Clinicopathology of Fatty Liver in Cows*

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(Received : 10-01-2012; Accepted : 11-08-2012)

Fatty liver is a frequent metabolic disorder in dairy cattle in early lactation. Clinicopathological studies were conducted in cows with fatty liver and the observations are presented.

Materials and Methods

The study was conducted with the cows that enrolled in LAC OP Medicine Unit of the Madras Veterinary College Teaching Hospital. Animals with the history of recent calving, reduced milk yield and suffering from periparturient disorders were screened for fatty liver. Cows were subjected to clinical, hematological (PCV, RBC, total leucocytic count, differential leucocytic count), biochemical (AST, ALP, TP, Albumin, NEFA, bHBA, triglycerides, GGT, cholesterol, total bilirubin, direct bilirubin, urea, glucose) and liver biopsy. Grading of the liver fat content was done (GdL) histopathologically as per Kalaitzakis et al. (2007) and the animals were grouped as

Group 1  GdL - 2 and below : Mild
Group 2  GdL-3-4 : Moderate
Group 3  GdL-5 : Severe

Results and Discussion

Out of 7,500 cows enrolled, incidence of the fatty liver was found to be 1.61 per cent (121 animals). In these 121 cows, 18.18 (22 animals) per cent were in the group 1, 46.28 (56 animals) per cent were in group 2 and 35 (43 animals) per cent were in group 3.

A higher incidence of moderate and severe fatty liver was observed in Jersey cross breeds compared to Holstein Friesian cross breeds and other breeds which may be because of the higher population of this breed in the study area.

Incidence of fatty infiltration of the liver was found to be high in 2nd, 3rd and 4th lactation. The occurrence of fatty liver is less in the first lactation which might be due to higher blood glucose concentration in heifers (Kappel et al. 1984).

Out of 121 cases, 50 animals were maintained under stall fed condition and the remaining 71 animals were let out for grazing. Lack of exercise and high concentrate intake might have resulted in obesity and may be a reason for higher incidence of fatty liver in stall fed animals.

Clinical signs included anorexia, depression, decreased ruminal contraction, loss of body condition and marked decrease in milk yield. The signs related to other primary diseases were also present. Cows with severe fatty infiltration of the liver in group 3 were characterized by increased body weight when compared to the group 1 and group 2 cases.

Anorexia and severe ketosis refractory to the usual treatment were observed in 22.72

¹Part of the Ph.D. thesis of the first author submitted to TANUVAS
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The Indian Veterinary Journal (April, 2013)
per cent in group 1, 35.71 per cent in group 2 and 58.11 per cent of group 3 which might be due to hepatic dysfunction and the presence of other periparturient disorders in these animals. CNS disturbances were exhibited in 4.6 per cent (n=2) cases in group 3 implicating the severity of hypoglycemia or failure of normal hepatic detoxification mechanism (Radostits et al., 2000). In group 3, 4.6 per cent of the animals died without responding to the treatment given. Death may due to the severity of hepatic dysfunction in this group when compared to other groups (Ahmed 2004). Hematological examination revealed an increase in PCV value in group 3 compared to other groups. This may be due to dehydration as a result of decreased fluid intake. Total leucocytic count was significantly reduced in group 2 and group 3 when compared with other two groups. A significant decrease was also observed in lymphocytic count in group 3 when compared to other groups. The significant decrease in the total leucocytic count and the lymphocytic count might be attributed to stress.

A significant decrease in glucose values were observed in group 2 and group 3 when compared to the control groups. Decrease in gluconeogenesis due to hepatic dysfunction could have led to decrease in the serum glucose levels (Sevinc et al., 2001). The serum total protein and albumin were significantly decreased in the group 2 and group 3 when compared to other groups. This reduction in total protein value might be because of the albumin fraction and a decrease in the synthesis of albumin by the liver.

A significant increase in the serum levels of AST, ALP, GGT, NEFA and bHBA was observed in group 2 and group 3 compared to other groups implicating the liver damage. No changes were observed in the total bilirubin and direct bilirubin among different groups. Accumulation of lipid and the consequent pressure did not cause severe obstruction of bile duct or biliary epithelium. The serum cholesterol and triglyceride values were decreased in the group 2 and group 3, indicating a decrease in the lipoprotein content in fatty infiltration of liver (Katoch, 2002).

Summary

The present study was conducted on 121 cows with history of recent calving, reduced milk yield and suffering from periparturient disorders. Cows were grouped into three different groups based on liver fat content. The clinical signs were more severe with the increase in the fat content. The incidence was found to be more than 80 per cent in 2nd and 3rd lactations. Hematology showed a significant reduction of total leucocytes with the increase in the fat content of the liver. Differential count revealed a decrease in lymphocytic count in the group 3 when compared to other groups. Serum biochemistry showed an increase in aspartate amino transference (AST), gamma glutamyl transferase (GGT), alkaline phosphatase (ALP), NEFA, b hydroxyl butyric acid and triglyceride with the increase in the fat content of the liver. There was a significant decrease in total protein, glucose, albumin and cholesterol with an increase in the fat content of the liver and could be used for evaluating the severity of the fat deposition in the liver.

References


The Indian Veterinary Journal (April, 2013)