www.nephropathol.com DOI: 10.5812/nephropathol. 9092 J Nephropathology. 2013; 2(1): 67-70

Journal of Nephropathology

Lipoprotein (a): More than a bystander in the etiology of hypertension? A study on essential hypertensive patients not yet on treatment

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ARTICLE INFO

Article type:
Brief Report

Article history:
Received: 1 September 2012
Revised: 29 September 2012
Accepted: 10 December 2012
Published online: 1 January 2013
DOI: 10.5812/nephropatho. 9092

Keywords:
Essential hypertension
Lipoprotein (a)
Renal failure

ABSTRACT

Background: Hypertension (HTN) is a very common disorder with a substantial impact on public health because of its complications.

Objectives: To study the association of serum lipoprotein(a) [Lp(a)] elevation with essential hypertension (eHTN).

Patients and Methods: This study was conducted on a group of essential hypertensive patients. Laboratory exams consisting of serum creatinine and Lp(a) were measured.

Results: Ninety five essential hypertensive patients were enrolled to the study. Serum LP (a) in patients was 46.5±20. In patients an inverse correlation between serum Lp(a) andcreatinine clearance was seen ($r = -0.175$ $p<0.05$). There was a significant correlation between serum Lp(a) and age ($r =0.191$ $p<0.05$) or duration of HTN (known duration of hypertension period) ($r =0.362$ $p<0.05$).

Conclusions: Our data suggest that Lp(a) may be involved as a cofactor in essential hypertension, with a mechanism that remains to be elucidated.

Brief Report

Implication for health policy/practice/research/medical education:
Lipoprotein (a) may be involved as a cofactor in essential hypertension, with a mechanism that remains to be elucidated.

Please cite this paper as: Ghorbani A, Rafieian-Kopaei M, Nasri H. Lipoprotein (a): More than a bystander in the etiology of hypertension? A study on essential hypertensive patients not yet on treatment. J Nephropathology. 2013; 2(1): 67-70. DOI: 10.5812/nephropathol. 9092

1. Background

Hypertension (HTN) is a very common disorder with a substantial impact on public health because of its complications. Despite the high prevalence of essential hypertension (eHTN) and many researches, the basic causes remain unclear (1-2). Serum lipoprotein(a) [Lp(a)] is a complex lipoprotein particle which has homology structure with plasminogen of the fibrinolytic system (3). Little is known about the association of serum Lp(a) elevation with essential hypertension , while in vitro experiments have shown that oxidized Lp(a) is able to impair the arterial endothelium – dependent dilation,

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thus suggesting a possible role of Lp(a) in the genesis of eHTN (4).

2. Objectives

Few studies have shown elevated level of LP (a) in eHTN, however, results are controversial (4, 5). Therefore, the aim of our study was to measure the serum concentrations of Lp (a) in a group of essential hypertensive patients with no clinical signs of organ damage.

3. Patients and Methods

This cross-sectional study was carried out on a group of essential hypertensive (eHT) patients who were documented by history, physical examination and laboratory tests. Factors served as exclusion criteria were cigarette smoking, anti-lipid drug taking, antihypertensive or any drug affecting lipids profiles. Also presence of diabetes mellitus, recent MI and vascular diseases, presence of acute or chronic infections were other exclusion criteria.

For all the patients, laboratory tests consisting of lipid profiles, serum creatinine were performed after 14 hours fasting. For all subjects serum Lp(a) was measured through enzyme immuno assay (ELISA) with Immuno-Biological Laboratories (IBL) kit of Hamburg. Normal values for Lp(a) in this study were the ones up to 39 mg/dL. Estimated glomerular filtration rate (eGFR) was calculated from serum creatinine, age and body weight. For stratification of hypertensive patients according to the report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure we stratified hypertensive patients from stage one to three (5). For statistical analysis descriptive data are expressed as Mean± SD and frequency distribution. For correlations Spearman's rho test was used. All statistical analyses were performed using the SPSS (version 11.00) software and statistical significance was inferred at a p value< 0.05.

4. Results

The total subjects were 95(F =61, M =34) eHT patients. The mean ± SD of ages of hypertensive group was 57±12 years. In eHT patients, eGFR was 87±17.8 cc/min. Duration of HTN in patients were 5.5±4.5 years. In eHT patients, serum Lp(a) was 51±20mg/dL. There was no significant association between Lp(a) and stages of hypertension ($p>0.05$). In eHT patients an inverse correlation between seum Lp(a) and craetinin clearance was seen ($r=-0.175$ $p<0.05$). There was a significant positive correlation between serum Lp(a) and age in eHT patients ($r=0.191$ $p<0.05$) or duration of HTN (known as duration of hypertension period) ($r=0.362$ $p<0.05$).

5. Discussion

In this study we found, no significant association between Lp(a) and stages of hypertension. In patients, an inverse correlation between seum Lp(a) with craetinin clearance was seen. Also, there was not any significant positive correlation between serum Lp(a) and ages of hypertensive patients or duration of HTN (known as duration of hypertension period). To measure the serum concentrations of Lp(a) in a group of essential hypertensive patients not receiving pharmacological treatment and with no clinical signs of associated pathologies or organ damage, Catalano et al. conducted a study on123 Caucasian eHT patients (47 men and 76 women) (6). They found that the hypertensive patients had higher plasma concentrations of Lp(a), total cholesterol, TG and very low density lipoprotein than controls with no differences in the plasma concentrations of Lp(a) between the two sexes (6). To evaluate Lp (a) in

HTN, Bhavani et al. studied a group of eHT patients, who were not receiving pharmacological treatment and with no clinical signs of associated illness or organ damage. The study contained 37 eHT patients (27 men and 10 women) and compared with 50 controls (32 men and 18 women). It was observed that the hypertensive patients had higher plasma concentrations of Lp (a), and Lp (a) values which were correlated significantly with systolic blood pressure (SBP) diastolic blood pressure (DBP). They showed that elevated plasma Lp (a) levels were associated with hypertension (7). They concluded that higher plasma concentrations of Lp (a), albeit with in the normal range, could be an independent risk factor for atherosclerosis, and could contribute towards increasing the risk for cardiovascular diseases in persons with essential hypertension (7). To investigate whether or not Lp(a) levels is a predictor of coronary heart disease (CHD) in patients with essential hypertension, Gazzaruso et al. conducted a study in 249 patients with eHTN and in 142 non-hypertensive patients with CHD as well as in 264 healthy controls (8). The study showed that, Lp(a) levels did not differ significantly between hypertensive and non-hypertensive patients with CHD. However, stepwise regression analysis indicated that high Lp(a) level is a strong predictor of CHD in hypertensive patients (8). Likewise, Antonicelli et al. investigated the correlation between blood pressure levels and plasma Lp(a) concentration, in patients with eHTN. The study was performed in 54 untreated hypertensive patients whose blood pressures were monitored for 24 h by ambulatory blood pressure monitoring. A significant correlation was found between Lp(a) levels and the night-time systolic or diastolic pressures, as well as between the mean night-time fall in systolic and diastolic blood pressures (3).

6. Conclusions

Our data suggest that Lp(a), as a cofactor in essential hypertension, may be involved in a mechanism that remains to be elucidated.

Authors' contributions

HN and AG designed and performed the research. MRK analyzed data and wrote some parts of paper. AG also provided extensive intellectual contribution. MRK reviewed the draft, too. HN prepared the final draft.

Conflict of interest

The authors declared no competing interests.

Acknowledgments

This study was granted by the research deputy of Shahrekord University of Medical Sciences (grant #248).

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