

Original Research Article

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Assessment of Biochemical Profile of Pre Weaned Kids

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ABSTRACT

The present study was conducted on eight pre-weaned (birth to three months of age) kids. Five ml of whole blood samples were collected from the experimental animals on 0, 7, 15, 30, 45, 60, 75 and up to 90 days age of kids. Total Protein, Cholesterol, Urea, Uric acid, Creatinine, Calcium, Phosphorus, Magnesium using diagnostic kits. Significant ($p < 0.05$) decrease was observed in glucose and uric acid levels from 0-90th days in kids. Cholesterol levels were significant between days ($p < 0.05$) whereas, BUN, Total protein and Creatinine did not show any significant difference between days. The calcium levels decreased significantly ($p < 0.05$) from 0-90th days in kids only, while inorganic phosphorus was significant between days and levels of magnesium were non-significant.

Keywords

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Introduction

Sheep and Goat are an important livestock species of India. They contribute greatly to the agrarian economy, especially in the arid/semiarid and mountainous regions where crop and /or dairy farming are not economical. Goats are multipurpose animals producing meat, milk, skin and hair, They are mainly concentrated in ecologically fragile, arid and semiarid areas. In India, it is generally known as "poorman's cow" and as "wet nurse". Sheep provides the much needed wool, fibers, manure and to small extent milk also. Sheep is traditionally a poor man's companion. Sheep and goat manure is an

important source of soil fertility (Srivastava and Sharma, 1998).

The uterine environment ends, and the subsequent 24 hours represents a critical transition phase between the foetal functions and those of the newborn. The neonatal period is one of the most demanding adaptation periods during the life of any animal, including kids. The adaptation period to the extrauterine life begins immediately after parturition. The survival of the newborn depends on rapid adaptations to new environmental conditions which requires establishment of cardiovascular, respiratory, metabolic and thermoregulatory homeostasis

mechanisms that are essential for survival and growth. Post-partum period represents a transition phase from intrauterine to the extrauterine environment. Nearly half of all weaned lambs die on the day of birth, while the rate of lamb losses is greatly reduced beyond the first week of life (Piccione *et al.*, 2009). From week 34 of intrauterine life till the first post-partum hours, all blood components and the coagulation factors are subjected to continuous changes and even after this period (Piccione *et al.*, 2008).

Good management techniques and early intervention, diagnosis and treatment could prevent a substantial proportion of neonatal diseases or death. Specific serum biochemical reference ranges could help to promote the ability of clinicians to interpret clinical pathology data more accurately and diagnosis of neonatal diseases (Piccione *et al.*, 2008). There is a great variation in the biochemical parameters as observed between breeds of goats and in this regard it may be difficult to formulate a universal metabolic profile test for lambs and kids. These differences have further underlined the need to establish appropriate physiological baseline values for lambs and kids, which could help in realistic evaluation of the management practice, nutrition and diagnosis of health condition (Tambuwal *et al.*, 2002). Keeping in view the above points, the present study was undertaken in kids and lambs.

Materials and Methods

The research was approved by the Institutional Animal Ethics Committee (IAEC, No.: 256/VPY/2016). The present study was conducted in the Department of Veterinary Physiology and Biochemistry, College of Veterinary Science and A. H., Anand Agricultural University, Anand on eight pre-weaned (birth to three months of age) kids maintained at Instructional Livestock Farm Complex (ILFC) of Department of

Livestock Production Management at College of Veterinary Science and A.H., Anand. The experimental animals were reared in semi-open housing system which is made up of a concrete floor under asbestos roofed housing system constructed east-west direction and well covered with trees. These experimental animals were separated from other animals in pakka shed house. The experimental animals were maintained on ICAR feeding standards, 1998. Five ml of whole blood samples were collected from the experimental animals on 0, 7, 15, 30, 45, 60, 75 and up to 90 days age of kids. Samples were collected aseptically from the jugular vein in heparinized vacutainer. Plasma was separated by centrifugation at 3000 rpm for 15 minutes and stored at -20 °C in deep freeze until analyzed for Glucose, Total Protein, Cholesterol, Urea, Uric acid, Creatinine, Calcium, Phosphorus, Magnesium using diagnostic kits manufactured by Crest Biosystems, Coral Clinical systems, Goa. The data was analyzed using a completely randomized design (CRD) and significance was tested by Duncan's New Multiple Range Test (DNMRT).

Results and Discussion

Biochemical parameters are the parameters which help in diagnosis of many conditions. Little information is available on the stress induced changes in blood biochemical profile indicating changes in metabolic pattern. In the present study, different biochemical profiles *viz.* glucose, blood urea nitrogen (BUN), total protein, uric acid, creatinine, cholesterol, calcium, inorganic phosphorous and magnesium were measured. The detailed result of biochemical metabolites generated after plasma analysis are presented in Table 1.

In the present study, the mean (\pm SEM) glucose (mg/dl) concentration of kids were ranged from 72.88 ± 4.67 to 122.42 ± 21.19 with the mean value of 93.28 ± 4.07 from birth to three months of age which was significant.

The highest and lowest glucose concentration was observed on 15th & 75th day respectively. The level of glucose attained the adult values on 90th day. The mean (\pm SEM) BUN (mg/dl) of kids were ranged from 9.54 ± 0.67 to 12.73 ± 1.76 with the mean value of 11.06 ± 0.42 from birth to three months of age which was non-significant. Here, the lowest BUN was found on 30th day. Whereas, highest BUN recorded on 90th day. Total protein (g/dl) of kids were ranged from 6.06 ± 0.22 to 6.64 ± 0.43 and the mean was 6.38 ± 0.12 from birth to three months of age which was non-significant. Lowest Total protein was observed on 15th day, whereas, highest Total protein recorded on 45th day. The range for creatinine (mg/dl) was 0.53 ± 0.06 to 0.62 ± 0.10 and the mean was 0.58 ± 0.02 which was non-significant. Highest creatinine was recorded on the day of birth whereas, lowest creatinine was found on 90th day. 0.72 ± 0.16 to 1.99 ± 0.83 was the range found for uric acid with the mean of 1.21 ± 0.12 which was also non-significant. Highest Uric acid values were recorded on the day of birth whereas, lowest Uric acid was found on 60th day. However, a significant decrease was found in uric acid levels from 0 day to 90th day. The mean cholesterol (mg/dl) of kids were ranged from 79.65 ± 9.98 to 186.51 ± 14.81 with the mean of 124.05 ± 6.91 which was significant. The highest and lowest cholesterol concentration was found on 30th and 90th day respectively as compared to 0 day of life. There were non-significant differences recorded for other days. The mean calcium (mg/dl) was ranged from 5.20 ± 0.32 to 10.15 ± 3.28 with the mean of 6.61 ± 0.49 from birth to three months of age which was non-significant. The highest calcium concentration on 0 day which was decreased non-significantly on 7th day. A lowest calcium concentration was found on 15th day which differed significantly ($p < 0.05$) as compared to 0 day. Thereafter, non-significant differences were recorded till 90th day. The

mean Inorganic phosphorus (mg/dl) was ranged from 5.52 ± 0.54 to 8.75 ± 0.94 with the mean value of 6.84 ± 0.25 from birth to three months of age which was significant. The lowest and highest concentration of Inorganic Phosphorus was observed on 30th and 75th day respectively. Inorganic Phosphorus did not differ significantly from 0 day till 45th day. A significantly ($p < 0.05$) higher concentration of Inorganic Phosphorus was found on 60th and 75th day as compared to 0 day. Magnesium (mg/dl) of was ranged from 2.39 ± 0.29 to 3.33 ± 0.43 with the mean value of 2.95 ± 0.12 from birth to three months of age which was non-significant. We observed the highest and lowest Magnesium concentration 45th day and 30th day.

Mbassa and Poulsen (1991) also observed higher glucose level at birth and then observed gradual decrease with adult age in kids of Dwarf and Danish Landrace breeds. He concluded that the higher glucose levels in initial days than in adult goats is probably due to the large energy requirements as a result of high metabolic rates. As per him urea and total protein concentration decreases within the first week of life, but later, levels increased with age. Total proteins contribute profoundly to neonate immunity and growth, not only because of the immunoglobulin content, but also because of other nutritional and physiological effects on the neonates (Chinter *et al.*, 2013). The creatinine concentrations increased gradually and slightly with age in kids. Ashour *et al.*, (2015) also observed lower cholesterol levels at birth in Ossimi lambs and Damascus kids which is similar to the findings observed in the present study. However, Mbassa and Poulsen, (1991) observed cholesterol level was high at the birth and then decreased with age in kids of Dwarf and Danish breed. Celi *et al.*, (2008) also observed that plasma calcium levels decreased with age as observed in the present study.

Table.1 Mean (\pm SEM) values of metabolic profiles in kids (n=8) from birth to 90 days

Days	Glucose (mg/dl)	BUN (mg/dl)	Total Protein (g/dl)	Creatinine (mg/dl)	Uric acid (mg/dl)	Cholesterol (mg/dl)	Calcium (mg/dl)	Inorganic Phosphorus (mg/dl)	Magnesium (mg/dl)
0	100.28 ^{abc} \pm 12.91	11.57 \pm 0.95	6.50 \pm 0.51	0.62 \pm 0.10	1.99 ^b \pm 0.83	85.22 ^{ab} \pm 5.74	10.15 ^b \pm 3.28	6.05 ^a \pm 0.69	2.44 \pm 0.32
7	108.35 ^{bc} \pm 10.56	12.48 \pm 0.87	6.58 \pm 0.58	0.55 \pm 0.09	1.68 ^{ab} \pm 0.27	96.59 ^{ab} \pm 12.85	6.87 ^{ab} \pm 1.47	6.99 ^{abc} \pm 0.78	3.13 \pm 0.40
15	122.42 ^c \pm 21.19	11.13 \pm 1.61	6.09 \pm 0.15	0.59 \pm 0.09	1.07 ^{ab} \pm 0.17	133.18 ^{bc} \pm 7.51	5.20 ^a \pm 0.32	6.64 ^{ab} \pm 0.44	2.92 \pm 0.36
30	100.23 ^{abc} \pm 9.12	9.54 \pm 0.67	6.06 \pm 0.22	0.60 \pm 0.13	1.10 ^{ab} \pm 0.17	186.51 ^d \pm 14.81	6.17 ^{ab} \pm 0.57	5.52 ^a \pm 0.54	2.39 \pm 0.29
45	83.39 ^{ab} \pm 5.76	10.23 \pm 1.10	6.64 \pm 0.43	0.61 \pm 0.06	1.21 ^{ab} \pm 0.14	124.65 ^{abc} \pm 26.65	5.77 ^{ab} \pm 0.70	6.00 ^a \pm 0.56	3.21 \pm 0.41
60	83.35 ^{ab} \pm 4.17	9.97 \pm 0.89	6.18 \pm 0.07	0.59 \pm 0.08	0.72 ^a \pm 0.16	170.70 ^{cd} \pm 19.14	6.30 ^{ab} \pm 0.52	8.16 ^{bc} \pm 0.54	2.98 \pm 0.28
75	72.88 ^a \pm 4.67	10.87 \pm 1.24	6.52 \pm 0.12	0.56 \pm 0.07	1.03 ^{ab} \pm 0.15	115.90 ^{ab} \pm 17.27	6.27 ^{ab} \pm 0.58	8.75 ^c \pm 0.94	3.33 \pm 0.43
90	75.30 ^{ab} \pm 2.70	12.73 \pm 1.76	6.45 \pm 0.20	0.53 \pm 0.06	0.87 ^a \pm 0.13	79.65 ^a \pm 9.98	6.17 ^{ab} \pm 0.78	6.59 ^{ab} \pm 0.49	3.24 \pm 0.26
GM	93.28 \pm 4.07	11.06 \pm 0.42	6.38 \pm 0.12	0.58 \pm 0.02	1.21 \pm 0.12	124.05 \pm 6.91	6.61 \pm 0.49	6.84 \pm 0.25	2.95 \pm 0.12
CV%	31.98	30.37	15.01	42.30	78.52	35.58	58.63	26.48	33.53
CD_{0.05}	29.98	-	-	-	-	44.36	-	1.82	-

Values having different superscripts differed significantly ($P < 0.05$) within column

However, Jagos *et al.*, (1980) reported that the mean concentration of plasma Calcium in calves varied in first week of age which dropped to the lowest value at the age of 14 days. Calcium requirements for pregnancy and lactation are higher than those for maintenance, which increases the quantity of Calcium required at tissue level and thereby increases Calcium absorption from the gastrointestinal tract of sheep and goats, which subsequently is reflected in the newborn. However, Jagos *et al.*, (1980) reported that the level of inorganic phosphorus gradually decreased from high concentration during early days of life, while Siddique (2011) stated that phosphorus level varied significantly ($p < 0.05$) in calves with advancement of age.

In conclusions, significant ($p < 0.05$) decrease was observed in glucose and uric acid levels from 0-90th days in kids. Cholesterol levels were significant between days ($p < 0.05$) whereas, BUN, Total protein and Creatinine did not show any significant difference between days. The calcium levels decreased significantly ($p < 0.05$) from 0-90th days in kids only, while inorganic phosphorus was significant between days and levels of magnesium were non-significant.

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