Journal of Veterinary and Animal Sciences. 26 (1995) 123-124

Short Communication

PANCREATIC FUNCTION TEST IN INDUCED OVINE PREGNANCY TOXAEMIA

Pregnancy Toxaemia (PT) is a metabolic disease occurring in the later part of pregnancy commonly in ewes bearing twins or triplets. The disorders of glucose homeostasis appears to play an important role in the pathogenesis of pregnancy toxaemia (McClymont and Setchell, 1955). The purpose of the present work was to assess the ability of pregnant ewes to maintain glucose homeostasis.

Ten pregnant ewes of Muzzaffarnagari breed in the last quarter of gestation (125 ± 5 days) were used for this study. The experiment was carried out in Central Institute for Research on Goats at Makhdoom, Mathura. The test was performed in six experimental (Gr.I) and four control (Gr.II) ewes. Pregnancy toxaemia was induced in experimental (Gr.I) ewes by administration (s/c) of protamin zinc insulin @ 40 I.U./ewe on alternate days followed by semi-starvation as reported by Singh *et al.* (1992).

For the intravenous glucose tolerance test (IVGTT) 40 per cent acqueous solution of dextrose was prepared and administered intravenously at the rate of 0.5g/kg body weight after collecting fasting (overnight) blood in Sodium Fluoride. Blood samples were collected at intervals of 5, 15, 30, 60, 90, 120, 240, 300, 480 minutes and 24 hours. The blood glucose concentration was analysed according to the method of Folin and Wu (1920). The glucose tolerance test was carried out both in experimental (Gr.I) and control (Gr.II) animals during the 3rd week of the experiment when the experimental ewes started manifesting the symptoms of pregnancy toxaemia. The diagnosis of PT was made by clinical signs and biochemical changes in blood/serum of the ewes.

The clinical manifestations exhibited by the experimental animals (Gr. I) included anorexia, depression, weakness, nervous symptoms, lateral and sternal recumbency, partial blindness, development of ketonuria and proteinuria.

Prior to IVGTT, a significant drop in blood glucose level (28.4 mg/dl) and significant elevation of ketone bodies/acetone (28.1 mg/dl) concentrations became evident in experimental ewes (Gr.I) during the 3rd week of experiment compared to the pre-experimental values of 58.0 and 3.5 mg/dl of blood glucose and ketone bodies, respectively. IVGTT for pancreas function test carried out at 3rd week of experiment in Gr.I and II, showed that the highest blood glucose concentration (177 ± 17.62 and 164 ± 16.94 mg/dl in Gr. I and II, respectively) was reached within 30 minutes after injecting 40% dextrose solution (Table 1). The blood glucose concentration started declining after 30 minutes in both the groups. The declining rate/glucose disappearance became slow during 1 to 5 hours, in Gr. I indicating an impairment of glucose tolerance. Glucose levels in Gr. I remained elevated (61 ± 3.34 mg/dl) upto 24 hours.

The severity and onset of clinical symptoms appeared to correlate with levels of blood sugar and ketone bodies and lent support to the findings of Vihan and Rai (1984). A slow disappearance/ impaired glucose tolerance was observed in experimental ewes (Gr.I) suffering from pregnancy toxaemia. Impaired glucose tolerance has also been reported in type I diabetes mellitus in human beings (Sigurdsson, 1988). Saba *et al.* (1966) observed lower pancreatic function and insulin activity in fasting pregnant ewes. Reid (1968) and Sigurdsson (1988) opined that

reduction or impairment in the insulin secretion occurs in ketotic/toxaemic ewes.

Table 1 IVGTT in toxaemic and control ewes

Time	Experimental Ewes Gr. I (6) mg/dl	Cntrol Ewes Gr. II (4) mg/dl
Fasting	28.4±3.33	56.0±4.63
5 mts	146.0±13.56	135.0±11.66
15 mts	177.0±17.62	164.0±16.94
30 mts	137.0±14.97	126.0±13.34
60 mts	119.0±9.55*	95.0±8.25
90 mts	104.0±7.32*	78.0±7.76
120 mts	97.0±6.81*	66.0±5.17
180 mgs	90.0±5.77*	60.0±4.65
240 mts	82.0±5.26*	54.0±4.21
300 mts	75.0±4.83*	53.0±3.81
360 mts	70.0±3.61*	54.0±3.12
24 hours	61.0±3.34	58.0±2.85

* Significance $P < 0.05$ mean comparisons along columns with in experimental an control (I and II) groups

Acknowledgements

The author is thankful to Dr. M.C. Prasad, IVRI, Izatnagar and Dr. Nem Singh, C.I.R.G., Makhdoom, Mathura for their kind help and providing facilities to carry out this work.

S.K. Singh,
Department of Pathology
Veterinary College, Anand-388 001, Gujrat

References

Folin, O. and Wu, H. (1920). A simplified and improved method for determination of sugar. J. Biol. Chem. **41:** 367-374

McClymont, G.L. and Setchell, B.P. (1955). Ovine pregnancy toxaemia. Aust. Vet. J. **31:** 170

Reid, R.L. (1968). The physio-pathology of under-nourishment in pregnant sheep with particular reference to pregnancy toxaemia. Adv. Vet. Sci. **12:** 163-238

Saba, N.; Burns, K.N.; Cunningham, N.F.; Hebert, C.N. and Patterson, D.S.P. (1966). Some Biochemical and hormonal aspects of experimental ovine pregnancy toxaemia. J. Agric. Sci. **67:** 129-138

Sigurdsson, H. (1988). The effects of pregnancy and feeding on the insulin and glucose concentration in blood of ewes in late pregnancies. Acta. Vet. Scand. **29**: 401-405

Singh, S.K.; Prasad, M.C.; Nem Singh and C. Ramakrishna (1992). Clinico-biochemical studies on induced pregnancy toxaemia in sheep. Indian J. Vet. Path. **16**(2): 85-90

Vihan, V.S. and Rai, P. (1984). Studies on biochemical and haematological changes in metabolic derrangement of sheep and goats. Indian J. Vet. Med. **4:** 9-12