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High Sensitivity-CRP in Diabetic Retinopathy Patients

Dr. Khaja Moinuddin, Dr. Mirza Sharif Ahmed Baig*, Dr. Saba Nazneen Khan
Department of Biochemistry, KBN Institute of Medical Sciences, Gulbarga, India

Original Research Article

***Corresponding author**
Dr. Mirza Sharif Ahmed Baig

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Abstract: Diabetic retinopathy is the most common cause of vision loss among people with diabetes and a leading cause of blindness among working age adults, it is a serious sight threatening complication of diabetes. Hs-CRP is a marker of low-grade inflammation and its levels are raised in patients with diabetic retinopathy. The current study was undertaken in 60 subjects. 30 diabetic retinopathy patients and 30 non diabetics as normal control group. The aim of the study was to assess the serum levels of hs-CRP in diabetic retinopathy patients. hs-CRP is significantly much higher in diabetic patients with retinopathy compared to control group. TC, TG, LDL-C and VLDL-C levels where significantly elevated and HDL-C levels were significantly lower in cases when compared to controls. Hence it is concluded that the serum levels of hs-CRP appear to be useful as markers of diabetic retinopathy and provide valuable information for proper medical intervention.

Keywords: high sensitive-C Reactive Protein, Diabetic Retinopathy & Lipid Profile

INTRODUCTION

Diabetic retinopathy is the most common microvascular complication of diabetic patients and the leading cause of blindness. Hyperglycemia, longer duration of diabetes, hypertension and hyperlipidemia are well known risk factors for the development and progression of diabetic retinopathy [1, 2]. The underlying specific mechanism for the development of diabetic retinopathy is not fully understood, it includes abnormal metabolic pathways, oxidative stress, and subclinical inflammation.

Intravitreal injections of corticosteriods or anti-VEGF agents have showed to be effective for showing down the development of diabetic retinopathy [3,4]. Therefore inflammation seems to be very important in the development of diabetic retinopathy.CRP is a marker of low grade inflammation, an acute phase protein synthesized by the liver or adipose tissue when microbial invasion or tissue injury occurs [5]. The role of CRP in the pathogenesis of diabetic retinopathy is still unknown. Hence the present study is undertaken to assess the role of hs-CRP in diabetic retinopathy patients.

MATERIALS AND METHODS

The present study was carried out in the Department of Biochemistry, KBN Institute of Medical Sciences Gulbarga. Clearance was obtained from the institutional ethical committee.

The study was carried out on 30 age and sex matched healthy controls and 30 type 2 diabetic patients with retinopathy who attended the outpatient and inpatient department of KBN Institute of Medical Sciences, Gulbarga.

Inclusion Criteria

Patients in the age group of 40 – 70 years with diabetic retinopathy were selected.

Exclusion Criteria

Patients with recent infectious disease, immunological disorders, Surgeries, Burns, renal failure, pancreatitis, alcoholism, liver diseases, tuberculosis, thyrotoxosis, Osteoarthritis, Rheumatoid arthritis and all other inflammatory disorders were excluded from the study.

Informed consent was taken from patient and control subjects. A pre-structured and pre-tested proforma was used to collect the data. Baseline data including age and sex, detailed medical history including conventional risk factors, clinical examinations and relevant investigations including ECG, echocardiogram, nerve conduction test, fundoscopy etc were included as part of the methodology.

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Laboratory methods

Fasting venous blood samples were collected from cases and controls and the samples were centrifuged, serum was separated and stored at 4^0C. Serum high sensitive C-reactive protein was measured using the immunoturbidimetric CRP assay [6], by using auto-analyzer, based on the principle of agglutination reaction. Presence of CRP in the test specimen results in the formation of an insoluble complex producing a turbidity, which is measured at wavelength between 505-578 nm. The increase in turbidity corresponds to the concentration of CRP in the test specimen. FBS and PPBS were measured by GOD/POD method. Urine sample was analyzed for protein and sugar by using dipsticks.

STATISTICAL METHODS

Student t test/Chi-square test has been used to find the significance of homogeneity of study characteristics between the groups of patients. Analysis of variance has been used to find the significance of study parameters between three groups.

Results were expressed as mean $\pm$ SD, p values are obtained by using the post-hoc Turkey test.

Significant figures + Suggestive significance $0.05<p<0.10$* Moderately significant $0.01<p<0.05$ ** Strongly significant $p<0.01$

Statistical software

The Statistical software namely SPSS 15.0, Stata 8.0, MedCalc 9.0.1 and Systat 11.0 were used for the analysis of the data and Microsoft word and Excel have been used to generate tables etc**.**

RESULTS AND DISCUSSION

A Comparative study with 30 in Controls, 30 in diabetic patients with retinopathy is undertaken to study the biochemical parameters.

Table-1: **Hs-CRP in the study groups**

Study parameters	Controls	DM with Retinopathy	p-value
hs-CRP mg/L	0.72±0.45	3.55±0.86	<0.001**

Results are presented in Mean±SD

P values are obtained by using the Post-hoc Tukey test.

Table-2: **FBS and PPBS in the study groups**

Study parameters	Controls	DM with Retinopathy	p-value
FBS mg/dl	88.13±18.95	187.83±29.89	<0.001**
PPBS mg/dl	127.03±21.42	317.00±48.32	<0.001**

Results are presented in Mean ± SD

The present study was carried out to evaluate the significance of serum levels of hs CRP in diabetic patients with retinopathy. 30 type diabetic retinopathy patients were considered as cases and 30 healthy, age and sex matched individuals served as controls. The values of hsCRP are presented in Table 1. The mean hsCRP among cases is highly significant compared to controls (p value in the groups<0.001).The values of fasting blood glucose and postprandial blood glucose in the cases and controls are indicated in Table 2. The mean fasting blood glucose levels in the cases compared to controls is statistically significant, (p value <0.001 in the groups). Similarly the mean PPBS levels in the study groups as compared to the controls is statistically significant, (p value in the groups<0.001).

Our study has revealed that hsCRP values are significantly higher in diabetics' retinopathy patients (3.55±0.86mg/L) as compared to controls (0.72±0.45mg/L). A study conducted by Budak YU *et al*. in patients with type2 diabetes mellitus with and without retinopathy also got similar results [7]. Another study conducted by Wang XL *et al.* also found that the levels of high sensitivity C- reactive protein in diabetic retinopathy patients are significantly elevated when compared to controls [8]. Several studies done across the world have projected similar results [9,10]. Diabetic retinopaty is a major microvascular complication of diabetes and is the leading cause of blindness among working aged adults around the world.

The incidence of diabetic retinopathy parallels with diabetes duration and tight glycaemic control can delay its development. Several pathways and processes including the rennin-angiotensin system, vascular endothelial dysfunction, tissue matrix remodeling, and angiogenesis have been strongly associated with the pathogenesis of diabetic retinopathy. C-reactive protein a marker of inflammation which is produced in response to various stimuli is involved in endothelial dysfunction and angiogenesis have been proposed to play an important role in the pathogenesis of diabetic retinopathy.

CRP inhibits the endothelium dependent nitric oxide mediated dilation in retinal arterioles, thus facilitating the development of retinal vascular diseases.CRP stimulates leucocyte endothelium

interaction,decrease endothelial nitric oxide and impair number and function of endothelial progenitor cells, there by promoting endothelial dysfunction which is another important mediator in the development of diabetic microvascular complications.

CONCLUSION

The current study is carried out to assess the usefulness of high sensitivity C-reactive protein in diabetic retinopathy patients. Compared to controls, cases had significantly higher levels of high sensitivity-C- reactive protein.

Hence estimation of serum levels of hs-CRP regularly in diabetic patients may be a good biomarker for diabetic retinopathy. Further research is needed to understand the role of inflammation in the pathogenesis of diabetic retinopathy.

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