



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1064343>Available online at: <http://www.iajps.com>

Research Article

**ASSOCIATION OF C-REACTIVE PROTEIN AND ESSENTIAL
HYPERTENSION****Dr. Abdul Haque Khan ^{1*}, Dr. Muhammad Zaman Baloch ², Dr. Ghulam Hussain Baloch ¹,
Dr. Hamid Nawaz Ali Memon ³, Dr. Imran Karim ⁴, Dr. Sajjad Ali ⁵ and Dr. Samreen ⁶**¹Department of Medicine, Liaquat University of Medical and Health Sciences (LUMHS)

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²Indus Medical College, Tando Muhammad Khan, Sindh Pakistan³Zulekha Hospital Dubai United Arab Emirates⁴Liaquat University Hospital Jamshoro Sindh Pakistan⁵Steward Carney Hospital Boston, Massachusetts USA⁶National Institute of Cardiovascular Diseases Karachi, Pakistan**Abstract:****Objective:** To determine the association of C-reactive protein (CRP) and essential hypertension at tertiary care hospital**Patients and Methods:** All the patients with ≥ 30 years of age, either gender with essential hypertension for ≥ 3 years were included in the six months cross sectional study after taking informed consent. The essential hypertension was labeled when the average of multiple systolic BP readings on two or more subsequent visits was consistently ≥ 140 mmHg on presentation or average of 02 or more diastolic BP measurements on at least 2 subsequent visits was ≥ 90 mmHg for ≥ 03 months duration. All the hypertensive population was screened and evaluate for serum C-reactive protein by withdrawn of venous blood sample and considered as raised when it was ≥ 06 mg/L. The data saved on pre-designed proforma and analyzed in SPSS 16 while the mean \pm SD, frequencies and percentages was calculated.**Results:** During six months study period total fifty patients with essential hypertension were evaluate for C-reactive protein. The mean \pm for age (years) & duration of chronic liver disease (years) for whole population was 56.81 ± 4.95 & 7.92 ± 3.64 respectively. The CRP was raised in 34 (68%) of the patients with male gender predominance 28 (58.8%) while the mean \pm SD for CRP in male and female population was 20.75 ± 7.92 and 22.92 ± 8.86 respectively.**Conclusion:** Increase in blood pressure was significantly associated with raised circulating C-reactive protein in patients with essential hypertension.**Keywords:** Essential hypertension, C-reactive protein and inflammatory marker**Corresponding author:****Dr. Abdul Haque Khan,**

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Please cite this article in press as Abdul Haque Khan et al., Association of C - reactive protein and Essential Hypertension, Indo Am. J. P. Sci, 2017; 4(11).

INTRODUCTION:

Hypertension is risk factors for cardiovascular and cerebrovascular disorders and is the fourth leading cause of deaths in developed countries & seventh in developing countries [1]. The prevalence of hypertension increased from 2% to 25% among urban residents of India while the National Health Survey of Pakistan estimated that hypertension affects 18% of adults [2]. An raised arterial pressure can be asymptomatic and easily treatable often leads to adverse complications in advance stage and if left untreated [3]. Despite the widely recognized treatment options the disease still remain exists with cardiovascular and cerebrovascular accidents although the morbidities and mortalities can be reduced with proper knowledge, awareness and control of hypertension [4].

The association between inflammation and essential hypertension (EH) emerges and shown that inflammatory marker like C-reactive protein (CRP) is raised in hypertensive patients and can predict the rate of complications as acute myocardial infarction and stroke [5]. The patho-physiology includes that raised CRP may reduce nitric oxide formation in endothelial cells causes vasoconstriction and increased formation of endothelia [6, 7], it also acts as proatherosclerotic factor and correlate with endothelial dysfunction while the Lima LM, et al reported prevalence for raised serum C-reactive protein in patients with essential hypertension was 59% [8]. The present study was carried out to evaluate the C-reactive protein levels in essential hypertensive patients as early and appropriate screening and control of hypertension can save the

life threatening complications associated with raised CRP level.

PATIENTS AND METHODS:

All the patients with ≥ 30 years of age, either gender with essential hypertension for ≥ 3 years were included in the six months cross sectional study after taking informed consent. The essential hypertension was labeled when the average of multiple systolic BP readings on two or more subsequent visits was consistently ≥ 140 mmHg on presentation or average of 02 or more diastolic BP measurements on at least 2 subsequent visits was ≥ 90 mmHg for ≥ 03 months duration. The exclusion criteria of the study were the patients with malignancy, autoimmune disorders, pregnant ladies, chronic lungs and kidney disease, hyperthyroidism, already on immunosuppressive and antibiotic therapy and the population with secondary causes for hypertension. All the hypertensive population was screened and evaluate for serum C-reactive protein by withdrawn of venous blood sample and considered as raised when it was ≥ 06 mg/L. The data saved on pre-designed proforma and analyzed in SPSS 16 while the mean \pm SD, frequencies and percentages was calculated.

RESULTS:

During six months study period total fifty patients with essential hypertension were evaluate for C-reactive protein. The mean \pm for age (years) & duration of chronic liver disease (years) for whole population was 56.81 ± 4.95 & 7.92 ± 3.64 respectively. The demographical and clinical profile of study population is presented in Table 1 while the frequency and mean \pm SD of serum CRP is shown in Table 2.

TABLE 01: THE DEMOGRAPHICAL AND CLINICAL PROFILE OF THE PATIENTS

AGE (years)	FREQUENCY (N=50)	PERCENTAGE (%)
30-39	08	16
40-49	15	30
50-59	17	34
60+	10	20
GENDER		
Male	29	58
Female	21	42
RESIDENCE		
Urban	32	64
Rural	18	36
Duration of E.H (yrs)		
3-5	10	20
5-10	21	42
>10	19	38
Co-morbidities		
Diabetes mellitus	18	36
Dyslipidemia	12	24
Obesity	20	40
Taking anti-hypertensive drugs		
Irregular	32	64
Regular	18	36
Mean \pm SD blood pressure (males)		
Systolic	160.82 \pm 8.85	
Diastolic	100.76 \pm 3.52	
Mean \pm SD blood pressure (females)		
Systolic	165.32 \pm 10.72	
Diastolic	95.98 \pm 5.85	

TABLE 02: THE FREQUENCY AND MEAN \pm SD OF SERUM CRP IN PATIENTS WITH ESSENTIAL HYPERTENSION

Parameter	Frequency (N=50)	Percentage (%)
RAISED CRP		
Yes	34	68
No	16	32
GENDER (n=34)		
Male	20	58.8
Female	14	41.1
Mean \pmSD for CRP		
Male	20.75 \pm 7.92	
Female	22.92 \pm 8.86	

DISCUSSION:

In current series, hypertension was associated with raised C-reactive protein level in both male and female gender. Systolic and diastolic blood pressures were associated with CRP. The strength of the association varies among population with the highest association identified in urban individuals and less in urban population. Former studies have observed association between blood pressure and C-reactive protein. Blake et al [9] showed an independent relationship between C-reactive protein and blood pressure. Increase in blood pressure was significant predictors for C-reactive protein after controlling bias and confounders. Others studies had also confirmed an association between hypertension and CRP [10-12] except a Colombian and Spanish study [13] population. [14] The study by Bautista LE et al, [14] C-reactive protein didn't increase the risk of prevalent hypertension in Colombians population when had comparison. Wang CH, et al [15] observed that C-reactive protein independently up-regulates angiotensin II receptors in smooth muscle cells as it acts through angiotensin II receptors leads to subsequent rising blood pressure. Secondly the hypertension can stimulate the production of inflammatory cytokines due to biomechanical activation [16], up regulation of monocyte chemoattractant protein-1 [16], and formation of reactive O₂ species. [17] CRP has play key role in response to injury and pressures overlord in vascular and cardiac remodeling. Therefore, the usual mechanism for the association between hypertension and inflammation remains unclear and could be multidirectional while whether these pathogenic mechanisms differ by population is also still unknown and required large multidisciplinary and multi-centered study.

CONCLUSION:

It has been observed that increase in blood pressure was significantly associated with raised circulating C-reactive protein in patients with essential hypertension and also support a possible role of inflammatory stimulus for hypertension and contributing in adverse cardiovascular and cerebrovascular events.

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