5.6)	(4.2-5.6)	(4.2-5.6)	(4.2-5.6)	(4.2-5.6)
Calcium	mmol/L	$\bar{X}\pm SD$	2.01±0.08	2.55±0.1	2.8±0.1	3.27±0.1	2.06±0.01	2.5±0.01	(2.8±0.1	3.2±0.12
		Range	(1.6-2.4)	(2.1-3.1)	(2.3-3.3)	(2.6-3.2)	(1.56-2.56)	(1.9-2.9)	(2.34-3.4)	(2.6-3.8)
Copper	mmol/L	$\bar{X}\pm SD$	13.7±0.17	13.7±0.2	13.9±0.2	13.9±0.1	13.9±0.3	14.02±0.1	12.89±0.2	12.7±0.1
		Range	(12.8-14.4)	(12.8-14.6)	(12.5-14.3)	(13.1-14.8)	(12.5-15.3)	(13.2-15.6)	(12.1-13.6)	(11.8-13.5)