

Serum Protein and Cholesterol Levels in Kankrej Heifers at various reproductive stages in different feeding regimes*

S.V. AMBATKAR¹, N.S. RADADIA², S.K. PANDEY³, J. NINAN⁴, and V.P. VADODARIA⁵

Livestock Research Station,
Gujarat Agricultural University,
Sardar Krushinagar - 385 506.

ABSTRACT

Changes in the Total Serum Protein (TSP) and Total Serum Cholesterol (TSC) levels were noted in 18 pregnant heifers, divided into three groups as per their feeding regimes, both at prepartum and postpartum periods. TSP and TSC levels varied significant ($P < 0.01$) with respect to various reproductive stages. However, their levels were almost same at any reproductive stage under the three feeding regimes undertaken, indicating that even low cost feeding was equally capable of maintaining normal levels at par with the other groups.

—x—x—x—

Physiological status of any domestic animal is mainly determined by normal levels of certain biochemicals in the blood (Govinda Rao, 1990). Study on biochemical aspects during different stages of reproduction will help to understand the significance at particular stage of reproduction, which also depends on the nutritional status of the animal at that period. Insufficient intake of carbohydrate and protein might cause failure or delay in the onset of puberty in heifers (Roberts, 1971). Thus, the present study was aimed at knowing the changes in blood profile due to feeding regimes taking into account its association with reproductive stages.

MATERIALS AND METHODS

Investigation was conducted on 18 pregnant Kankrej heifers maintained at Livestock Research Station, Gujarat

Agricultural University, Sardar Krushinagar which were divided into three groups and allotted to different feeding regimes (Table 1). Each group was allotted to three treatments at random. Extra concentrate mixture was offered to all the milch animals in all three groups @ 50% of milk production during lactation, serum separated from blood collected aseptically from the jugular vein at different prepartum and postpartum stages was stored at -6°C in deep freeze till used for further assay. Total serum protein and total serum cholesterol was estimated by modified Biuret and Dumar method (Varley, 1980) and one step method of Wybenga and Pileggi (1970), respectively, as described by span Diagnostic using spectronic-20. Statistical analysis of variance was done as per the method suggested by Snedecor and Cochran (1980).

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1. Associate Professor, Department of L.P.M. Bombay Veterinary College, Goregaon (E), Mumbai - 400 065.
2. Former Research Scientist, Livestock Research Station, Gujarat Agricultural University, Sardar Krushinagar - 385 506, Dist. Banaskantha.
3. Associate Professor, Department of Animal Husbandry & Dairy Science, College of Agriculture, Rewa - 486 011.
4. Assistant Professor, Department of Physiology, Rajiv Gandhi College of Veterinary Science & Animal Husbandry, Pondichery.
5. Professor, Department of Physiology, College of Veterinary Science & Animal Husbandry, Gujarat Agricultural University Campus, Anand - 388 001.

RESULTS AND DISCUSSION

Total Serum Protein (TSP): The total serum protein level was found to be minimum at conception, increased during gestation upto ninth month; and dropped at calving. Significant ($P < 0.01$) differences were found between the various prepartum and postpartum periods. TSP levels at conception and calving varied significantly ($P < 0.01$), however, the average TSP level during postpartum was found to be at par. Similar trends were observed by Pathak *et al.*, (1986) in Surti buffalo, respectively. Total protein in the circulation represents the balance between the biosynthesis and catabolism or mechanical loss. There is a positive correlation between protein concentration and stage of pregnancy (Pathak *et al.*, (1986). Towards term specially 15th day antepartum, protein levels in serum start decreasing due to the increasing levels of protein in the colostrum at calving (Rao *et al.*, 1981). The three different feeding regimes did not cause significant difference in the TSP values recorded at various stages (Table 2) which indicated that low cost feeding (FR-I) was equally capable of maintaining normal TSP level at par with other groups. As the TSP level is an indicator of protein intake (Topps

and Thompson, 1984), the present study pointed out equal protein intake under the three feeding regimes.

Total Serum Cholesterol (TSC): The Average Total Serum cholesterol levels recorded at prepartum and postpartum stages differed significantly ($P < 0.01$). The cholesterol level declined from conception upto calving, where it was noted to be the lowest, and increased at postpartum with highest level being recorded at postpartum oestrus. Significant ($P < 0.01$) difference were found in the cholesterol level at conception, calving and at postpartum oestrus. The average cholesterol levels noted herewith within the normal range reported by Rathore and Kohli (1987) in dairy cattle. The decrease in cholesterol levels at parturition would be attributed to parturition stress, as it serves as an indicator of stress (Rathore and Kohli, 1987). Cholesterol serve as a precursor of steroids, which increase considerably near parturition leading to depletion in its level (Hafez, 1980 and MacDonald, 1969).

The observations on three different feeding regimes revealed non-significant differences in the cholesterol values. It pointed out that feeding regimes under study were adequate to maintain normal cholesterol levels at par.

Table 1

Feed Item	Feeding Regimes (FR)		
	I (Control)	II	III
Concentrate Mixture at the rate of	0.00	0.25%	0.50%
Green Forage (Kg)	6.00	6.00	6.00
Dry Fodder	ad.lib.	ad.lib.	ad.lib.

Table 2. Total serum protein (g%) and Total serum cholesterol (mg%) during different reproductive stages.

Reproductive stages	Blood parameter	Feeding Regimes			Overall mean	'F' Value
		I	II	III		
Prepartum periods						
At conception	TSP	6.24 ±0.19	6.69 ±0.15	6.11 ±0.26	6.34 ±0.12 ^a	2.20 ^{NS}
	TSC	165.69 ±11.03	151.25 ±12.40	153.82 ±19.32	156.92 ±8.12 ^x	0.27 ^{NS}
3 Months	TSP	6.70 ±0.15	6.75 ±0.22	7.03 ±0.25	6.83 ±0.12 ^{ab}	0.67 ^{NS}
	TSC	138.65 ±12.99	126.25 ±12.17	114.99 ±6.73	126.63 ±6.40 ^{uv}	1.15 ^{NS}
5 Months	TSP	6.96 ±0.50	7.12 ±0.34	7.03 ±0.24	7.04 ±0.20 ^b	0.04 ^{NS}
	TSC	122.71 ±9.02	111.47 ±6.66	135.02 ±13.32	123.07 ±5.93 ^{uv}	1.37 ^{NS}
7 Months	TSP	7.66 ±0.31	7.96 ±0.58	8.16 ±0.43	7.92 ±0.25 ^d	0.21 ^{NS}
	TSC	139.81 ±8.26	137.04 ±4.07	139.44 ±8.30	138.70 ±3.89 ^{vw}	0.04 ^{NS}
9 Months	TSP	8.25 ±0.29	7.57 ±0.34	7.51 ±0.42	7.78 ±0.21 ^{cd}	1.34 ^{NS}
	TSC	121.80 ±11.40	116.63 ±7.00	137.00 ±6.36	125.15 ±5.03 ^{lv}	1.54 ^{NS}
Postpartum periods						
At calving	TSP	7.65 ±0.37	7.44 ±0.31	6.60 ±0.26	7.23 ±0.20 ^{bc}	3.04 ^{NS}
	TSC	122.14 ±12.81	121.68 ±6.95	121.65 ±9.67	121.82 ±5.48 ^u	0.0007 ^{NS}
1 Month	TSP	7.23 ±0.04	7.01 ±0.22	6.91 ±0.06	7.05 ±0.08 ^b	1.36 ^{NS}
	TSC	152.90 ±7.34	147.86 ±9.96	148.86 ±13.73	149.87 ±5.81 ^{wx}	0.06 ^{NS}
3 Months	TSP	7.38 ±0.42	6.62 ±0.27	7.33 ±0.33	7.11 ±0.20 ^b	1.50 ^{NS}
	TSC	220.27 ±7.82	212.78 ±5.75	209.69 ±5.26	214.25 ±3.62 ^y	0.27 ^{NS}
5 Months	TSP	6.38 ±0.40	6.92 ±0.40	8.24 ±0.69	7.18 ±0.34 ^b	3.38 ^{NS}
	TSC	223.51 ±8.05	213.38 ±9.76	217.95 ±10.80	218.28 ±5.30 ^y	0.27 ^{NS}
At PPE	TSP	6.60 ±0.36	6.68 ±0.12	7.05 ±0.34	6.78 ±0.16 ^{ab}	0.62 ^{NS}
	TSC	248.67 ±10.93	244.00 ±12.35	256.27 ±11.38	249.65 ±6.39 ^z	0.28 ^{NS}

Note: Means carrying different superscripts differed significantly (P < 0.01) from one another between reproductive stages. NS = Non significant.

REFERENCES

- Govinda, Rao (1990). Physiological status of Indigenous Livestock, its contribution towards rural economy and prospects with respect to Southern zone. Paper presented at national Symposium and Sixth Annual Conference at SAPI, Guwahati, 24-26 Oct., 1990.
- Hafez, E.S.E. (1980). Reproduction in farm animals. 4th Edn., Lea and Febiger, Philadelphia. U.S.A.
- McDonald, L.E. (1969). Veterinary Endocrinology and Reproduction. 1st Edn., Lea and Febiger, Philadelphia, U.S.A.
- Pathak, M.M., Patel, A.V., Diwan, Kalpana and Janakiraman, K. (1986). Blood serum protein at different stages of pregnancy in Surti buffaloes. *Indian J. Anim. Repro.*, 7: 66-69.
- Rao, D.G., Prasad, A.B.A., Krishna, V.J. and Rao, K.S. (1981). A note on serum protein levels on Ongole and Friesian X Ongole cows in pre-partum and post-partum periods. *Indian Vet. J.*, 58 943-944.
- Rathore, S.S. and Kohli, I.S. (1987). Blood serum cholesterol in antepartum prolapse of vagina and its variation under certain chemotherapeutic strees in Rathi cows in Arid zone. *Indian J. Anim. Repro.*, 8: 55-56.
- Roberts, S.J. (1971). Veterinary Obstetrics and genital diseases. 2nd Edn., Publ. by Author. Ithaca, New York.
- Snedecor, G.W. and Cochran, W.G. (1980). Statistical methods. 7th Edn. The Iowa State Univ. Press, Aves, Iowa. U.S.A.
- Toppe, J.H. and Thompson, J.K. (1984). Blood characteristics and nutrition of ruminants. Her Majesty's Stationery Office, London.
- Varley, H. (1980). Practical clinical biochemistry. 5th Edn. William Heinemaun Medical Books Ltd., London.
- Wybenga, D.R. and Pileggi (1970). *Clinical Chemistry*, 16:44 980.