

Lipid and Reductive Enzymes Profile in Hypertensive Patients

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ABSTRACT

Hypertension is a major public health problem in developed and developing countries. Essential or primary hypertension is the world's leading risk for global disease burden, and it is expected to cause more than half of the estimated 17 million deaths per year resulting from cardiovascular disease (CVD) worldwide. The objective of this study was to determine the association between serum lipid profiles and the activities of gamma glutamyl and lactate dehydrogenase in hypertensive patients and normotensive control subjects in Nigeria. This study was carried out among 60 participants of whom, 50 were hypertensive patients and ten normotensive patients. The blood pressure, lipid profile (Total cholesterol, Triglyceride, low density lipoprotein, high density lipoprotein) including enzymatic assay (gamma glutamyltransferase and lactate dehydrogenase) were determined using standard methods. Multivariate analysis of variance was used for the statistical analysis. The mean blood pressure for hypertensive were SBP and DBP were 150 and 89mmHg and 138 and 79 mm Hg for normotensive respectively. The result showed that HDL (38.48 ± 9.457 mg/dl, was lower in hypertensive patients compared to normotensive patients with (mean \pm standard deviation) of 57.00 ± 6.06 ($p > 0.05$). The serum level of TC, LDL, TG and LDH were higher in hypertensive patients compared to normotensive patients was significantly higher $p > 0.05$. With increase in the TG and LDL level showed by hypertensive patients, they may be prone to cardiovascular disease compared to normotensive.

Keywords: Total cholesterol, Lipo-protein, Lactate dehydrogenase (LDH), and gamma glutamyltransferase (GGT).

INTRODUCTION

Hypertension is a major public health problem in developed and developing countries. Essential or primary hypertension is the world's leading risk for global disease burden, is expected to cause more than half of the estimated 17 million deaths per year resulting from cardiovascular disease (CVD) worldwide. Hypertension defined as an elevation of blood pressure beyond 140/90mmHg. Study suggested that hypertension is strongly correlated with adverse outcome such as stroke, ischemic heart disease, heart failure, and end stage renal disease (Yoon.2010).

Hypertension and dyslipidemia are associated with oxidative stress and are major causes of cardiovascular disease amounting to 30% of global death rate. It is widely accepted that cardiovascular disease is associated with hypertension and increased blood levels of low

density lipoprotein (LDL), total cholesterol (TC), and Triglycerides. In contrast, a low level of High density lipoprotein (HDL), is a risk factor for mortality from cardiovascular disease and because LDL is present in many types of organ failure; it is associated with the risk of different cell damage.

Epidemiology studies have established a strong association between hypertension and coronary artery disease (CAD). Hypertension is a major independent risk factor for development of CAD, stroke and renal failure. In study the association of GGT concentration with CVD and mortality remained significant after adjustment for traditional cardiac risk factors (lee et, al 2006). The challenges of managing hypertension and preventing the development of these latter outcomes are unlikely to relent; the global burden of hypertension is projected to increase by 60% to affect approximately 1.6

million adults worldwide by 2025. Study suggested that considerable hurdles remain in overcoming the burden of hypertension. First, the insidious nature in which hypertension develops means that hypertension is frequently undiagnosed, and early detection prior to the development of end-organ damage remains a challenge. Second, many patients appropriately diagnosed with hypertension fail to achieve the treatment target recommended by guidelines. This high lights the considerable challenges in implementing risk factor mediation and appropriate adherence to antihypertensive (Muntner et, al 2005).

It is our aim to determine the lipid profile (cholesterol, HDL cholesterol,) and relate the activities of these reductive enzymes (lactate dehydrogenase and Gamma Glutamyl transferase) to the level of lipidemia in hypertensive and normotensive subjects.

Parameters	Hypertensive	Control	P-Value
TC (mg/dl)	279.00±78.72	201.56±19.263	P<0.05
TG(mg/dl)	120.14±23.284	93.30±13.89	P<0.05
HDL-C(mg/dl)	38.48±9.457	57.00±6.055	P>0.05
LDL-C(mg/dl)	138.48±28.00	133.70±27.7	P<0.05
GGT(U/L)	83.28±84.28	31.90±11.94	P<0.05
LDH(U/L)	395.02±99.74	335.00±104.18	P<0.05

Result obtained showed a decrease in HDL-C in hypertensive patients compared to non-hypertensive patients ($p>0.05$). Also, there was a significant increase in TC, LDL-C and TG in hypertensive patients than that of control ($p<0.05$). Equally observed was a significant increase in the activities of GGT and LDH in hypertensive patients compared to non-hypertensive patients (control) ($p<0.05$).

This study GGT level was elevated. This is an agreement with the study of Hwang et, al., (2010) in which they revealed an “Association between increased activity of glutamyl Transferase with hypertension”. This probably, suggests a possible protective role of GGT in detoxification process. It should be noted; however that GGT is important in maintaining appropriate intracellular glutathione levels, which is a powerful antioxidant. Therefore, it is possible that the generation of free radicals, which can occur in hypertension may deplete intracellular glutathione and thus induce the activity of GGT in the circulation. Oxidative stress with the attendant low-grade inflammation has been implicated in a number of pathological conditions, including aging, atherosclerosis and Diabetes (Demirkon et al 2010).

MATERIALS AND METHODS

Fifty hypertensive individuals (cases) and 10 healthy non-hypertension (controls) adults who had no history of hypertension in their lineage and between the ages of 20 and 70 years were used for this study.

Blood pressure was measured by standard sphygmomanometer (Manual) in supine posture; while the lipid profile and GGT, and; LDH were estimated with the auto analyzer (selectra analyzer machine) using procedures approved by International Federation of Clinical Chemistry and Laboratory Medicine (IFCC).

RESULT AND DISCUSSION

Table shows the mean and standard deviation of TC, TG and HDL. GGT and LDH on hypertensive and non-hypertensive patients.

Furthermore, it was observed in this study that LDL level in hypertensive patients is significantly higher than that of control subjects. The increase in LDL in hypertensive patients was as a result of increased number of triglycerides and is in agreement with the study of Larry et al (2005) Igboh et al (2013). Triglycerides is dangerous because they are a harbinger of cardiovascular disease, the study of Whitfield et al (2012) equally ,revealed that people with higher TG have a higher risk of cardiovascular disease . The study is suggesting that hypertension, may be predisposing factors to cardiovascular disease due to hyperlipidemia and increased activities of Gamma Glutamyl Transferase and Lactate Dehydrogenase.

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