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Levels of Alanine Aminotransferase (ALT), Aspartate Amino transferase (AST) and Gamma Glutamyl Transferase (GGT) in Hypertension.

Akash Gupta*, Meenakshi Panthari*, Naved Ahmad*, S. Nagtilak, S. Nandwani**

*Department of Biochemistry, Subharti Medical College, Meerut, U.P. 250005, India
**Department of Medicine, Subharti Medical College, Meerut, U.P., India

Abstract

Hypertension is very common in our country. The aim of our study was to find the levels of liver enzymes ALT, AST and GGT in normotensive pre hypertensive and hypertensive individuals. Patients were categorized into three groups – Group 1 Normotensive or Controls (n= 80), Group 2 Pre Hypertensive (n=64) and Group 3 Hypertensive (n=76). Values of ALT, AST and GGT were with in the normal reference range in all the three groups. No significant relation was found between ALT, AST and GGT in normal, pre hypertensive and hypertensive individuals.

Key words – ALT, AST, GGT, B.P, Pre Hypertension, Hypertension

Accepted……

Introduction

Hypertension (HTN) is very common in our country. The prevalence of HTN in Indian males is 36% and 37% in females. [1] Based on the results of National Health and Nutrition Examination Survey (NHANES) U.S.A[2], HTN is defined as systolic B.P. >140 mm Hg and diastolic B.P. > 90 mm Hg. HTN increases with age, obesity, high salt intake, alcohol consumption, smoking, psychological stress and low level of physical activity. Recent classification adapted from Chobanian et al [3] recommends criteria for defining normal B.P. pre hypertension, HTN and isolated systolic HTN is as follows –

Classification	Systolic B.P.	Diastolic B.P.
Normal B.P	<120 mm Hg	< 80 mm Hg
Pre HTN	120-139 mm Hg	80-89 mmHg
Hypertension		
(Stage I)	140-159 mm Hg	90-99 mm Hg
(Stage II)	>160 mm Hg	>100 mm Hg
Isolated systolic		
HTN	>140 mm Hg	< 90 mm Hg

Alanine Aminotransferase (ALT) and Aspartate Aminotransferase (AST) constitute a group of enzymes that catalyzes inter conversion of amino acid to 2-oxoacid. Activity of ALT and AST increases in, alcoholic hepatitis, hepatic cirrhosis, infectious disease of liver, ascites and portal hypertension. [4] Gamma Glutamyl Transferase (GGT) is a peptidase enzyme which catalyses hydrolytic cleavage of peptides to form amino acid or small peptides. [5-7] GGT levels increases in intra hepatic biliary obstruction, post hepatic biliary obstruction and fatty liver, due to alcohol consumption. [6, 8-10] Many studies [11-15] have found increased levels of ALT, AST & GGT due to Alcohol and HTN. But no study has found the effect of HTN on levels of liver enzymes. So we excluded alcohol in our study to find weather only HTN is responsible for increase in the levels of these enzymes or not.

Material and Methods

After obtaining ethical clearance, patients were selected from medicine O.P.D of CSS hospital associated with Subharti medical college, Meerut, U.P.
Total no of cases were 220 (group 1 n=80, group 2 n=64, group 3 n=76).

Patients having diabetes, acute or chronic liver disease, renal or respiratory disease, alcoholics, patients on any medicine, which can increase liver enzymes, were not included in study.

Patients were categorized into three groups-
Group 1- Normotensive – Systolic B.P. <120 mm Hg, Diastolic B.P. <80 mm Hg
Group 2- Pre hypertensive – Systolic B.P. 120-139 mm Hg, Diastolic B.P. 80-89 mm Hg
Group 3- Hypertensive – Systolic B.P. >140 mm Hg, Diastolic B.P. > 90 mm Hg
Serum ALT, AST and GGT enzymes levels of these patients were estimated on Vitros 250 auto analyzer by

reflectance spectrophotometry using dry slide from Ortho Clinical diagnostics (part of Johnson and Johnson Company U.S.A)

Results were expressed as mean ± SD. Data was analyzed by unpaired student t test.

Results

Mean ± SD of B.P. in mm Hg for Group 1 was 109.5 ± 7.1 (systolic B.P.) & 73.4 ± 6.8 (diastolic B.P.), for group 2 was 128.9 ± 7.9 (systolic B.P.) & 82.3 ± 5.2 (diastolic B.P.) and group 3 was 148.8 ± 7.6 (systolic B.P.) & 96.2 ± 5.9 (diastolic B.P) respectively.

Mean ± SD of ALT in U/L for Group 1 was 27.8 ± 2.2, for Group 2 was 31.1 ± 11.8 and for Group 3 was 29.8 ± 12.7 respectively. Mean ± SD of AST in U/L for Group 1 was 28.8 ± 4.9, for Group 2 was 32.9 ± 14.4 and for group 3 was 33.1 ± 10.3 respectively. Mean ± SD of GGT in U/L for Group 1 was 27.1 ± 5.6, for Group 2 was 29.1 ± 13.4 and Group 3 was 28.3 ± 11.1 respectively. (Table)

Values of ALT, AST & GGT were with in the normal reference range in all the three groups. No significant relation was found between ALT, AST & GGT and hypertension.

Table: Mean ± SD Values of B.P, ALT, AST, GGT in different group.

Parameters	**Group 1 (n= 80)**	**Group 2 (n= 64)**	**Group 3 (n= 76)**	**p value**
Systolic B.P. (mm Hg) Mean ± SD	109.5 ± 7.1	128.9 ± 7.9	148.8 ± 7.6	
Diastolic B.P (mm Hg) Mean ± SD	73.4 ± 6.8	82.3 ± 5.2	96.2 ± 5.9	
ALT (U/L) Mean ± SD	27.8 ± 2.2	31.1 ± 11.8	29.8 ± 12.7	> 0.01
AST (U/L) Mean ± SD	28.8 ± 4.9	32.9 ± 14.4	33.1 ± 10.3	>0.01
GGT (U/L) Mean ± SD	27.1 ± 5.6	29.1 ± 13.4	28.3 ± 11.1	>0.01

When compared between group 2 and 3, p value for ALT was 0.45, for AST was 0.99 and for GGT was 0.71

Discussion

In our present hospital based study we estimated the values of ALT, AST & GGT in individuals categorized into three groups. We found the values of all these three enzymes were with in the given normal reference range. The values of Group 2 were slightly higher than Group 3, but no reason could be found for this increase. Patients in our study were using following antihypertensive medicines; atenolol, amlodipine, enalapril or their combinations. None of these cause elevation of liver enzymes.

Values were analyzed statistically by unpaired student t test. Levels were not significant statistically when compared between group 2 & 3. P value was > 0.01.

Yamada Y, Ishikaki M et al [11] in their study reported prevalence and incidence of HTN as well as B.P. were higher in subjects with serum GGT level > 50 U/L then those with normal levels.

Yamada Y, Ikai E et al [12] reported in their study that prevalence of HTN and levels of B.P. were positively correlated with the level of the serum GGT in both male and female drinkers and non drinkers.

Severio Stranges et al [13] reported in their study that ALT, AST & GGT have been associated with HTN. They found GGT as a marker of alcohol consumption. Mean values of age, anthropometric measures, B.P. and GGT were significantly higher in hypertensives.

Lee D.T, Gross M et al [14] reported that there is increase in GGT levels in alcoholics and hypertensive patients and showed that elevated GGT could be predictor for hypertension in drinkers.

Bernard M. Y et al [15] reported that ALT, AST and GGT level were elevated in patients of HTN.
Van Barneveld et al [16] reported in a study of 38 yr old Dutch male GGT was not associated with systolic or diastolic B.P.

Conclusion

In our study no significant relation was found between liver enzymes (ALT, AST & GGT) and HTN. In above mentioned studies all the patients were alcoholics while in our study the patients were non alcoholic. This could be the cause of normal level of liver enzymes in hypertensive patients of our study.

Over past 20 years many cross sectional and fewer longitudinal investigations have reported [11-14, 17, 18] positive association of GGT with B.P. During last decade frequency of alcohol consumption has been focus of several investigations assessing alcohol blood pressure

relationship [19-21]. However till date studies have provided contrast findings. In order to understand complex interaction between liver enzymes HTN and alcohol there is a need for large well constructed prospective study to elucidate the association between above factors.

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Correspondence to:

Akash Gupta
Department of Biochemistry
Subharti Medical College
Meerut, U.P. 250005
India

Email: akash_inspace@yahoo.com