STUDIES ON SOME SERUM ENZYME LEVELS IN VARIOUS LIVER DISEASES.

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ABSTRACT

Serum alkaline phosphatase (ALP) (EC 3.1.3.1), 5'nucleotidase (5'NT) (EC 3.1.3.5), aldolase (ALD) (EC 4.1.2.13) and sorbitol dehydrogenase (SDH) (EC 1.1.1.14) were estimated in infective hepatitis, alcoholic hepatitis, chronic active hepatitis, obstructive jaundice, cirrhosis of liver and amoebic liver abscess. It was observed that serum ALP and 5'NT were significantly increased in all cases of chronic active hepatitis and obstructive hepatic disease. However, the elevation observed in the latter was much higher than the former. Serum SDH and ALD levels were elevated in all cases of infective hepatitis, studied though increase in the former was much higher than the latter, suggesting its significance in the diagnostic confirmation of this disease. Results presented suggest 5'NT and SDH as more reliable diagnostic test compared to ALP and ALD for obstructive jaundice and infective hepatitis respectively.

KEY WORDS : Alkaline phosphatase, aldolase, 5'nucleotidase, sorbitol dehydrogenase, infective hepatitis, obstructive jaundice

INTRODUCTION

Serum enzymes and their altered activities aid the diagnosis of different liver diseases(1). Enzymes like ALP and the transaminases are routinely assessed in serum to diagnose liver diseases(1,2). However transaminases increase in other diseases like pancreatitis and myocardial infarction(3). Increase in serum levels of ALP generally indicates obstructive jaundice(4), but it also increases in serum in diseases of bone, kidney, leucocyte, placenta and intestine (5). Alternatively 5'NT level in serum has been recommended for elucidating the origin of raised serum ALP activity (6,7) and is preferred by some (7,8) as a routine test of liver function, though some investigators have found it clinically unimportant (9). Serum ALD level was suggested as an important parameter in the differential diagnosis of liver diseases(10), but its

ubiquitous nature makes it less reliable. To the contrary, serum SDH was reported(11) as a more specific indicator of parenchymal damage, because it is mainly found in the liver(12).

Thus it has been reported that all the four enzymes namely ALP, 5'NT, SDH and ALD are useful parameters for diagnosis of various liver diseases(7,8,10,12). However, in a recent review(13) some of these enzymes were not listed for their use in diagnosis of various types of liver disease. Under these circumstances the aim of the present investigation was to study these enzymes in various types of liver diseases to assess their diagnostic importance.

MATERIALS AND METHODS

Blood was collected by venepuncture using 10 ml aseptic disposable syringe from patients with liver disease admitted to the medical ward of the

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Government Wenlock Hospital, Mangalore. The diagnosis of each of these patient was confirmed by the physicians of the said hospital based on their examination of the patient and results of a few investigations done in the hospital laboratory. Blood samples from normal healthy adults were studied as controls. Serum was separated and unhaemolysed samples were analysed immediately without storage.

Serum ALP was estimated by King's method(14) and values expressed in King Armstrong Units / dl (KAU/dl). 5'NT was estimated by the method(15) of Cambell and values expressed in IU/L. ALD activity was calculated using calibration curve as reported by Bauer et.al. (16) and expressed in IU/L. SDH was estimated by the method of Rose and Henderson(17) with a modification of using a larger volume of serum with proportionate increase in the reagents for increased sensitivity. The activity was expressed in IU/L using the equation : $IU/L = 578.8 \Delta A / 340/\text{mins}$.

RESULTS AND DISCUSSION

In this study higher levels of ALP and 5'NT were observed in serum in all cases of obstructive jaundice. However, the latter showed an average increase of about 8 times their mean normal value which was much higher than that of ALP in all cases of

obstructive jaundice. It is well known that serum ALP and 5'NT are elevated (18) in all cases of obstructive jaundice though controversial reports (19,20) exist in literature about the importance of these enzymes as specific markers of obstructive liver disease. Further these enzymes are elevated in most cases of liver disease though this increase above normal values was marginal to that observed in obstructive liver disease. Comparing the significance of 5'NT and ALP in obstructive jaundice, the former seemed to be a better parameter for diagnosis.

SDH level in serum increased to 8 times the normal value in infective hepatitis where as the levels of ALD increased only 3 times the normal value. The much higher increase of SDH compared to ALD suggests the former to be a better index of infective hepatitis. Further, mild elevation in serum levels of both enzymes was observed in most of the other cases of liver disease though significant increase was only seen in infective hepatitis. SDH is present in liver cells (21) and injury to these cells as in infective hepatitis is the prime cause for its increased serum level. In contrast, ALD originates from various organs and hence is less reliable as a specific diagnostic parameter to indicate hepatocellular damage.

In conclusion it could be suggested that level of 5'NT is more useful than ALP for diagnosis of

Table 1. Serum enzymes in various liver diseases.

	No of cases	ALP KAU/dl	5'NT IU/L	SDH IU/L	ALD IU/L
Normals	30	8.4 ± 3.3	9.0 ± 3.9	1.1 ± 0.4	23.8 ± 13.4
Infective hepatitis	30	15.7 ± 5.1	25.4 ± 12.9	8.4 ± 2.5**	69.6 ± 20.5**
Alcoholic hepatitis	15	11.3 ± 2.1	13.7 ± 8.9	2.4 ± 1.2	23.8 ± 12.3
Chronic active hepatitis	10	15.9 ± 3.8*	32.0 ± 11.8**	1.8 ± 0.8	27.3 ± 9.7
Obstructive jaundice	15	35.4 ± 15.8**	85.1 ± 17.2**	1.6 ± 0.3	26.5 ± 10.3
Cirrhosis of liver	30	11.7 ± 2.7	13.5 ± 7.6	2.0 ± 0.8	32.5 ± 11.6
Amoebic liver abscess	15	12.1 ± 2.4	15.1 ± 7.9	1.9 ± 0.8	31.4 ± 12.5

Values are mean ± SD, * $p \leq 0.01$; ** ≤ 0.001

obstructive jaundice where as SDH is definitely a better index of infective hepatitis compared to ALD. 5'NT has hepatobiliary (20) and SDH has parenchymal(21) origin and thus their estimation has relevance for the differential diagnosis of obstructive jaundice and infective hepatitis respectively and the present work supports their inclusion and use as reliable tests for diagnosis of specific liver disease.

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