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SERUM ENZYME ACTIVITIES IN DAIRY CATTLE
-- CONSIDERATIONS OF THEIR DIAGNOSTIC SIGNIFICANCE
IN EXPERIMENTAL AND CLINICAL CASES --

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The purpose of the present study was to assess the diagnostic significance of serum enzymes in dairy cattle. Experimental hepatic lesions and clinical cases were observed for pathological findings and serum enzymes. The results obtained were as follows :

1) Two calves treated with carbon tetrachloride developed hepatic centrilobular congestion, hemorrhage and necrosis. Serum GOT, m-GOT, GLDH, γ -GTP and LDH activities increased markedly during a 24-49 hour period. These activities were compared with the degree of hepatocellular damage. It appeared that the increase in serum enzyme activities reflected the severity of the hepatic lesions.

2) From macropathological findings or histopathological hepatic findings, the diseased cattle were classified into 4 groups : normal liver and skeletal muscle, hepatic lesions, hepatic and skeletal muscular lesions, and skeletal muscular lesions.

3) In normal liver and skeletal muscle cattle, the serum GOT, GPT γ -GTP, LDH activities and LDH isoenzyme % of total activity were within the normal range. The serum m-GOT, GOTm/T%, ALD and CPK activities were also within the normal range in this group ; the levels (previously unreported) were : m-GOT : 8.9 ± 2.9 K.U., GOTm/T% : 16.3 ± 5.0 %, ALD : 18.0 ± 16.4 IU/L., CPK : 21.3 ± 13.4 IU/L. There were high activities of serum GOT, m-GOT, LDH, GLDH and γ -GTP in the hepatic lesion group, of serum GOT, m-GOT, LDH, LDH₅, GPT and CPK in the skeletal muscular lesion group, and of serum GOT, m-GOT, LDH, LDH₅, ALD, GPT, CPK, GLDH and γ -GTP in the hepatic and skeletal muscular lesion group. These enzyme findings were compatible with their individual organ specificities. Therefore, the measurements of these serum enzyme activities is recommended as an aid in differential diagnosis of hepatic and/or skeletal muscular lesions in dairy cattle.

4) Total serum GOT activity increased markedly in the skeletal muscular lesions, but increased only slightly with the appearance of hepatic lesions. Serum m-GOT activity increased markedly with the occurrence of both skeletal muscular and hepatic lesions. Serum GOTm/T% levels did not change in the cases having skeletal muscular lesions. The serum GOTm/T% level had a tendency to increase in the cases with severe hepatic parenchymatous lesions. Consequently, serum m-GOT activity and GOTm/T% levels seem to be useful in the diagnosis of hepatic parenchymatous lesions.

5) Total serum LDH activity increased with the occurrence of skeletal muscular and hepatic lesions. However, isoenzyme LDH₄ and LDH₅ activities were high in the skeletal muscular lesions and low in the hepatic lesions. Thus, when the activity of total serum LDH is high, LDH isoenzymes should be assessed.