
C-REACTIVE PROTEIN (CRP) LEVEL IN DIABETIC, HYPERTENSIVE AND DIABETIC-HYPERTENSIVE

Joseph Chukwufumnanya Mordi
*Department of Medical Biochemistry,
Delta State University, Abraka, Nigeria*

ABSTRACT

Hypertension is one of the leading causes of death in both developing and developed countries. This may be due to its association with increased risk of coronary heart diseases. One of the major complications of diabetes mellitus is hypertension. In order to investigate the prevalence of these diseases, the C-reaction protein level of diabetic, hypertensive, diabetic-hypertensive individuals were estimated from patient at Eku Baptist Hospital, Delta State, Nigeria. Eighty subjects were assessed comprising of both male and female within the ages of 27 and 67. Their C - reactive protein levels were determined using standard techniques and the data obtained were analysed using student t-test. The result obtained showed a significant increase ($p < 0.05$) in mean C - reactive protein value of hypertensive (1.57 ± 0.18) and diabetic-hypertensive (2.06 ± 0.03) respectively, when compared to normal control (0.60 ± 0.04). Results obtained from diabetic patients alone revealed a higher mean value which was not statistically significant (1.06 ± 0.12 , $p > 0.05$) from the control. From this finding, it was observed that hypertensive and diabetic-hypertensive subject had higher C - reactive protein levels which thus suggest risk of subjects developing cardiovascular diseases.

Key words: Diabetic, hypertensive, diabetic-hypertensive and C - reactive protein (CRP)

INTRODUCTION

CRP is considered to be a major inflammatory cytokine that functions as a non-specific defence mechanism in response to tissue injury or infection (1). Synthesized mainly in the liver, CRP activity is stimulated by other cytokines, especially interleukin (IL)-6; IL-1 β and tumor necrosis factor α (TNF α). It binds to a variety of molecules particularly liposome and lipoproteins, such as LDL and VLDL and is a powerful activator of the classic complement system. Modest elevation of CRP can be found even in apparently healthy people (2). A progressive rise in CRP can reflect augmented stages of vascular inflammation, but the specific clinical condition under which this occurs are incompletely understood. There is a strong association of C - reactive protein with diabetes mellitus and insulin resistance. Several studies have earlier shown that C-reactive protein as a biomarker of inflammation predicts diabetes and hypertension in Western populations (3). This relationship has remained scarce in our environment especially as it affects rural settlements and low-income developing areas of the Nigeria. It is on this note that this research work attempts to assess the relationship between the levels of C - reactive protein in diabetic, hypertensive and diabetic-hypertensive patients as well as to provide documented scientific information on the interaction between diabetics and CRP, and hypertension and CRP patients in the study area Eku.

MATERIALS AND METHODS

Subjects

Sixty patients (20 Diabetic, 20 Hypertensive, and 20 Diabetic-Hypertensive between the ages of 27-67 years) and in apparently good health were randomly selected from Eku Hospital, Delta State, Nigeria. Twenty (20) apparently healthy non-diabetic and non hypertensive subjects of similar socioeconomic status, who were members of the hospital community, were recruited to serve as control. Informed consent was sought and obtained from the subjects and their participation was approved by both the hospital-based Ethics Committee and our Faculty's Bioethics and Research Committee. The study was conducted between June and October, in the Department of Medical Biochemistry, Delta State University, Abraka, Nigeria.

Sample collection and handling

Five milliliters (5mls) of blood was collected from the subjects using the vein puncture technique after being screened for hypertension by taking their blood pressure using a sphygmomanometer calibrated in "mmHg". The blood samples were dispersed into a plain bottle which is allowed to clot but not to lyse. It was then centrifuged for about 5 minutes at 1, 200 x g (rpm) to obtain serum which was decanted into a clean bottle for storage in a refrigerator at 4°C prior to analysis.

Analysis of sample

Determination of C - reactive protein was carried out using the turbidimetric method (4). The reagent CRP turbidimetric assay is a quantitative turbidimetric assay for measurement of CRP in human serum latex particles coated with specific human anti-CRP, were agglutinated when mixed with sample containing CRP. The agglutination causes an absorbance change, depending upon the CRP contents of the patient sample that can be quantified by comparison from a calibrator known CRP concentration. The reagents used for this assay were supplied in a commercial test kit by Randox Laboratories, Limited, United Kingdom.

Statistics

The data obtained were presented as mean \pm SD. Serum levels of the C - reactive protein among hypertensive and diabetic-hypertensive were correlated with serum level of both the diabetic and controlled subjects. The student t-test was used to determine the level of significance which was set at $P < 0.05$.

RESULTS

The experimental values are shown on Table 1. The mean C - reactive protein (CRP) value for the normal control was 0.60 ± 0.04 . Results obtained from the Hypertensive and diabetic-hypertensive showed statistically significant difference ($p < 0.05$) when compared with the control. Observation from the result of diabetic subjects alone revealed a non significant value ($1.06 \pm 0.21, p > 0.05$).

Table 1

C-REACTIVE PROTEIN OF DIABETIC, HYPERTENSIVE AND DIABETIC - HYPERTENSIVE SUBJECTS

Subject	n	Mean±SD Conc.	CRP	t-test
Diabetic	20	1.06± 0.21		2.451
Hypertensive	20	1.57 ± 0.81**		2.649
Diabetic- hypertensive	20	2.06 ± 0.13**		3.552
Normal	20	0.60±0.04		

Values are expressed as mean± S. D for 'n' subjects. ** Statistically significant when compared to normal control.

DISCUSSION

Hypertension otherwise known as high blood pressure is one of the leading cause of death in developing countries (5). The prevalence of hypertension has been found to vary in age, geographical pattern, gender and socio-economy status. It has been shown that incident of cardiovascular disease is on the increase and they are predicted to be the biggest cause of death by 2020 in place like India (6). Previous studies have shown a strong relationship between CRP and diabetic mellitus and it has being reported that the CRP levels were elevated in diabetic subject when compared with normal subject (3). In addition, those with elevated level of CRP were found more likely to develop diabetes over the course of the study (7). From this current study, C-reactive level of diabetic subject indicated a higher mean value than the control group but was not significantly different ($p > 0.05$). Although possible mechanisms of the relationship between CRP and cardiovascular disease is not clear, growing evidence suggest that serum CRP concentration is an important risk factor for cardiovascular disease and this might not have prognostic significance in patient with coronary artery disease (8). Results obtained from this study showed that in hypertensive subject and diabetic-hypertensive subjects, the c-reactive protein level reveals a mean value significantly higher ($p < 0.05$) when compared with the normal subject and diabetic groups. Such statistically higher value might be an indicator for cardiovascular disease since CRP is an acute phase reactant which increases in much inflammatory disorder (4).

Based on the results obtained from this present study, we may concluded that diabetic, hypertensive and diabetic hypertensive patient exhibited a higher C-RP values when compared to their normal counterpart suggesting that subjects with high level of CRP is at risk of developing diabetic and cardiovascular disease. It is therefore recommended that timely assessment of C - reactive protein among hypertensive, hypertensive-diabetics be routinely done in other to make early diagnosis of increases C - reactive protein level and also minimise the occurrence of associated complications.

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