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METABOLIC PROFILE OF 'DOWNER COW' SYNDROME IN CROSSBRED DAIRY CATTLE

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'Downer Cow' Syndrome is a clinical condition of worldwide occurrence and is usually considered as a complication of hypocalcaemia in dairy cattle. Hallgren (1955) and Hemsley (1957) regarded 'Downers' as cows that were normal in every respect but without the necessary muscular strength to regain feet. Cows that had parturient paresis are considered as 'Downers' when they do not get up within 24 to 48 hours after the initial treatment for milk fever. A high incidence of 'Downer Cow' Syndrome was observed among the crossbred dairy cattle in the recent past in Kerala.

This paper presents the evaluated metabolic profile of fourteen field cases of 'Downer Cows'.

Materials and methods

Fourteen clinical cases of 'Downers' in crossbred dairy cows, 3-13 years of age, from Trichur district were selected at random and utilized for the present study. Their body weight ranged from 250-300 kg and were maintained under average conditions of feeding and management. Fourteen healthy crossbred cows of similar age group and body weight maintained under identical conditions of feeding and management from the areas from which the clinical cases were studied were selected at random and utilized as controls. Samples of blood, urine and dung from the animals of both the groups were collected and analysed using standard procedures.

Haematological parameters were determined as per the method of Schalm *et al.* (1975). Blood glucose, urea nitrogen, serum calcium, phosphorus, magnesium, total protein and albumin levels were estimated. Plasma sodium and potassium levels were also determined. Values were analysed as per the methods of Snedecor and Cochran (1967).

Results and discussion

Analysis of the data from the diseased animals indicated a higher incidence in Jersey crossbred cows during summer. Clinical signs observed in the present study like sternal recumbency for at least 24-48 hours, bright and alert appearance without any systemic disturbance are in agreement with the reports of Rosenberger (1958), Curtis *et al.* (1970) and Allen and Davies (1981).

Results of biochemical studies are presented in Table 1.

Highly significant increase ($P < 0.01$) was observed in the PCV value ($34.53 \pm 1.53\%$ against the normal value of $29.86 \pm 0.62\%$) in the 'Downers'. Fenwick and Daniel (1992) reported increased PCV as an abnormal finding in 'Downer cows' but could not explain whether this was due to shrinkage of plasma or increase in mean corpuscular volume. Significantly ($P < 0.05$) increased haemoglobin content of 12.20 ± 0.35 g%

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against the normal value of 11.17±0.23 g% in the diseased cows was in agreement with the finding of Prasad *et al.* (1989) and this could be due to splenic contraction associated with the strenuous efforts made by the animals to get up during recumbency. The value of ESR, RBC and WBC in 'Downers' were 5.29±0.52 mm/24 hr, 6.85±0.50 millions/c mm and 4.21±0.24 thousands/c mm against the normal values of 5.79±0.65 mm/24 hr, 6.21±0.31 millions/c mm and 4.83±0.29 thousands/c mm, respectively. On differential leucocytic counts neutrophila (40.21±2.91% against normal value of 30.0±2.16%) and eosinopenia (2.43±0.65% against normal value of 6.71±0.85%) were observed and this could be due to the stressor response (Prasad *et al.*, 1989).

Table 1 Comparison of biochemical values between controls and 'Downer cows'

Parameters	Control animals Mean ± SE	Diseased animals Mean ± SE
Blood glucose (mg%)	49.936 ± 1.342	48.850 ± 1.295
BUN (mg%)	21.914 ± 2.235	17.293 ± 1.744
Ca (mg%)	9.704 ± 0.205	8.531 ± 0.268**
P (mg%)	5.249 ± 0.226	4.136 ± 0.246**
Mg (mg%)	2.279 ± 0.123	1.993 ± 0.122
Total protein (gm%)	7.886 ± 0.323	7.008 ± 0.139*
Albumin (gm%)	3.375 ± 0.129	2.535 ± 0.125**
A : G ratio	0.804 ± 0.720	0.603 ± 0.073
Na (mEq/L)	134.810 ± 1.264	133.761 ± 1.299
K (mEq/L)	4.727 ± 0.204	4.393 ± 0.305

* indicate $P < 0.05$ ** indicate $P < 0.01$

A highly significant difference ($P < 0.01$) in serum calcium level between the values of controls and 'Downer Cows' was observed which was in agreement with Curtis *et al.* (1970), Fenwick (1977) and Fenwick *et al.* (1986). However, Julian *et al.* (1977). Narayana *et al.* (1977) and Rao *et al.* (1991) reported that there was no significant change in serum calcium level in 'Downers'. Drain of calcium into colostrum or interference to absorption of calcium from the gut could be the reason for low level of calcium observed in the present study.

Highly significant difference ($P < 0.01$) was evident in the serum phosphorus levels between the healthy and 'Downer cows'. Low level of phosphorus obtained from diseased cows was in agreement with the report of Curtis *et al.* (1970). Roine *et al.* (1973) and Caple *et al.* (1977). Serum phosphorus level appears to be intimately related to carbohydrate metabolism and hypophosphataemia may be related to the lower carbohydrate reserves (Caple *et al.*, 1977).

Significant decrease ($P < 0.05$) in serum protein and highly significant decrease ($P < 0.01$) in albumin level obtained in 'Downer Cows' could be due to inadequate production, malnutrition and hypoproteinaemia during pregnancy and onset of lactation (Kaneko, 1980).

No significant variation in blood glucose, urea nitrogen, sodium, potassium, magnesium and A/G ratio were observed in the present study. Analysis revealed no consistent result indicative of any systemic involvement and no parasitism on examination of dung, microscopically.

Summary

Fourteen field cases of 'Downers' in crossbred dairy cows in Trichur district were studied. Highly significant increase in PCV and significant increase in Hb with no significant change in ESR, RBC and WBC were observed. Leukocytic responses observed were neutrophilia and eosinopenia. Biochemically, hypocalcaemia, hypophosphataemia, hypoproteinaemia and hypoalbuminaemia were observed.

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