Evaluation of Serum Profile during Various Stages of Gestation in Crossbred Deoni Cows

Mahesh S. Dodamani*, Khaja Mohteshamuddin, S.D. Awati, M.K.Tandle and S.S.Honnappagol

Department of Animal Reproduction, Gynecology and Obstetrics,
Veterinary College, KVAFSU, Bidar585401
* Corresponding author e-mail: msdkvafsu@yahoo.co.in

Abstract

The research was conducted on 36 (Deoni and Deoni X H.F.) cross-bred cows between 2nd to 5th lactation. Cows were divided as early, mid and late gestation period comprising 12 cows in each group. Results of the present study indicated that there is no variation in serum Ca, Mg, Na and K level but serum P level declines significantly from early to late gestation, where as serum Cl level decreases from early to mid gestation and again increases from mid to late gestation.
Keywords: Gestation, serum, minerals

Introduction

Minerals are indispensable for normal growth, reproduction and health of the animals. They are important for growth of the most organs and particularly mineralization of the bone network. Their distribution and status varies with different physiological conditions like neonatal period, prepubertal period, pubertal period and post pubertal period, estrus cycle, pregnancy and lactation (Manoshiphukan *et.al* 2000). The Physiological role of the Trace minerals-Ca, P, Mg, Na, K, and Cl has been studied since 19th century (Ruckebusch *et.al* 1991). Still it has been observed that the blood biochemistry of indigenous and their crossbred animals have not been investigated adequately. Considering this background, present study was conducted to study change in the level of serum Ca, P, Mg, Na, K, and Cl in crossbred cows during early, mid and late gestation.

Materials and Methods

Thirty Six Crossbred cows (Deoni and Deoni X Holestein Freisian) ranging between 2nd to 5th Lactation and about 6 to 9 years of age from Bidar district of Karnataka were selected. These 36 cows were divided into three groups as per their gestation period as-early, mid and late, with 12 cows in each group.

During the study, cows were maintained under standard nutritional and managemental conditions. Blood samples (3 to 4 ml) were collected aseptically from Jugular vein in the sterilized test tubes between 8 a.m to 10 a.m. and allowed to clot at room temperature. Serum was separated by centrifugation at 3000 r.p.m. for 5 minutes. Serum Ca, P, Mg, Na, K, and Cl were estimated using STAT-FAX 2000 Auto analyzer and kits from Menarini diagnostics - Italy.

The results of the various parameters were tabulated and the data was statistically analyzed according to Snedecor and Cochran (1994) using CRD for groups and means were compared by using C.D. Test.

Results and Discussion

Table-1 revealed that gradual decrease of the serum Calcium from 10.91 ± 0.46 mg/dl in the early gestation to 10.64 ± 0.48mg/dl in the mid and then 10.28 ± 0.33 mg/dl in late gestation. However, the difference was statistically non significant in the three stages of the gestation. Present findings of the non significant variation of the Calcium are in agreement with the earlier reports of Deshpande (1983), Tainturier *et.al* (1984), and Siviah *et.al* (1986). A decline in calcium level during late gestation has also been reported by Sahukar *et.al* (1984), this may be because of increased level of estrogen during this period which favors the deposition of Ca in the bone, tends to lower the blood Ca level (Manzoor *et.al* 1994).

Serum phosphorus (Table-2) level significantly ($P<0.01$) declined during different stages of gestation. These results are concurrent with the results of Mc Adam and O'dell (1982) and Sahukar *et.al* (1984), who noticed fall in "P" level during late gestation but in contrast with Siviah *et.al* (1986), who recorded non significant variation in the P level. The Significant decrease in the P level during the late gestation might

be due to increased utilization of "P" at this stage and to enhance Carbohydrate metabolism of pregnancy (Sahukar et.al 1984) or may be due to meeting requirement of the P for the secretion of colostrum (Rock and Thomas 1983).

There was gradual decrease in the serum Magnesium level, as gestation period progresses but the difference was non significant. Sarmah *et.al* (1999), observed lower Mg concentration in heifers than in pregnant cows, but Cakla and Albrycht (1973), did not observe appreciable change in "Mg"concentration during gestation. Serum "Na" level of the gestation period did not indicate difference among early, mid and late gestation periods, which are contrary to Datta *et.al* (1983) who reported significant change in serum "Na" level during different stages of gestation, where as Ferrel *et.al* (1982), reported lower "Na" in early gestation which increases rapidly after 250 days of gestation.

Non significant variation in serum "K" level was recorded in different stages of the gestation which satisfied the findings of Bahgu and Singh (1992) who did not revealed any noticeable change in "K" level in gestation.

Serum "Cl" concentration during gestation indicated significant (P>0.05) variation among three stages. Serum "Cl" level decreases from early gestation to mid gestation but later increased in late gestation, which is in accordance with Murtuza *et.al* (1979) who reported significantly lower "Cl" level in the late pregnancy than early pregnant cows, but contrast with Mc Adam and O'dell (1982), stating that "Cl" concentration does not vary as a function of age and breed during gestation.

Conclusion

Thus, it is concluded from the present study that there is variation in mineral profile during the pregnancy as they performs various functions in this period. Therefore supplementation of these micro nutrients through diet is must during gestation period to satisfy the requirement of different stages of gestation.

References

1. Bahga, C.S. and Singh N. (1992): Effect of stage of parturation and plasma electolite in normal parturean cows, *Ind. J. of Anim. Sci*. 7: 169-170.
2. Cakala, S. and Albrycht A. (1973) sodium potacium, magnecium, inorganic phosporus and calcium levels in blood serum of polish black and white low land cow, *Dairy Sci. Abst.* 30: 4008
3. Datta, J.C.et.al. (1983): Serum Sodium and poatacium levels in cows and buffaloes retaining and not retaining foetal membranes, *Ind. Vet. J.* 60: 931-932
4. Deshpande, S.D. (1983): studies on haemogram and some blood biochemical constituents in red Kandhari cows with special reference to pregnancy and lactation: M.V.Sc. Thesis submitted to Marthawada Krishi Vidyapeeth Parabhani.
5. Ferrel,C.L.,et.al.(1982): mineral accration during prenatal growth of cattle, *J.Anim. Sci.* 54: 618-624.
6. Manoshiphukan, A. B.,et.al.(2000): Serum macro and micro mineral levels in crossbred cows during pre weaning and post weaning periods. *Indian Vet. J*. 77: 583 -585.
7. Manzoor, M.,et.al.(1994): concentration of some major elements in blood plasma and milk of crossbred cows during different stages of lactation. *Ind. J. Dairy Sci.* 47: 94-98.
8. McAdam, P.A. And O' Dell, D.G. (1982): mineral profile of blood of lactating dairy cows, *J. Dary Sci.* 65: 1219-1226.
9. Murtuza, Md.,et.al.(1979): concentration of certain minerals in the serum of Hariyana cattle under various physiological states, *Ind. Vet. J.* 56: 95-99.
10. Rook, J.A. and Thomus P.C. (1983): nutritional physiology of farm animals, Ed. Rook J.A. F. and Thomus P.C. (ed. j.) Longman Inc. New York.
11. Ruckebusch, Y.; Chaneut,L.P. and Dunlop, R. (1991): Physiology of small and Large animals, B.C. Decker Inc. Hamilton, Ontario: pp 448-449
12. Sahukar C.S.et.al.(1984): electrolyte during various reproductive phases in cross bred cows, *Ind. J. Animal. Sci.* 54: 993-995.
13. Snedecor G.W.and Cocharan W.G. (1994), Statistical methods 9th edition. Affiliated East-West press, Lowa State University press.
14. Tainturier, D.,et.al.(1984): Variation in blood composition in dairy cows during pregnancy and after calving, *Res. Vet. Sci.* 37: 129-131.

Table-1. Serum mineral profile during three stages of gestation period in crossbred cows.

Group	Gestation	Ca(mg/dl)	P(mg/dl)	Mg(mg/dl)	Na(mEq/l)	K(mEq/l)	CL(mEq/l)
I	Early Gestation (1-3 month)	10.91± 0.46 NS	6.56± 0.16^{a}	2.61± 0.34 NS	160.25 ±4.54 NS	6.16± 0.34 NS	142.60± 6.78^{b}
II	Mid Gestation (4-6 month)	10.63± 0.48 NS	5.59± 0.26 ^{a}	2.51±0.28 NS	161.58±2.98 NS	5.75± 0.44 NS	121.63± 4.35 ^{a}
III	Late Gestation (7-9 month)	10.28± 0.33 NS	5.01± 0.18 ^{b}	1.97±.40 NS	156.91±3.80 NS	6.33± 0.22 NS	128.15± 3.08 ^{a}
	Grand mean	10.60	5.72	2.36	159.59	6.08	130.79