

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/apme

Original Article

Association of serum gamma glutamyl transferase with lipid abnormalities in end stage renal disease



R. Sowmi^a, M.E. Sumathi^{b,*}, K.N. Shashidhar^c, B.N. Raghavendra Prasad^d

^a VI term MBBS, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka, India

^b Associate Professor, Department of Biochemistry, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka, India

^c Professor & Head, Department of Biochemistry, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka, India

^d Professor, Department of Medicine, Sri Devaraj Urs Medical College, Tamaka, Kolar, Karnataka, India

ARTICLE INFO

Article history:

Received 23 December 2015

Accepted 18 May 2016

Available online 8 June 2016

Keywords:

Cardiovascular complications

Dyslipidemia

End stage renal disease

GGT

Oxidative stress

ABSTRACT

Background: End stage renal disease (ESRD) is characterized by high degree of mortality and cardiovascular complications. These complications occur due to many metabolic and endocrinal disturbances and dyslipidemia is the constant feature of ESRD. Oxidative stress is the final pathway mediating cardiovascular damage. There is evidence that GGT plays very important role in antioxidant defense system. Hence dyslipidemia and oxidative stress are predominant features of ESRD, which in long term predispose to cardiovascular complications. Objectives of our study were to estimate and to correlate lipid profile and GGT levels in ESRD patients on hemodialysis and healthy controls.

Methods: A case–control study was conducted in patients attending Nephrology unit of hospital. After obtaining informed consent, 45 patients who were clinically and biochemically diagnosed of ESRD between 25 and 60 years of age and undergoing hemodialysis were included as cases. Age of 70 and sex matched normal healthy volunteers from hospital staffs or patient attenders were included as controls. Serum lipid profile and GGT were estimated in all the study groups.

Results: Mean values of serum total cholesterol, triglycerides, LDL and GGT were significantly elevated in ESRD patients on hemodialysis. Serum HDL was significantly decreased in patients when compared to controls. We did not find any significant association of GGT with lipid parameters.

Conclusion: ESRD is associated with dyslipidemia and oxidative stress which predispose to adverse cardiovascular complications. However in our study no significant correlation between GGT levels and lipid parameters was observed.

© 2016 Indraprastha Medical Corporation Ltd. All rights reserved.

* Corresponding author. Tel.: +91 9740371006.

E-mail address: drsuma_bio@yahoo.co.in (M.E. Sumathi).

<http://dx.doi.org/10.1016/j.apme.2016.05.001>

0976-0016/© 2016 Indraprastha Medical Corporation Ltd. All rights reserved.

1. Introduction

End stage renal disease (ESRD) is characterized by high degree of mortality and cardiovascular complications.¹ It is estimated that there are about 55,000 patients on dialysis in India, and the dialysis population is growing at the rate of 10–20% annually.²

ESRD is associated with accelerated atherosclerosis and a high incidence of cardiovascular morbidity and mortality. Incidence of cardiovascular complications is still much higher in hemodialysis patients. A number of factors such as oxidative stress, inflammation, hypertension, endothelial dysfunction, insulin resistance, vascular calcification and dyslipidemia contribute to atherosclerosis and cardiovascular disease in ESRD population. Among these disturbances dyslipidemia is the constant feature of ESRD. Severity and pattern of dyslipidemia associated with ESRD depend on dialysis modality, lipid-altering drugs such as statins, fibrates, sevelamer, calcineurin inhibitors, steroids and rapamycin, pre-existing genetic disorders of lipid metabolism, malnutrition and inflammation among other factors. Most common abnormalities are increase in serum triglycerides, very low density lipoprotein (VLDL) and intermediate density lipoprotein (IDL). Serum cholesterol and LDL cholesterol values are frequently within or below the normal limits in hemodialysis patients and low density lipoprotein (LDL) consists of highly atherogenic small-dense particles which contain abnormal levels of residual triglycerides. High density lipoprotein (HDL) is reduced because of impaired maturation and function.

In ESRD, oxidative stress is considered as the final pathway mediating cardiovascular damage triggered by a variety of traditional and non-traditional risk factors. There is evidence that gamma glutamyl transferase (GGT) plays very important role in antioxidant defense system. The primary role of GGT is to metabolize extracellular glutathione (GSH) and allowing reutilization of aminoacids for resynthesis of intracellular GSH. However this process is involved in generation of reactive oxygen species through production of cystenyl glycine radical, which reduces Fe^{3+} to Fe^{2+} and promotes generation of other free radical species. Experimental studies also suggest that GGT adsorbs on to the circulating LDL and oxidizes to form oxidized LDL which is involved in atherosclerosis.^{3,4}

Hence dyslipidemia and oxidative stress are predominant features of ESRD, which in long term predispose to cardiovascular complications. We hypothesize that increased serum GGT levels are associated with lipid abnormalities in patients with ESRD.

2. Objectives

- (1) To estimate lipid profile in ESRD patients on hemodialysis and healthy controls.
- (2) To estimate GGT in ESRD patients on hemodialysis and healthy controls.
- (3) To correlate GGT levels with lipid parameters in ESRD patients on hemodialysis and healthy controls.

3. Materials and methods

3.1. Study design

A case-control study was conducted in patients attending Nephrology unit of RL Jalappa Hospital and Research unit, Kolar, Karnataka, India. This is a tertiary care teaching hospital attached to Sri Devaraj Urs Medical College. Study was conducted for a period of two months from April to May 2014. After obtaining informed consent, 47 patients who were clinically and biochemically diagnosed of ESRD between 25 and 75 years of age on hemodialysis were included as cases. 61 age and gender matched normal healthy volunteers from hospital staffs or patient attendees were included as controls.

An institutional ethical clearance was obtained and informed consent was obtained from all the subjects before starting the study.

We excluded patients with chronic alcoholism, hypothyroidism, liver disease, under drugs such as barbiturates, NSAIDs, malignancy and patients on hypolipidemic drugs.

3.2. Sample collection

After obtaining informed consent and explaining about the procedure, under aseptic precautions, 2 ml of blood was collected after 8–10 h of overnight fasting in a plain tube. Once blood was clotted, serum was separated after centrifugation and serum was used to analyze the following biochemical parameters in central clinical Biochemistry laboratory, RLJH.

Fasting blood glucose (FBS), blood urea, serum creatinine, serum sodium and serum potassium values were recorded from the case records.

Serum total cholesterol, triglycerides, HDL and GGT were estimated by Vitros 250 Drychemistry Analyzer⁵ and LDL was calculated by Friedewald's formula.⁶

Internal and external quality control checks were done during the assay.

4. Results

Table 1 depicts the basic biochemical characteristics in cases and controls. Among the study group, the age group of cases ranges from 23 to 75 years and mean age was 56.2 ± 12.7 . Age group of controls ranging from 22 to 74 years and mean age was 45.8 ± 11.5 . Cases had 33 males and 14 females whereas controls had 38 males and 23 females.

Among 47 cases, 23 had both type 2 diabetes and hypertension, 5 had hypertension, 5 had only diabetes, 11 had chronic glomerulonephritis and one had type I diabetes.

Comparison of biochemical parameters between cases and controls are depicted in Table 2. Mean values of total cholesterol, LDL and HDL cholesterol are significantly decreased in cases when compared to controls. Mean values of triglyceride, GGT, VLDL and TC/HDL are significantly increased in cases when compared with controls. Mean value of LDL/HDL is increased in cases when compared to controls but this difference was not statistically significant.

Download English Version:

<https://daneshyari.com/en/article/3234758>

Download Persian Version:

<https://daneshyari.com/article/3234758>

[Daneshyari.com](https://daneshyari.com)