

Assessment of Hepatic Dysfunction in Cattle Associated with Hepatic Jaundice

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Abstract

Jaundice is a disorder of liver characterised by yellowish discoloration of the skin, sclera and mucous membranes due to deposition of bilirubin in tissues. Liver function test rapid evaluation strategy to define the degree of hepatic insufficiency due to hepatic damage and dysfunction, to assess prognosis and monitor response to therapy. Study was performed on 11 healthy and diseased cattle with aim to assess the aspartate aminotransferase (AST) and gamma glutamyltransferase (GGT) activity and concentration of bilirubin, protein and albumin in serum. Significantly ($P>0.05$) higher activity of both AST and GGT was observe in serum of in diseased cattle as compared to healthy control. The concentration of serum bilirubin was also significantly ($P>0.05$) higher in diseased cattle as compared to healthy control. However, the value of total protein and albumin was significantly ($P>0.05$) lower in diseased cattle then healthy control. Degree of hepatic dysfunction can be asses by estimating GGT, AST, bilirubin, total protein and albumin in serum of diseased animal.

Key words: Cattle, Jaundice, Hepatic dysfunction, Bilirubin, serum enzyme

Introduction:

Liver has central role in metabolism and dairy cows are commonly prone to liver disease (Kalaitzakis e al., 2010). It controls several vital functions in animal body related to metabolism of carbohydrates, proteins and lipid. Liver also play important role in elimination of toxic substance from body. Hepatic dysfunction is commonly associated with many metabolic disorders, infectious and parasitic diseases and toxicity (Bogin et al., 2008; West, 2007). Hepatic jaundice occurs due to incapability of bilirubin to conjugate in liver cells and which leads to failure in its excretion by kidneys from body (Shaikh et al., 2018a). A fewer cases of hepatic jaundice reported in bovines (Bhikane et al, 2010). Hepatic function test rapid evaluation strategy to define the degree of hepatic insufficiency due to hepatic damage and dysfunction, to assess prognosis and monitor response to therapy (Shaikh et al., 2018b). Parameters such as aspartate aminotransferase (AST) and gamma glutamyltransferase (GGT), bilirubin, total protein and albumin provides some information related to hepatic dysfunction (Sharma and Sridhar, 2007; Kalaitzakis e al., 2010). However, there is lack in literature cited concern to hepatic dysfunction associated with hepatic jaundice in cattle. The purposes of the study were to assess some parameter pertaining to hepatic dysfunction associated with hepatic jaundice.

Material and methods:

This study was performed on eleven clinical cases of infectious/ non-infectious diseases associated with hepatic dysfunction in cattle presented to Veterinary Clinical complex, Bihar Veterinary College, Patna. Cattle brought to the Veterinary Clinical complex for treatment with signs of anorexia, yellowish mucous membranes and dark yellow urine was screened for serum bilirubin and animal having serum bilirubin level more than 2mg/dl was included in study. Eleven healthy cattle from Instructional livestock farm included in this study. Blood samples were aseptically collected from jugular vein and kept for one hour for proper clotting. Thereafter, all the sample were centrifuged at 700 g for 15 min. to separate the serum. The separated serum was kept at -20°C till further use. Serum enzyme GGT and AST were estimated by kinetic method using commercial kit (Coral clinical systems, India). Serum metabolite bilirubin, total protein, albumin was estimated by endpoint assay using commercial kit (Coral clinical systems, India). Globulin was calculated by subtracting albumin from total protein. Statistical significance of data was measured by the independent sample 't' test using the statistical package SPSS 26.0 version.

Result and discussion:

The results are presented in Table 1. Significantly ($P>0.05$) higher level of serum enzyme like GGT and AST were observed in diseased cattle as compared to healthy control suggest hepatic damage. Increase in

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serum activity of AST and GGT in hepatic disease has been widely documented (Kalaitzakis e al., 2010; Lotfollahzadeh et al., 2011; Moreira et al., 2012). Significantly ($P>0.05$) higher value of serum bilirubin was reported due to incapability of bilirubin to conjugate in liver cells and which leads to failure in its excretion by kidneys from body in diseased (Betjes et al., 2006); Shaikh et al., 2018a). similar kind of result was also

observed by (Bhikane et al, 2010; Shaikh et al., 2018b). The value of total protein and albumin was significantly ($P>0.05$) lower in diseased cattle than healthy control. Low serum protein and albumin values because of liver disease showed diffuse and chronic liver dysfunction (Prasse et al., 1983; Shaikh et al., 2018b; Kulyaba et al., 2019).

Parameter	Diseased cattle	Healthy cattle
GGT (IU/litre)	55.15 ^b ± 2.3	13.54 ^a ± 1.7
AST (IU/litre)	217.30 ^b ± 13.62	52.47 ^a ± 5.8
Bilirubin (mg/dl)	2.65 ^b ± 0.48	0.36 ^a ± 0.02
Total protein (g/dl)	4.57 ^a ± 0.16	7.52 ^b ± 0.17
Albumin (g/dl)	1.63 ^a ± 0.13	3.65 ^b ± 0.02

Table:1 Liver function test values in healthy and diseased cattle

Conclusion:

Hepatic jaundice causes liver damage and degree of hepatic damage and dysfunction, assessment of prognosis and monitoring of therapy response can be assessed by estimating GGT, AST, bilirubin, total protein and albumin in serum of diseased animal.

Acknowledgement:

The authors are thankful to the Dean, Bihar Veterinary College for providing all possible facilities needed for conducting this study.

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