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Utility of 5' nucleotidase test in detection of various liver diseases

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Abstract
Background: 5'-nucleotidase is an enzyme which catalyzes the phosphorylytic cleavage of 5'nucleotides. The present study was conducted to assess the level of 5'-nucleotidase activity in viral hepatits, alcoholic liver disease and liver cirrhosis.
Materials & Methods: This study was conducted in the department of general medicine in year 2015. It included 66 patients. They were divided into 3 groups based on clinical and histopathological examination. Each group had 22 patients. 5' NT level was measured in each patient.
Results: Group I was viral hepatits group containing 22 patients, group II was Alcoholic liver disease group containing 22 patients and group III was liver cirrhosis group containing 22 patients. In group I, serum 5' NT level was 32.4± 6.20, in group II, 26.54± 4.18, in group III, 22.86± 4.2 and in group III it was 10.4± 1.6. The difference was significant (P- 0.05).
Conclusion: The level of 5'nucleotidase level is raised in viral hepatits patients, Alcoholic liver disease patients and liver cirrhosis patients. This level is useful in determination of diseases affecting liver.

Keywords: 5'-nucleotidase, alcoholic liver disease, viral hepatits, liver cirrhosis

Introduction

Liver is an important vital organ of body. It is required for blood detoxification, purification, synthesis of plasma proteins, production of bile, and the metabolism of carbohydrates, fats and proteins. Patients suffering from liver diseases, have to undergo different laboratory tests. Careful clinical evaluation and various laboratories investigations are foremost requirement for the proper diagnosis of the lesions and management of the patient [1].

5'-nucleotidase is an enzyme which catalyzes the phosphoryl tic cleavage of 5'nucleotides. Although originally found in snake venom, the activity of 5'nucleotidase has been described for bacteria and plant cells, and is widely distributed in vertebrate tissue. In mammalian cells the enzyme is predominantly located in the plasma membrane and its primary role is in the conversion of extracellular nucleotides, which are generally impermeable, to the corresponding nucleoside which can readily enter most cells. Consequently, the enzyme plays a key role in the metabolism of nucleotides [2].

Its role in differential diagnosis of hepatobiliary and osseous diseases has been well demonstrated by Dixon and Purdon [3] which also showed that the enzyme activity is increased only in hepatobiliary diseases. Raised levels of 5'-nucleotidase activity were found in patients with obstructive jaundice, parenchymal liver disease, hepatic metastases.

The present study was conducted to assess the level of 5'-nucleotidase activity in viral hepatits, alcoholic liver disease and liver cirrhosis.

Materials & Methods

This study was conducted in the department of general medicine in year 2015. It included 66 patients suffering from viral hepatits, alcoholic liver disease and liver cirrhosis. They were informed regarding the study and written consent was obtained.

General information such as name, age, gender, underlying disease etc was recorded in the case history performa. They were divided into 3 groups based on clinical and histopathological examination. Each group had 22 patients.

From each patient, 5ml blood sample was collected in a plain vial. Serum was separated after allowing the blood samples to clot at room temperature for 45 minutes and centrifugation was done at 3000 rpm for 10 minutes. The activity of 5`-NT was assayed on haemolysis free sera.

Estimation of 5`-nucleotidase level was done by colorimetric method of Campbell [4].

For the determination of 5 NT two test tubes were set up as follows:

1. For assessment of total activity, 0.2 mL of serum was taken, then 0.1 mL of 0.02M manganous sulfate and 1.5 mL of 40 mM, pH 7.5 barbitone buffer were added.
2. For non-specific ALP activity, 0.2 mL of serum was taken, then 0.1 mL of 0.02 M manganous sulfate, 1.3 mL of 40 mM, pH 7.5 barbitone buffer and 0.2 mL of 0.1M nickel chloride were added.

Results were subjected to statistical analysis using chi- square test. P value less than 0.05 was considered significant.

Results

Graph I shows that group I was viral hepatits group containing 22 patients, group II was Alcoholic liver disease group containing 22 patients and group III was liver cirrhosis group containing 22 patients.

Table I shows that in group I, serum 5' NT level was 32.4± 6.20, in group II, 26.54± 4.18, in group III, 22.86± 4.2 and in group III it was 10.4± 1.6. The difference was significant (P-0.05).

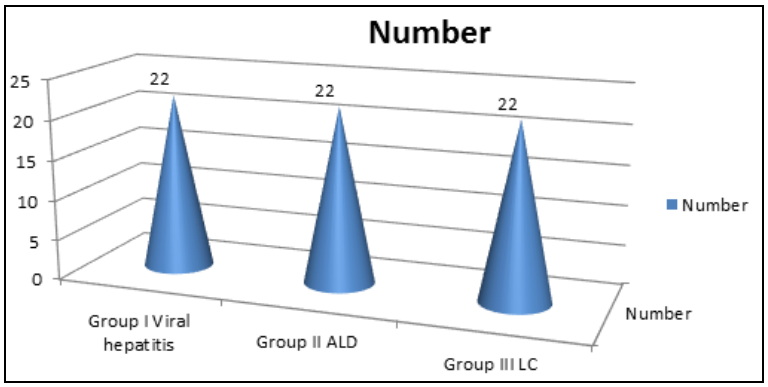

Fig 1: Graph I Distribution of patients

Table 1: 5' NT level in groups

Group	Group I Viral Hepatits	Group II Alcoholic liver disease	Group III Liver cirrhosis	Control	P value
Serum 5' NT level	32.4± 6.20	26.54± 4.18	22.86± 4.2	10.4± 1.6	0.05

Discussion

The concentration of 5'nucleotidase protein in the blood is often used as a liver function test in individuals that show signs of liver problems. The combined assays of serum 5'nucleotisase and alkaline phosphatase (AP) activities are extremely helpful in differential diagnosis since serum 5'nucleotidase activity is increased in obstructive hepatobiliary disorders, but not in osseous disorders, whereas serum AP activity is generally increased in both categories of diseases. In other words, the test is used to determine if elevated protein levels are due to skeletal damage or liver damage [5]. Normal levels of 5'nucleotidase are 2-17 units per liter. Elevated levels may indicate cholestasis, destruction of liver cells, hepatitis (liver inflammation), liver ischemia, a liver tumor, or use of liver-damaging drugs. Pregnancy and certain medications (acetaminophen, halothane, isoniazid, methyldopa, nitrofurantoin) may interfere with the test [6].

The present study was conducted to assess the level of 5'-nucleotidase activity in viral hepatits, alcoholic liver disease and liver cirrhosis.

In present study, we included 66 patients which were divided into 3 groups. Group I was viral hepatits group containing 22 patients, group II was Alcoholic liver disease group containing 22 patients and group III was liver cirrhosis group containing 22 patients.

In each patient, level of 5' NT was assessed. In group I, serum 5' NT level was 32.4± 6.20, in group II, it was 26.54± 4.18, in group III, it was 22.86± 4.2 and in group III it was 10.4± 1.6.

The higher level was seen in group I ie viral hepatitis group. Our results are in agreement with Chakroborthy AS et al. [7] who found in their study that 5' NT level was highly raised in patients with viral hepatitis. However, a study done by Raghvendra et al. [8] reported highest level among infective hepatitis patients than alcoholic hepatitis and liver cirrhosis.

Low levels of 5'-N activity are found in the serum of most normal individuals. They appear to be relatively constant in the same individual and appear to be elevated by pregnancy. In contrast to AP, 5'-N values are not affected by age or, for that matter, by race or sex [9].

Conclusion

The level of 5'nucleotidase level is raised in viral hepatits patients, Alcoholic liver disease patients and liver cirrhosis patients. This level is useful in determination of diseases affecting liver.

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