Klinik Araştırma

Comparison of Non-HDL Cholesterol Levels in Patients with Dipper Hypertension and Non-dipper Hypertension

Dipper ve Non-dipper Hipertansiyonlu Hastalarda Non-HDL Kolesterol Seviyelerinin Karşılaştırılması

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ABSTRACT

Objective: *In this study we aimed to compare non-HDL cholesterol levels between patients with dipper hypertension and non-dipper hypertension.*

Methods: *Ambulatory blood pressure monitoring was performed and serum cholesterol levels were measured for all patients.*

Results: *Mean non-HDL cholesterol level was 136,7±7 mg/dl in dipper hypertensive group; whereas it was detected 143,3±6 mg/dl in non-dipper hypertensive group, the difference was statistically insignificant (p: 0,1).*

Conclusion: *Non-dipper hypertensive patients in our cohort had higher non-high density lipoprotein levels when compared to dipper hypertensive patients.The difference was not statistically significant. The number of patient in our study may be the reason for that. Since the relationship between non-HDL-C and NDHT is still obscure, further studies with larger cohorts are needed to elucidate this question.*

Keywords: *hypertension, non-HDL cholesterol, LDL cholesterol*

ÖZET

Amaç: *Bu çalışmada dipper ve non-dipper hipertansiyonlu hastalarda non-HDL kolesterol seviyelerini karşılaştırmayı amaçladık.*

Yöntemler: *Tüm hastalara ambulatuar kan basıncı takibi yapıldı ve serum kolesterol seviyeleri ölçüldü.*

Bulgular: *Dipper hipertansiyonlu grupta ortalama non-HDL kolesterol seviyesi 136,7±7 mg/dl iken non-dipper hipertansiyonlu grupta ise 143,3±6 mg/dl saptandı, farklılık istatistiksel olarak anlamlı değildi (p: 0,1).*

Sonuç: *Çalışma grubumuzda non-dipper hipertansiyonlu hastalar dipper hipertansiyonlu hastalara göre daha yüksek non-HDL kolesterol seviyesine sahipti. Farklılık istatistiksel olarak anlamlı değildi. Çalışma grubumuzun küçük olması, bunda rol oynamış olabilir. Non-dipper hipertansiyon ve non-HDL kolesterol arasındaki ilişki hala bilinmemektedir. Bu konuyu aydınlatmak için daha büyük hasta gruplarıyla ileri çalışmalara ihtiyaç vardır.*

Anahtar Kelimeler: *hipertansiyon, non-HDL kolesterol, LDL kolesterol*

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INTRODUCTION AND OBJECTIVE

Hypertension is the leading cause of morbidity and mortality in developed countries (1). Hypertension and hyperlipidemia are two major risk factors for cardiovascular disease and coexistance of these diseases is related with increased morbidity and mortality. It was highligheted in Framingham Heart Study and European Society of Cardiology 2013 Guidelines for the Management of Arterial Hypertension that metabolic risk factors such as hyperlipidemia are more common in patients with high blood pressure (BP) (2, 3). A metaanalysis showed that an elevation of 10 mmHg in systolic BP or an elevation of 5 mmHg in diastolic BP would be associated with %40 higher risk of stroke and %30 higher risk of death from ischemic heart disease (4). Dipper hypertension (DHT) is defined as decline of nocturnal mean BP levels of more than 10% when compared to mean BP levels during the day. Patients with non-dipper hypertension (NDHT) have lack of this phenomenon; on the contrary, nocturnal mean BP may even be incresaed (5). Many studies have shown that NDHT was more closely associated with end-organ damage than DHT (6, 7). As a result of sympathetic nervous system activation, increased peripheral vascular resistance and elevated serum norepinephrine levels were shown to be responsible for NDHT. Even though sympathetic nervous system activation seems to be the most important mechanism of NDHT, lipid parametres are not clear in NDH patients. In this study we aimed to compare non-HDL-C levels in patients with DHT and NDHT.

MATERIAL AND METHODS

Seventy three consecutive patients with newly diagnosed essential hypertension and did not use any lipid modifying drugs were included the study. Total cholesterol levels (total-C; <200 mg/dl) and high-density lipoprotein (HDL-C; 35–65 mg/dL), serum total-C and HDL-C levels were recorded and non-HDL-C levels were calculated with total-C minus HDL-C formula. Ambulatory BP follow up was performed (A&D TM-2430 Ambulatory Blood Pressure Monitor, Japan) and the values measured by device were obtained from computer recording system. Measurements made every 30 minutes during daytime and every 1 hour at nighttime for a period of 24 hours. Patients whose mean BP decreased %10 at nighttime when compared to mean BP during daytime were considered as dipper hypertensive group (DHG), patients had lack of this phenomenon were considered as non-dipper hypertensive group (NDHG).

STATISTICAL ANALYSES

Percentages were used for categorical variables and mean value ± SD was used for continuous variables. Mann Whitney U test performed to compare age and non-HDL-C levels between two groups. Chi-square test used for comparing categorical variables. p<0,05 was considered as statistically significant. All statistical analyzes were made with Statistical Package for the Social Sciences (SPSS) version 17.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

Twenty eight (38,4%) were men and 45 (61,6%) were women. Mean age in study cohort was 45,6±8,9. There were 41 (56,1%) and 32 (43,9%) patients in DHT and NDHT groups, respectively. Mean non-HDL-C was 140±7 for all patients (Table 1). In DHG there were 16 men (39%) and 25 women (61%) patients, and in NDHG there were 12 men (37,5%) and 20 women (62,5%).

The mean age was 46,3±8 in DHG and 44,9±9 in NDHG. There was no significant difference between two groups according to gender and mean age (p:0,8 for gender and p:0,7 for age). Mean non-HDL-C level was 136,7±7 mg/dl in DHT group; whereas it was 143,3±6 mg/dl in NDHG, the difference was statistically insignificant (p=0,1) (Table 1).

DISCUSSION

NDHT is more closely associated with end-organ damages and cardiovascular morbidity-mortality than DHT (8, 9). O'Brien and friends have fistly shown that NDHT was a higher risk for stroke than DHT (7). It was also shown that NDHT was associated with more antihypertensive drugs for BP control (10). Bae Keun Kim and colleagues showed that NDHT was a risk factor for inappropriate high left ventricular mass, that was related worse cardiovascular prognosis than appropriate left ventricular mass (11, 12). There is stil no biochemical parameter identifying DHT and NDHT in clinical practice.

Some studies showed that sympathetic nervous system activation was critical for NDHT, and there was an elevation in serum norepinephrin levels in NDHT patients. Also several factors may affect the circadian rhythm of BP, such as abnormal neurohormonal regulation, lack of physical activity, nutritional factors and smoking (13). However, additional factors are stil obscure.

Table 1. Comparison of the two groups in terms of age, gender and non-HDL-C.

	n-%		Mean±SD		p
	DHG	NDHG	DHG	NDHG	
Gender					p:0,8*
Men Women	16 (39%) 25 (61%)	12 (37,5%) 20 (62,5%)			
Age			46,3±8	44,9±9	p:0,7**
Non-HDL-C			136,7±7	143,3±6	p:0,1**

* Chi-square test, ** Mann-Whitney U test

Therapies targeting LDL-C has been shown to effectively prevent cardiovascular events in many studies; however it has been recently suggested that similar decrease in LDL levels may not have the same improvement in cardiovascular outcomes. Therefore, lipoproteins other than LDL are thought to be responsible. Non-HDL-C is closely associated with cardiovascular morbidity and mortality.

Liu and collagues showed that non-HDL-C was strongly associated with coronary heart disease regardless LDL-C (14). Moreover, in another study Liu and friends showed that non-HDL-C levels were more critical for cardiovascular diseases than LDL-C (15). They concluded that non-HDL-C is a stronger predictor for cardiovascular morbidity and mortality than LDL-C (15).

Optimizing Non-HDL-C levels has become more important for minimization of residual cardiovascular risks than optimizing LDL-C levels. Non-HDL-C may be a stronger predictor of coronary risk than LDL-C because it reflects the sum of atherogenic lipoproteins (16). Bittner and collagues showed that while LDL-C and HDL-C did not predict cardiovascular events at follow up, non-HDL-C was an independent risk factor for non-fatal myocardial infarction and angina pectoris (17). Weiquan and collagues showed that non-HDL-C was a useful predictor for cardiovascular disease in patients with type 2 diabetes mellitus (18).

Robinson JG and friends showed in their meta-analysis that there was a one-to-one relationship between the non-HDL-C lowering percentage and coronary heart disease risk reduction (19). We had hypothized that higher risk of end organ damage in NDHT patients than DHT patients would be associated with higher non-HDL cholesterol levels in NDHT patients and therefore planned this study. At our study, NDHG had higher non-HDL levels when compared to DHG. The difference was not statistically significant. The number of patient in our study may be the reason for that. Since the relationship between non-HDL-C and NDHT is still obscure, further studies with larger cohorts are needed to elucidate this question.

According to current results, we suggest to aim more intensive treatment for non-HDL cholesterol in NDH patients because of they have higher cardiovascular risks than DH patients.

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