



Association Between Hypertension , C- Reactive Protein and Uric Acid

SHRAWAN KUMAR MEENA

:Department of Biochemistry Jhalawar Medical College, Jhalawar (Rajasthan)

AJAY KUMAR BHARGAVA

:Department of Biochemistry Jhalawar Medical College, Jhalawar (Rajasthan)

V. D. BOHRA

Department of Biochemistry Jhalawar Medical College, Jhalawar (Rajasthan)

ABSTRACT

Increased level of C- Reactive protein and uric acid in serum is found to be risk factor for cardiovascular diseases and development of hypertension. .we aimed to investigate the correlation between C- Reactive protein(C-RP) and uric acid value in serum and hypertension. We studied 100 patients suffering from hypertension and 100 normotensive healthy subjects. C- Reactive protein positive(elevated) in 72 patients and uric acid level raised in 58 cases with hypertension, out of 100 cases. A significant correlation was found of uric acid value in hypertensive cases when compared with control subjects ($p < .001$). C- Reactive protein is a atherogenic and uric acid function as antioxidant and both are positively associated with hypertension and may be important markers in cardiovascular risk factor.

KEYWORDS : C- REACTIVE PROTEIN, HYPERTENSION, URIC ACID

INTRODUCTION:

Hypertension is a common and affects nearly 1 billion adults all over the world (Wrelton pk 2004).

From last decade the prevalence of hypertension increased from 2% to 25% and among urban and rural respectively among residents in India (milind 2013).

C- Reactive protein is acute phase protein that increase during systemic inflammation, it is synthesized by the liver in response to cytokines (Ridker PM et al 1999). The association between hypertension and inflammation emerges from the recent studies showing that circulating inflammatory molecules i.e, C- Reactive protein increased in hypertensive patient (pauetto p 2006). C- Reactive protein has been accepted independent risk factor for cardiovascular disease (Zebrack J S et al 2002) and its elevated level found to be associated with hypertension (Ferrerios 1999 and Rajesh Kumar 2013 et al). C- Reactive protein and high blood pressure may be important in diagnosis of coronary heart disease. Uric acid is important marker of purine metabolism and it functions as antioxidant (Jules Assob 2014). Hyperuricemia is a condition in which serum uric acid level is elevated abnormally and it's associated with hypertension (Frederick et al Mussata Ger 2013). Present study was carried out to investigate the relationship between C- Reactive protein and uric acid in hypertensive and normotensive subjects of Jhalawar region of Rajasthan.

MATERIALS AND METHODS:

The present study was undertaken in the department of Biochemistry and SRG Hospital, Jhalawar (Rajasthan) between January 2009 to December 2010. Two hundred subjects in the age group of 25- 60 years divided into two groups of hypertensive and control healthy normotensive group.

Hundred patients suffering from hypertension and 100 age matched non hypertension subjects who were volunteered to be included in the study . Both the groups were evaluated for C-RP and uric acid. A self constructed questionnaire was employed in each case and detailed history regarding the ischemic heart disease (IHD) and hypertension was recorded.

The individual suffering from Type- 2 diabetes mellitus, tuberculosis, renal disorders, cardiac failure, tumor of any type, the subjects who were consuming drugs like Aspirin, statins, fibrates and phenytoin were excluded from the study.

Fasting blood sample were collected for estimation of C-RP direct kit. Semi quantitative method (Hayansi H and Longripper GA 1972) uric acid was estimated by quantitative commercial kit method (Trivediet al 1978) on Autoanalyzer Miura- 200.

Blood pressure was measured (both systolic and diastolic) and hypertension was described as a systolic blood pressure > 140 mmHg and diastolic pressure > 90 mmHg and normotensive as systolic pressure < 120 mmHg and diastolic blood pressure as < 80 mmHg (Juules clemert Nguedia Assob 2014).

RESULTS:

The patients of hypertension under study comprised of 62 males and 38 females Out of 100 case of hypertension the age near between 25 years to 60 years. The C- Reactive protein positive cases was found in 72 cases and C- RP negative 28 cases. In healthy control group all subjects were found to be sero-negative C- RP. Uric acid levels were high in 58 cases and normal levels were found to be in 42 cases. However uric acid level observed within normal limits in all normotensive subjects. There was a significant correlation ($p < .001$) between serum uric acid level in hypertensive cases and normotensive subjects. (Table 1) Both C- RP and uric acid increased in more than 50% cases of Hypertension.

Table – 1 Serum C-RP and Uric Acid level In Hypertension and Normotensive Cases:

PARAMETERS	HYERTENSIVE	NORMOTENSIVE
CRP (n=100)	72% (Positive)	28% (Negative)
Uric Acid (Mg/dl) (n=100)	(I) HYPERTENSIVE 7.1 ± 1.8 (Mean ± S.D.)	(II) HYPERTENSIVE 4.8 ± 1.3 (Mean ± S.D.)

pl vsll = (p .001)

DISCUSSION:

Hypertension is increasingly important health problem not only in India but also all over the world, affecting approximately one billion populations (Chobanian 2003). C- RP is a marker of systemic inflammation and it is associated with Hypertension and increased risk of

incidence of Myocardial Infarction (Rideker et al 1999, Koenig et al 1999). It has been demonstrated from the studies that sero-positive elevated level of C- Reactive protein is a risk factor for the development of Hypertension (Braziliy et al 2004 and O.P. Patidar 2015). These studies are similar to our findings. According to Rajesh Kumar et al 2013 C- RP and high blood pressure in combination have additional predictive value for cardiovascular outcome. Previous study suggested hyperuricemia found to be a risk factor of hypertension (Framan JP et al 2009, Hall JE et al 2003, Wallace CE et al 2007, Payne RA et al 2010) which is similar to our study. Uric acid has been implicated in hypertension via mechanism like inflammation, vascular smooth muscle cell proliferation in renal microcirculation, endothelial dysfunction and activation of the rennin angiotensin- aldosterone system (Opatham et al 2008). Previous workers reported association between uric acid with both systolic and diastolic blood pressure and increase in both systolic and diastolic blood pressure also marked by an increase in serum uric acid concentration, similar trend was observed in present study (Xhang W et al 2009, Peristein T S et al 2006, Lu Z et al 2009). Some studies suggested the increased level of uric acid in plasma is protective against the ischemic heart disease, since uric acid act as an antioxidant. We concluded in present study a significant positive association between increased level of C- Reactive protein and uric acid with Hypertension.

REFERENCES

- Alexander Haig (1989) on uric acid and arterial tension. *Br. Med. J.* 1, 288- 291. || 2. Braziliy JI, Peterson DJ, Cushman M, Stanfar MJ (1999). Inflammation aspirin and the risk of cardiovascular disease in apparently healthy men. *N. Eng J Med* 336: 973-976. || 3. Chobanian A V, Bakris G L, Black H R, Cushman W C, Green L A (2003). Seventh report of the joint national committee on prevention detection, evaluation and treatment of high blood pressure Hypertension. 42 : 1206 – 1252. || 4. Dallis N (1987). The cardiovascular and renal relations and manifestations of GOUT JAMMA. 29: 261-234. || 5. Frederick Mahomed (1979). On chronic brights disease and its essential symptoms. *Lancet*, 1 399-401. || 6. Hyanshi H and Longrippe G A (1972) C- RP latex test for operative and semiquantitative estimation of C- Reactive protein in human serum samples *H Ford Hosp Med. J.*, 20. Esi. || 7. Jules C N Assob et al, Marcelin a GOWE, Dickson S N Sagha, Anna L N Juda, Y vonne Welikim, Diedonne Nsimon. The relationship between uric acid and Hypertension in adults in Fako division, SW region Cameroon. 15-21 Req. uric acids. || 8. Koenig W Sand M, Frohlich M (1999). C- Reactive protein, a sensitive marker of inflammation predicts future risk of coronary heart disease in initially healthy middle aged men: Results from the MONICA (Monitoring trends and determinants in cardiovascular disease) Augsburg cohort study 1984 to 1992. *Circulation*. 99,237-242. || 9. LUZ, Dong W, Wu H, Chen T (2009). Serum uric acid level in primary hypertension among chinese non agesians centanarrians. || 10. Milind Y Nadkar (2013). Indian guidelines of Hypertension. Illrd supplement to journal of association of physicians of India. 6. 12. www. JAPI. Org. || 11. Mustafa Gor, Dumus Y S, Jafer Elbason Goham YK, Aliyil liz (2013). Uric acid and high sensitive C- Reactive Protein are associated with subclinical thoracic aortic atherosclerosis. 1,2,144-148. || 12. Pauletto P, Ratazzi M. (2006). Inflammation and hypertension. The search for the link Nephrology dialysis Transplantation. 21(4), 850- 853. || 13. Peristelin TS, Gumieniak O, William GM, Sparrow D, Vokonas DS (2006). Uric acid and the development of hypertension. The normative aging study. *Hypertension* 48:1031-1036. || 14. Rajesh kumar, Suchet and Sonia Kochhar (2013). C- Reactive protein and severity of Hypertension JARBS, 15(4), 331- 335. || 15. Ridker P.M., (1999). Inflammation atherosclerosis and cardiovascular risk: An epidemiological view. *Blood Coagulation Fibrinolysis*. 10. 9-12. || 16. Trivedi RC, Rebar L, Berka E S (1978). Uric acid enzymatic method. *lin chem.* ; 14:1908-1912). || 17. Whelton PK (2004). Epidemiology and the prevention of hypertension. *J Clin hypertens* 6: 636-642. || 18. Xhang W, Sun K, Yang Y, Zhang H, HUB (2009). Plasma uric acid and hypertension in a chinese community. Prospective study and meta analysis. *Clin chem* 55: 2026-2034. || 19. Zebrack J S, Muhlestein J B, Harne B D (2002). C- Reactive protein and angiographic coronary artery disease; independent additive predictors of risk in subjects with angina. *J. Am. Coll. Cardio* 39. 632- 637.