# A Cross-sectional Examination of the Relation Between Etiological and Demographic Distribution of Serebrovascular Diseases and Atherosclerosis Risk Factors

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**ÖZET**
*Serebrovasküler hastalıkların etyolojik ve demografik dağılımı ile ateroskleroz risk faktörleri arasındaki ilişkinin kesitsel olarak irdelenmesi*
**Amaç:** Bu çalışmada serebrovasküler hastalıkların etyolojik ve demografik özelliklerinin kesitsel olarak incelenmesi ve ateroskleroz risk faktörleri ile olan ilişkisinin irdelenmesi amaçlanmıştır.
**Gereç ve Yöntem:** Serebrovasküler hastalık tanısı konulan 24 hasta ile benzer yaş ortalaması olan 18 sağlıklı birey çalışmaya alındı. Hastalarda açlık kan şekeri, total kolesterol, trigliserid, düşük dansiteli lipoprotein-kolesterol düzeyleri (LDL-K), vücut kitle oranı, sigara ve alkol kullanımları, ailede aterosklerotik kalp hastalığı öyküsü, sistolik kan basıncı ve diyastolik kan basıncı değerleri karşılaştırıldı.
**Bulgular:** En sık serebrovasküler hastalık nedeni olarak (n=19) iskemi saptandı. Onyedi hastada hipertansiyon, 8'inde diyabet, 20'sinde hiperlipidemi, 7'sinde sigara içme alışkanlığı, 14'ünde ailede aterosklerotik hastalık öyküsü mevcuttu. Serebrovasküler hastalığı olan diyabetik ve hipertansif hastaların açlık kan şekeri, total kolesterol, trigliserid, sistolik kan basıncı ve diyastolik kan basıncı değerleri serebrovasküler hastalığı olmayan diyabetik ve hipertansiflerden anlamlı olarak yüksek saptandı (sırasıyla p0.05, p0.06, p0.01, p0.001, p0.001). LDL-K düzeyleri serebrovasküler hastalığı olan diyabetik ve hipertansiflerde anlamlı olarak yüksekti (p0.01). İlçenin sosyokültürel yapısı nedeni ile alkol ve sigara öyküsü sağlıklı olarak alınamadı. Serebrovasküler hastalık tanılı diyabetiklerde vücut kitle oranı istatistiksel anlamı olmasa da yüksekti (p=0.108). Ailede aterosklerotik kardiyovasküler hastalık öyküsü anlamlı yüksekti (r=0.102, p0.001).
**Sonuç:** Serebrovasküler hastalık ile ateroskleroz risk faktörleri arasında sık ilişkinin olduğu, değiştirilebilir risk faktörleri ile ilgili primer ve sekonder korumanın serebrovasküler hastalık ile ilişkili mortalite ve morbiditeyi azaltacağı kanılarına varıldı.
**Anahtar kelimeler:** Serebrovasküler hastalıklar, iskemik serebral hastalıklar, aterosklerotik serebral olaylar, ateroskleroz risk faktörleri

**ABSTRACT**
*A cross-sectional examination of the relation between etiological and demographic distribution of serebrovascular diseases and atherosclerosis risk factors*
**Objective:** The aim of this study is investigation of the etiological and demographical features of cerebrovascular disease (CVD) and their relationship with atherosclerosis risk factors.
**Materials and Methods:** Twenty-four patients diagnosed as CVD and 18 healthy individuals with similar average age were included in this study. Fasting blood glucose (FBG) levels, total cholesterol levels (TC), triglyceride levels (TG), low density lipoprotein cholesterol (LDL-C) levels, body mass index (BMI), alcohol usage and cigarette smoking rates, systolic and diastolic blood pressure (SBP and DBP respectively), rates of patients with atherosclerotic heart diseases in family history were compared.
**Results:** The most common cause was determined as ischemia (n=19). Hypertension (n=17), diabetes (n=14), hyperlipidemia (n=20), cigarette smoking habit (n=7), atherosclerotic diseases (n=14) were determined in family histories of patients. FBG levels, TC levels, TG levels, SP and DP of diabetic and hypertensive patients with CVD were shown to be statistically significantly higher than levels of diabetic and hypertensive patients without CVD (p0.05, p0.06, p0.01, p0.001, p0.001, respectively). LDL-C levels were statistically significantly high in diabetic and hypertensive patients with CVD (p0.01). Alcohol usage and cigarette smoking habit of patients couldn't be properly registered because of the cultural structure of the district. BMI was not statistically significant but high in diabetic patients diagnosed as CVD (p=0.108). Cardiovascular disease history in the families of patients was statistically significantly higher (r=0.102, p0.001).
**Conclusion:** It was decided that there is a close relationship between CVD and atherosclerosis risk factors, and primary and secondary preventive methods of these risk factors will decrease morbidity and mortality related to CVD.
**Key words:** Cerebral diseases, ischemic cerebral diseases, atherosclerotic cerebral diseases, atherosclerosis risk factor

## INTRODUCTION

CVD continues to be an important disease in our country by causing high morbidity and mortality. It is known that especially ischemic cerebrovascular events due to atherosclerosis are closely related with other atherosclerotic vessel diseases like coronary heart diseases and peripheral vessel diseases. Therefore, there is no doubt that atherosclerosis risk factors take an important place in development and progress of cerebrovascular diseases. In this study etiologic and demographic features of patients with CVD diagnosis and the relationship between CVD and atherosclerosis risk factors are investigated.

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## MATERIAL AND METHODS

This study was performed in a small town in the east of Turkey having low socioeconomic level and traditional life-style. Forty-two patients with similar nutrition habits and cultural structure were included in this study. These patients were evaluated in two groups as Group 1 including 24 patients with a proved diagnosis of CVD in different Neurology clinics and applied to Internal Medicine policlinic of our hospital with various reasons. Eighteen patients having no CVD history or diagnosis but having similar number of hypertension, diabetes mellitus, hyperlipidemia and obesity diagnoses with patients in Group 1 were included into the second group (Group 2).

Two groups were compared regarding atherosclerosis risk factors. Systemic examinations and interrogations, electrocardiographical examinations and chest radiographs of all patients were evaluated. Levels of FBG, TC, TG, LDL-C, HDL-C and weight, height, BMI, SBP, DBP of all patients were included as study parameters. In addition, physical activity capacities, life and nutrition styles, family histories of atherosclerosis risk factors, cigarette smoking and alcohol usage of all patients were investigated.

The statistical evaluation was performed by using SPSS 9.0 for Windows. Student-t test, chi-square test and Pearson correlation test were used for statistical significance analysis.

## RESULTS

There was no statistically significant difference between two groups in respect of age ($p>0.06$). Most of the patients in Group 1 were female ($r=0.102$, OR=4.50) and average age of females included in this study were higher than males ($p<0.01$). The etiology was determined to be ischemia in 19 of 24 patients (79.1%) in Group 1. Hypertension (HT) in 17 (89.47%), Diabetes Mellitus (DM) in 8 (42.10%), hyperlipidemia (HL) in 19 (100%), cigarette smoking in 7 (36.84%), family history of atherosclerosis in 14 (73.6%) and obesity in 14 (73.6%) were observed in 19 patients diagnosed as ischemic CVD. HT and DM combination was determined in 7 patients. When the patients were investigated in respect of lipid profile disorders; hypercholesterolemia in 7 (36.7%), hypertriglyceridemia in 4 (21.05%), hypercholesterolemia and hypertriglyceridemia combination in 7 (36.7%), high LDL-C level in 10 (52.6%) and low HDL-C level in 9 (47.36%) patients were deteremined. Pathological changes in these parameters were statistically significantly evident in female patients than in male patients ($p<0.001$, $p<0.05$, $p<0.01$, $p<0.01$, $p<0.05$ respectively). Parameters like FBG, TC, TG, LDL-C, SBP, DBP were determined to be statistically significantly higher in patients diagnosed as CVD. Serum levels of FBG, TC, SBP, DBP and LDL-C were statistically significantly higher in diabetic and hypertensive patients with CVD diagnosis than in same number of diabetic and hypertensive patients without CVD diagnosis. ($p<0.05$, $p<0.006$, $p<0.01$, $p<0.001$, $p<0.001$ respectively). But serum HDL-C level was statistically significantly lower in diabetic and hypertensive patients with CVD diagnosis than in patients without CVD diagnosis ($p<0.05$). Cigarette smoking was common in male patients compared with female patients but there wasn't a statistically significant difference. There was no relationship between patients with CVD diagnosis and without CVD diagnosis in respect of BMI but BMI was high but not statistically significant in diabetic patients with CVD diagnosis ($p=0.108$). There was no difference between two groups in respect of cultural structure, life style, nutrition habits, education status, awareness of the disease and nutrition, physical activity. Foods containing high calories, high cholesterol content and saturated animal fats were the common features of nutrition in the population living in that small town, low socioeconomic level and lack of social life were similar in both groups of patients.

## DISCUSSION

Atherosclerosis risk factors have an important place in the development and progress of cerebrovascular diseases. This relationship is more evident in CVD cases with ischemic etiology. Improvement in changeable risk factors causes an important decrease in morbidity and mortality rates of heart and vessel diseases.

It is known that cholesterol levels are higher and lipid profile is more atherogenic in atherosclerotic cerebral infarct cases than in non-atherosclerotic cases (1).

The most important independent risk factors in CVD cases as in other atherosclerotic incidents are notified as HT and DM (2). It was determined in some studies that HT incidence was 43%, DM incidence was 30% and in cases with combination of these diseases incidence of

CVD was 19.5% (3). It is suggested that the cerebral blood flow was decreased and intracranial arterial resistance was higher in diabetic cases (4). It is also suggested that serum lipid levels have a direct relationship with CVD but HL as an independent risk factor is dominant (2). HT and DM were also determined in our study as the most important risk factors in ischemic CVD cases.

Morbidity and mortality increase correlated with related risk factors in also CVD cases as in whole atherosclerotic incidents. Therefore, primary and secondary prevention are important in these cases. Although there are studies reporting HL and lipoprotein -a level are not independent risk factors for CVD, it is also suggested that HL should be treated with statins in CVD cases to keep serum LDL levels below 100 mg/dl (2,5).

It is shown that primary and secondary prevention from HT, DM and HL causes a decrease in stroke speed and it is declared that a decrease in frequency of CVD can be obtained with primary prevention (6). Secondary prevention in an ischemic incident that affects arterial bed contributes primary prevention in impeding potential ischemic incidents in other arterial beds (7).

As a result, it is decided that the relationship between CVD and atherosclerosis risk factors are rather significant, and primary and secondary prevention about adjustable risk factors will decrease incidence and consequently morbidity and mortality of CVD. It is evident that this study doesn't represent the whole town completely and it is a cross-sectional study that includes patients who applied to our hospital. Therefore, randomized prospective studies with a more number of patients should be performed to support this suggestion.

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