Research Article

Protein Profile During Peripartum Period in Berari Goat

Sunita Bhoite[1]*, Mohini Khodke[1], Santosh Dalvi[1] and Durgesh Golher[2]

[1]Department of Veterinary Biochemistry, Post Graduate Institute of Veterinary and Animal Science, Akola -444104
[2]Livestock Development Officer, Animal Husbandry Department Maharashtra, Gadchiroli-442605

Abstract

The present study was conducted to find the levels of serum total protein, albumin, globulin and A: G ratio during peripartum period in the Berari goats. The average level of total protein concentration ranged from 5.80±0.18 to 6.88±0.19 g/dl, serum albumin ranged 3.20±0.14 to 3.45±0.12 g/dl, globulin concentration ranged 2.60±0.16 to 3.42±0.18 g/dl and the albumin globulin ratio ranged 1.02±0.71 to 1.30±0.11 g/dl during peripartum period in Berari goat. Total protein level slight increasing from the day 7th up to 21st day of postpartum but the differences were non-significant. The serum albumin concentration lowest on -14th day and highest on -7th day of kidding. Serum globulin level slightly increasing on the day 14th and 21st of postpartum. In conclusion, TP showed no specific trend, albumin suggested decreasing trend and globulin increased from the day of kidding onwards.

Keywords: Albumin**,** Berari goat, Globulin, Kidding, Total protein, Peripartum period, Post-partum and Protein Profile

***Correspondence**
Author: Sunita Bhoite
Email: sunibhoite@gmail.com

Introduction

Goat plays an important role in Indian economy (8.5% to livestock GDP) with providing source of employment to many landless laborer, marginal farmers and specially women's. As many authors reported that importance of goat milk as compared with bovine milk, its therapeutic and beneficial effects on the people that have allergy from other animal milk [1]. Berari goat is the pride of Vidarbha region of Maharashtra, with having total goat population in Vidarbha region about 2.95 lakh. Berari is not only reared for its chevon but also produced fair quantity of milk viz. 78 kg lactational yield in 130 days of lactation with about 533 g/day [2]. During pregnancy the blood biochemical levels may affected because of in reproduction process maternal tissues are involved in providing energy and it also affected other factors such as breed, age, malnutrition, foetal growth, or season [3]. Peripartum period nutrients uptake defined the future milking ability and body condition of mother due to transition in the every physiological aspects as the harmony between demand and supply of nutrients for the development of the fetuses as well as milk synthesis for new born kid. Proteins are very essential biochemical constituents involved in all reaction occurred in the organism such as maintenance of colloidal osmotic structure, catalysis and acid base balance. However few proteins it act as carriers of hormones, vitamins, mineral and lipid in circulatory system. Usually normal level of serum total protein in goat ranged 6-7.5 g/dl. Moreover the normal range changes with age and different physiological status of the doe. Kidding influenced the protein profile due to alteration in catabolic and anabolic pathway of milk synthesis upon delivering the foetus [4]. Such protein profiling data is unavailable especially during peripartum period in Berari goat. Therefore present study revealed that the transitional changes in proteins and their constituents.

Materials and Method

The present study was carried out on 12 advanced pregnant Berari goat selected from Berari Goat and Deccani Sheep Research, Demonstration and Training Centre, Borgaon (Manju) at Akola, Maharashtra. From all experimental animals 5 ml of blood was collected from the jugular vein puncture during morning hours at -14th day and -7th day before expected kidding, on 0th day (i.e. day of kidding) and 7th, 14th and 21st day postpartum. Clean serum was collected in sterilized eppendorf tubes for biochemical studies upon separation of serum by centrifugation at 1500 rpm for 10 minutes and biochemical constituents viz., total protein, albumin, globulin and A:G ratio were estimated by using biochemical semi auto analyzer and kits were supplied by [AGD Biomedical (INDIA) Pvt. Ltd. Nalagarh, Dist. Solan-174101 Himachal Pradesh, INDIA) Total serum protein was estimated by Biuret method as per the standard procedure using AGD biomedical reagents kit on AGD 2020 biochemical analyzer. [5]. Serum albumin estimated by using Bromocresol Green (BCG) method [6] Serum globulin levels were estimated by difference between total protein and albumin. Estimation of serum albumin-globulin ratio is calculated by dividing the albumin concentration

by globulin concentration. The data analyzed with completely randomized design (CRD) and for differences in means were using critical difference (CD) test done according to [7].

Results and Discussion

Present study investigated the blood serum level of total protein, albumin, globulin and A: G ratio during prepartum and postpartum period in Berari goat. Mean and standard error levels of total protein, albumin, globulin and A: G ratio presented in **Table 1**.

Table 1 Mean ± SE levels of serum Total protein (g/dl), Albumin (g/dl), Globulin (g/dl) and A:G ratio (g/dl) during prepartum and postpartum period in Berari goat

Days/ parameters	Prepartum period		Day of kidding	Postpartum period			P value
	-14 day	-7 day	0 day	7 day	14 day	21 day	
Total protein	5.80^{c} ±0.18	6.88^{a} ± 0.19	6.15^{bc} ±0.15	6.18^{bc} ±0.19	6.44^{ab} ±0.14	6.57^{ab} ±0.19	0.05
Albumin	3.20 ±0.14	3.45 ±0.12	3.29 ±0.16	3.32 ±0.13	3.37 ±0.14	3.28 ±0.13	NS
Globulin	2.60^{c} ±0.16	3.42^{a} ±0.18	2.86^{bc} ±0.11	2.86^{bc} ±0.14	3.07^{ab} ±0.14	3.28^{a} ±0.12	0.05
A:G ratio	1.30 ±0.11	1.05 ±0.89	1.18 ±0.96	1.20 ±0.87	1.13 ±0.78	1.02 ±0.71	NS
Means with at least one common superscript do not differ significantly within a row							

Serum Total Protein

The total protein concentration was 5.80±0.18, 6.88±0.19 g/dl on day -14th and -7th during of parturition respectively. On day 7th, 14th and 21st the level of serum total protein was recorded as 6.18±0.19, 6.44±0.14 and 6.57±0.19 g/dl during postpartum period, respectively. On the day of kidding (0th day) the value was 6.15±0.15 gm/dl. Serum total protein level on -14th day of kidding showed significant ($P<0.05$) increase as compared to -7th day of kidding. The values slightly decreased on the day of kidding (0th day). However, after kidding the total protein concentration showed slight increase from the day 7th up to 21st day of postpartum but the differences were non-significant. The values of total protein ranged between 5.80±0.18 to 6.88±0.19 g/dl during peripartum period and were comparable with the values reported by [8] in NARI Suwarna ewes. However, these values were found to be slightly higher during postpartum period (up to 35 days postpartum) than the present findings in Berari goats. In present study serum total protein was found to be increased significantly ($P<0.05$) from day -14th to -7th day of parturition. Similar finding were reported by [9] in ewes 7th day before lambing. However few researchers reported that highest level of serum total protein on day 45th postpartum in Surti goat by [10] while on day 40th postpartum in goat reported by [4]. Our findings indicated that the total protein level was found to be lowest on -14th day of parturition whereas it was found highest on 21st day postpartum in Berari goats. The similar results reported in goat by [11, 12]. There was no significant change in total protein concentration during peripartum period in ewes reported by [13].

Present findings are in contrast with the findings of [14]; [8] who reported significant ($P<0.05$) reduction in the blood serum total protein concentrations of the pregnant in ewes group as compared to control and post-partum. Moreover the physiological stage is also influenced the total protein concentration in different species. In dairy cattle these values were significantly higher during periparturient period found by [15] while in ewes total protein concentration was significantly ($P<0.05$) increased during pregnancy [16]. However significant ($P<0.01$) decrease in plasma total protein content from early to late pregnancy and parturition in Kilis does reported by [17]. Lactation period did not influence total protein in Sahel goat [18]. In the present study during peripartum period the serum total protein concentration ranged between (5.8 to 6.88 g/dl) in Berari goat. This finding is in line with the findings reported by [19] who indicated that the total protein level was less in kids as compared to the adults. Few authors observed slightly higher average total serum protein concentration; in Saanen goats (6.33 to 8.53 g/dl), Sirohi goat (11.24±0.61 to 12.74±0.60 g/dl) and in fawn goats (56 -90 g/L) by [19] and [20] respectively.

Albumin

The concentration of serum albumin was 3.20±0.14, 3.45±0.12 g/dl on day -14th and -7th during of parturition. On day 7th, 14th and 21st was 3.32±0.13, 3.37±0.14, 3.28±0.13 g/dl during postpartum respectively. On the day of kidding (0th day) 3.29±0.16 g/dl value was recorded. The serum albumin concentration lowest on -14th day and highest on -7th day of kidding. These results are in agreement with [21] and [16] in sheep. However, [10] recorded albumin concentration was lowest on 0th day in Surti goat while the present results showed the value was highest on -14th day of kidding. After kidding albumin concentration showed non-significant increased on the day 7th along with 14thday of postpartum and there after declined. The values of total serum albumin concentration on different days did not differ significantly.

The levels of albumin ranged between 3.20±0.14 to 3.45±0.12 g/dl during peripartum period in Berari goat. Present results corroborated with [8] in NARI Suvarna ewes and [22] in Saidi ewes. Similarly [23] reported that the statistically much higher concentrations of albumin in the blood of Merinolandschaf pregnant ewes comparing to the non-pregnant ones. The present result was contrast with [24] in ewes. Moreover [25] reported albumin started to increase significantly during different stage and reached maximum at parturition in Barki ewes whereas it was highest -7th day before kidding in the Berari goat. The serum albumin levels in Berari goats during peripartum period ranged between (3.2 ± 0.13 to 3.28 ±0.13 g/dl) was slightly higher as compared with albumin levels (2.54±0.09; 2.47±0.08 g/dl) during peripartum in Awassi ewes by [26].Serum albumin concentration during peripartum period in Berari goat is inconsistent with the findings of [27] who reported decreasing trends of albumin concentration during week −2 until week +3 post-partum in goats while a slightly decrease in the concentrations of albumin after 1 week of parturition, with a further decrease till the end of 6th week observed in cows by [28].

Globulin

Serum globulin concentration was 2.60±0.16, 3.42±0.18 g/dl on day -14th and -7th of kidding respectively. On day 7th, 14th and 21st was 2.86±0.14, 3.07±0.14 and 3.28±0.12 g/dl during postpartum period. On the day of kidding (0th day) 2.86±0.11 g/dl value was recorded. Serum globulin level on -7th day prepartum showed significant (P<0.05) increased as compare with -14th day of prepartum. The values decreased on the day of kidding (0th day). After kidding globulin concentration showed slightly increased on the day 14th and 21st of postpartum. The levels of globulin ranged between 2.60±0.16 to 3.42±0.18 g/dl during peripartum period in Berari goat. The serum globulin concentration highest on day 7th prepartum and lowest on day 14th prepartum and then comparable throughout the study period. Our finding are similar to [29] revealed there was significantly higher (P<0.05) concentrations of globulin during pregnant as compared with anoestrus, non-pregnant and postpartum in ewes. There was no definite pattern but increased from 14th day prepartum to 21stday of postpartum. These observation is in agreement with [27]. Our result contrast to [14] reported decrease globulin concentration on day 150 of gestation in ewes and [30] in cattle, they observed there was no effect of globulin concentration during three stages of pregnancy (early, mid and late).However, [12] reported markedly decline during the late pregnancy (P < 0.05) as compared with peripartum and dry period.

Albumin: Globulin Ratio

The albumin globulin ratio was 1.30±0.11, 1.05±0.89 g/dl on day -14th and -7th during parturition. On day 7th, 14th and 21st was 1.20±0.87, 1.13±0.78 and 1.02±0.71 during postpartum period. On the day of kidding (0th day) 1.18±0.96 g/dl value was recorded. However, difference in A: G ratio on different days are statistically non-significant. Present result contrast to [25] reported statistically significant (P<0.01) during lactation as compared with dry condition in ewes. The ratio shows decreasing trends from 7th day of postpartum till completion of the study. The levels of albumin globulin ratio ranged between (1.02±0.71 to 1.30±0.11 g/dl) during peripartum period in Berari goat. However, in contrast to present finding [31] recorded that A/G ratio was decreased in post-parturient cows than pre-parturient cows. A: G ratio might be indicates immune status of individual animal recorded highest during the postpartum phase in gaddi sheep by [29]. [32] Reported age related differences was statistically significant in Girgentana goats.

Conclusion

The levels of serum total protein without any specific trend. The levels of albumin highest level on -7th day before kidding with decreasing trend in Berari goat. The levels of globulin increasing trend postpartum in Berari goat.

References

[1] Haenlein, N.F.G. (2004) Goat milk in human nutrition. Small Ruminant Research, 51:155-16

[2] Kuralkar, S.V., N.K. Verma, K. Kharkar and P. Kuralkar (2013) Berari goats: Characterization, management, performance and population status. Indian Journal of Animal Sciences. 83(12): 1292–1298.

[3] Yokus, B., Cakir. D. U., Kanay. Z., Gulten. T., Uysal. E., (2006) Effects of seasonal and physiological variations on the serum chemistry, vitamins and thyroid hormone concentrations in sheep. Journal of Veterinary Medicine 53, 271-276.

[4] Krajnicakova, M., N.S. Kovae, M. 'Koostecky, I. Valocky, I. Maraeek, I. Sutiakova and L. Lenhatdt (2003) Selected clinico-biochemical parameters in the puerperal period of goats. Bull. Vet. Res. Inst. Pulawy, 47: 177-182.

[5] Lubran Michael M. (1978) The measurement of total serum proteins by the Biuret Method. Annals of Clinical and Laboratory Science, Vol. 8, No. 2.
[6] Doumas, B.T., W.A. Watson and H.G. Biggs (1971) Albumin standard and the measurement of serum albumin with Bromocresol green. Clin. C/tim. Acta. 31:87.
[7] Snedecor, G.W. and W.G. Cochran (1994) Statistical Methods, 8th edn. Iowa State University Press.
[8] Talawar, M., T. Veena and G.P. Kalmath (2016) Biochemical and mineral profile in NARI Suwarna ewes during late pregnancy and early postpartum period. I.J.S.N., 7(4) : 772-774
[9] Chniter, M., Imed Salhi, Hager Harrabi, Touhami Khorchani, Anne-Lyse Lainé, Raymond Nowak and Mohamed Hammadi (2015) Physiological changes in the peri-partum period and colostral IgG transfer in prolific D'man sheep: effects of parity and litter size. Trop Anim. Health Prod. DOI 10.1007/s11250-015-0963-8
[10] Manat, T.D., S.S. Chaudhary, V.K. Singh, S.B. Patel and G. Puri (2016) Hematobiochemical profile in Surti goats during post-partum period. Veterinary World. 9 (1):19-24. doi:10. 14202/ vetworld. 19-24.
[11] Tharwat, M., A. Ali and F. Al-Sobayil (2013) Hematological and biochemical profiles in goats during the transition period. Comp. Clin. Pathol., 24: 1-7.
[12] Elzein Eias, I Osman and Shadia and A. Omer (2016) Effect of physiological status in some haematological and biochemical parameters in Desert goats. Inter. J. Vet. Sci., 5(2): 95-98.
[13] Aysen, A. (2006) Study of serum growth hormone, 3, 5, 3-triiodothyronine, thyroxin, serum protein and free fatty acids levels during parturition and early lactation in ewes. Bull Vet. Inst. Pulawy, 50: 85-87.
[14] Balikci, E., A. Yildiz and F. Gurdogan (2007) Blood metabolite concentration during pregnancy and postpartum in Akkaraman ewes. Small Rumin. 67:247-251.
[15] Al-Mujali and M. Abdul-Aziz (2008) Studies on some serum constituents of dairy cows in Saudi Arabia. Scientific Journal of King Faisal University. Basic and Applied Sciences. 9(2):1429.
[16] Piccione, G., G. Caola, C. Giovannetto, F. Grasso, S. Calanni Runzo, A. Zumbo and P. Pennisi (2009) Selected biochemical serum parameters in ewes during pregnancy post-parturition, lactation and dry period. Animal Science Papers and Reports. 27(4)321-330.
[17] Iriadam, M. (2007) Variation in certain hematological and biochemical parameters during the peri-partum period in Kilis does Small Ruminant Research 73 : 54–57.
[18] Waziri, M.A., A.Y. Ribadu and N. Sivachelvan (2010) Changes in the serum proteins, hematological and some serum biochemical profiles in the gestation period in the Sahel goats. Vet. Arhiv. 80:215-224.
[19] Boss, P.H. and M. Wanner (1977) Clinical chemical values in the serum of Saanen goats. Schweiz. Arch. Tierheilk. 119(7): 293-300.
[20] Zubcic, D. (2001) Some biochemical parameters in the blood of grazing German improved fawn goats from Istria, Croatia. Vet. Arhiv. 71(5): 237-244.
[21] Gurgoze, S.Y., A.K. Zonturlu, N. Ozyurtlu and H. Icen (2009) Investigation of some biochemical parameters and mineral substance during pregnancy and postpartum period in Awassi ewes. Kafkas Univ. Vet. Fak. Derg. 15(6): 957-963.
[22] Teleb, D. F., A.H. Nashwa, Ahmed, A. Hanan, Tag El –Din, M. Safaa, Abou El Soud and Omaima M. Hassan (2014) Study on levels Of Some Blood Hormonal And Biochemical Constituents During Different Reproductive Status In Saidi Ewes. Egyptian Journal of Sheep & Goat Sciences, 9(3):105- 113.
[23] Antunovic, Z., M. Speranda and Z. Steiner (2004) The influence of age and the reproductive status to the blood indicators of the ewes. Arch. Tierz., Dummerstorf. 47(3):265-273.
[24] Boudebza, A., N. Arzour-Lakhel, M. C. Abdeldjelil, A. L. Dib, N. Lakhdara, H. Benazzouz and C. Benlatreche (2016) Blood biochemical parameters in Ouled Djellal ewes in the periparturient period. Der Pharma Chemica, 8(18):406-410.
[25] El-Sherif, M.M.A. and F. Assad (2001) Change in some blood constituents of Barki ewes during pregnancy and lactation under semi-arid conditions. Small Rumin. Res., 40: 269-277.
[26] Ozyurtlu, N. S.Y. Gurgoze, S. Bademkiran, A. Simsek and R. Celik (2007) Investigation of some biochemical parameters and mineral levels in pre and postpartum period of Awassi ewes. Firat Univ. J. Health Sci., 21(1): 33-36.
[27] Csilla Tóthová, Oskar Nagy, Veronika Nagyová and Gabriel Kováč (2016) Serum protein electrophoretic pattern in dairy cows during the periparturient period journal of applied animal research ISSN: 0971-2119 (Print) 0974-1844 (Online) Journal homepage.
[28] Sharma, A., P. Kumar, M. Singh and N.K. Vasishta (2015) Haemato-biochemical and endocrine profiling of north western Himalayan Gaddi sheep during various physiological / reproductive phases. Open Veterinary Journal, 5(2): 103-107.

[29] Mir, M.R. Z.A. Pampori S. Iqbal, S. Bhat, M.A. Pal and A. Kirmani (2008) Hemato-biochemical indices of crossbred cows during different stages of pregnancy. Int. J. Dairy. Sci., 3: 154-159.
[30] Rajora, V.S. and Pachauri, S.P. (1994a) Blood profile in pre-parturient and post-parturient cows and in milk fever cases. Indian J. Anim. Sci. 64:31-34.
[31] Alberghina, D., S. Casella, I. Vazzana, V. Ferrantelli, C. Giannetto and G. Piccione (2010) Vet. Clin. Pathol. Sep. 39(3):317-21.

Publication History
Received 02nd Jan 2019
Revised 27th Jan 2019
Accepted 04th Feb 2019
Online 28th Feb 2019