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ARAŞTIRMA YAZISI **ORIGINAL ARTICLE**

PROBABILITY OF STROKE IN THE COUPLES OF STROKE PATIENTS; USING FRAMINGHAM STROKE RISK PROFILE

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ABSTRACT

INTRODUCTION: Environmental and personal factors may be of importance for stroke risk. We determined the stroke risk factors among the stroke patients' couples and controls.
MATERIAL AND METHODS: A prospective study was conducted on 221 participants (71 stroke patients, 71 stroke patients' couples, 79 controls) aged more than 54 years. Framingham Stroke Risk Profile was used to measure the stroke risk.
RESULTS: In subjects aged 54 years and older, became a couple of stroke patient were not associated with an increased risk of stroke.
CONCLUSION: In this study, environmental and personal factors were an independent risk factor for stroke in stroke patients' couples and controls older than 54 years.
Key Words: Stroke, Couples, Framingham.

STROK HASTALARININ EŞLERİNDE FRAMİNGAM STROK RİSK PROFİLİNE GÖRE STROK GEÇİRME OLASILIĞI

ÖZET

GİRİŞ: Çevresel ve kişisel faktörler Strok riskinde etkili olabilir. Biz strok hastalarında, eşlerinde ve kontrol grubunda strok risk faktörlerini inceledik.
GEREÇ VE YÖNTEM: 54 yaş ve üzerindeki 221 katılımcıya (71 strok hastası, 71 strok hastası eşi ve 79 kontrol grubu) strok riskini belirlemek için Framingam Strok risk skalası uygulandı.
BULGULAR: 54 yaş ve üzerindeki strok hastası eşlerinde strok riskinde artış saptanmadı.
SONUÇ: Bu çalışmada, çevresel ve kişisel faktörler 54 yaş ve üzerindeki strok hasta eşleri ve kontrol grubunda bağımsız bir risk faktörüdür.
Anahtar Sözcükler: Strok, Eş, Framingam.

INTRODUCTION

Stroke becomes a growing healthcare problem in terms of disease burden, economic and social implications (1). Although many risk factors for stroke have been known, there are insufficient data on the genetic and environmental factors (2). Both twin, family studies and animal models support a role for genetic factors in stroke risk (2,3). But, candidate gene studies had inconsistent and inconclusive results because of the heterogeneity of pathophysiological mechanisms causing stroke. It has been suggested that familial factors have been important in individuals presenting with stroke at younger ages and in some stroke types (3,4) . Little is known about environmental factors on the incidence of stroke. Although there are well-documented modifiable risk factors of stroke, there is a broad category of environmental factors for stroke such as latitude, season, temperature (5), environmental tobacco smoke (6), radiation (7,8), metals (9), air pollution (10), drinking water parameters (11), pesticides (12). And also the psychosocial environment might be associated with

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increased risk of cerebrovascular disease. As usual there 's problem about inability to compare the datas among different peoples and areas. Because there isn't any standardized methods and diagnostic criteria for these environmental factors causing cerebrovascular disease.

In this study, we're interested to investigate environmental influences on the stroke risk. Using a same environment (where nearly almost all environmental influences welding) by choosing couples as a marker of stroke risk, we tried to determine the effect of environmental factors on stroke risk, specially focusing on stroke patients' husband or wifes that are likely to have the most similiar environmental component and to determine the risc profile of stroke patients' couples by using Framingham Stroke Risk Profile, a risk assesment tool for stroke incidence (13).

MATERIAL AND METHODS

The patients were collected from the stroke outpatient clinic of Mustafa Kemal University Hospital Neurology Department. 71 patients aged more than 54 with a diagnosis of stroke and their couples were recruited. Control subjects with the same gender and age were randomly chosen from the general neurology outpatient clinic. We identified 79 control subjects matching couples of patients with stroke. The local Ethics Committee approved the study.

All cases were examined by a neurologist and underwent neuroimaging (CT and/or MRI) and an ECG. All patients had extracranial carotid and vertebral duplex ultrasound. Among all participants, information on demographic characteristics, modifiable risk factors and environmental risk factors (including temperature, seasonal changes, economic, social and/or physical environments, environmental tobacco smoke, avoiding irritants, radiation, air pollution, drinking water parameters, psychosocial environments) were collected using a structured questionnaire. Cerebrovascular risk factors scores were determined using Framingham Stroke Risk Profile, a risk assessment tool used to assess the 10-year stroke incidence (13). Stroke risk factors included age, systolic blood pressure, use of antihypertensive therapy, diabetes mellitus, previously diagnosed cardiovascular disease (coronary heart disease [includes history of myocardial infarction, angina pectoris, and coronary insufficiency], cardiac failure, and intermittent claudication), cigarette smoking, atrial fibrilation, and left ventricular hypertrophy by electrocardiogram (13). Points taken from the scale were recorded for each couple and control.

Statistical Analysis

Demographic properties of patients were summarized by descriptive statics. Mann-Whitney U- test was conducted . Two-sample t test were used for analysing continous variables . Calculation were made using SPSS (version 11.5).

RESULTS

The gender distribution for the cases, cases' couples and controls was 120 women (18 cases, 53 cases' couples and 49 controls) and 101 men (53 cases, 18 cases' couples and 30 controls); the mean±SD ages were 67.78 ± 7.74 years for cases and 63.30 ± 8.6 years for couples and controls. There were no significant differences between age of cases' couples and controls with regard to age and sex in the overall analysis. There were a significant difference between number of men and women stroke patients in the study ($p<0.05$). Diabetes mellitus, heart disease, systolic blood pressure, antihypertansive treatment, atrial fibrillation, and current smoking were not significantly different in cases' couples than in control except for systolic blood pressure and left ventricular hypertrophy. Probable risk factor profiles of stroke patients, couples and controls are given in Table I and II.

Table I: Statistics for Significant Risk Factors in Stroke Patients

Total, n	71
	140.4± 22.8
Antihypertansive therapy (%)	48 (67.6%)
Diabetes Mellitus, n (%)	35 (49.3 %)
KKY, n (%)	4 (5.6%)
Atrial Fibrillation	15 (21.1%)
Left ventricule hypertrophy	14 (19.7%)
Smoking	
	13±5.3

*Age , SBP (systolic blood pressure), and average points are given as year ± SE, and mean ± SE.

The mean levels of points taken from the Framingham Stroke Scale for determining the stroke profiles of couples and controls were similiar in men and women ($p>0.05$).

Table II: Summary Statistics for Significant Risk Factors in Stroke Patients' Couples and Controls and Correlation Between Them

			Control		p value
Total, n	71		79		
Mean age, y (SE)	63.7 ± 8.5		62.8±8.7		0.42
Systolic Blood Volume, v (SE)	138.7±18.5		129.6±17.2		0.002†
Antihypertansive therapy, n, %	18	25.4%	33	41.8%	0.035
Diabetes Mellitus, n, (%)	8		13	11.3%	0.126
CVD, n, (%)	3	4.2%	2	2.5%	0.565
Atrial Fibrillation, n, %	1	1.4%	5	6.3%	0.126
Left ventricule hypertrophy, n, %	3	4.2%	11		0.042†
Smoking, n, %	14	19.7%	11	13.9%	0.343
Average points from Framingham Scale	8.1±4.4		8.5±5.9		0.889

*Age , CBP (systolic blood pressure), and average points are given as year ± SD, and value ± SD. † p<0.05

The average 10-year probability of stroke points were similiar in men and women, and also in stroke patients' couples and controls (p>0.05) .

The probability of stroke in an individual depends on the presence and levels of risk factors. The average 10-year probability of stroke can be calculated by using Framingham stroke scale. In our study the average point for the stroke patients, their couples and controls was 13.0±5.3, 8.1±4.4, and 8.5±5.9. There was no significant difference between the probability of stroke between couples and controls (p>0.05).

DISCUSSION

Stroke is one of the important causes of mortality and morbidity worldwide (14). It will continue to increase as the population ages and case-fatality decreases with better emergency care. It is therefore of general interest to analyse risk factors for stroke which could be prevented through interventions. The main treatable risk factors for stroke were identified as hypertension, diabetes mellitus, dyslipidemia, atrial fibrillation, carotid stenosis, cigarette smoking. A study of cardiac and stroke deaths in New Zeland determined that the main vascular risks were the result of social conducts [diet (30%), smoking (18%), sedentary life style (10%)]. Less frequent risk factors were hypercholesterolemia (17%), hypertension (15%), obesity (12%), infection (6.5%), air pollution (6%) and occupation (3.5%) (15). Pharmacological therapies, including lipid-lowering and anti-hypertensive medications, are efficacious in lowering some of the risk factors, the overall reduction risk is relatively modest and could be greatly improved by the addition of life style modifications.Stamler et al found that a low-risk life style, defined as cholesterol <200 mg/dL, blood pressure <120/80 mmHg, and not smoking, was associated with 52% to 76% lower risk of total sroke mortality (16).

There isn't enough knowledge about environmental influences on the incidense of stroke among the population. There's also limited evidence of peoples' knowledge about the ability to reduce their risk of stroke by changing environmental effects.

The lack of standardized methods and diagnostic criteria, the assessment of exposure of environmental factors those were thought to influence stroke and the impossibility to compare these findings to other population remain a big problem and cause confusion. For example; although some studies mentioned that the incidence and/or mortality of stroke were highest in winter through colder months (17,18), several reported that ischemic stroke incidence peaks in winter –spring months (19). Some authors also reported that improvement of in home heating might cause decline in stroke incidence (20). Some authors didn't find any seasonal variation or relation between stroke rates and temperature (21).

Epidemiologic study has shown key risk factors for stroke and provided an estimate of the relative impact of these risk factors (13). A health risk appraisal function has been found for the prediction of stroke by using the Framingham Study cohort. The stroke risk factors included in the profile are age (>54 year), systolic blood pressure, the use of antihypertensive therapy, diabetes mellitus,cigarette smoking, prior cardiovascular disease (coronary heart disease, cardiac failure, intermittent claudication), atrial fibrillation, and left ventricular hyperthrophy by electrocardiogram (13). In Framingham study, there isn't any discrimination as a risc profile for ischemic an/or hemorragic stroke. By using this simple profile, stroke risk can be estimated easily.

In this study, we used Framingham stroke scale and don't distinguish the risk factors for ischemic an/or hemorragic stroke as in the original study.

A lot of article and text books mentioned that male sex may be a stronger risk factor for stroke. The incidence is about 30% higher in men than in women. In our study, male patient number is also higher than women patient similiar to references.

In our study, only systolic blood pressure (higher in couples group) and left ventricular hypertrophy (more in control group) were found significantly different in couples and controls.The other parameters were not significantly different. The reason of difference can due to only personel specialties or incidental. Because there isn't any difference between the other whole parameters.

The limititation of this study is not to use transcranial doppler USG besides extracranial carotis USG.The reason of this limitation is not to have a transcranial USG in our hospital.

At present, results of our investigation indicate that environmental factor is an independent factor for stroke . We didn't find a significant correlation between the average 10-year stroke probability points of couples and controls ($p>0.05$). And there wasn't any significance difference between the points of women and men both in couples and controls (Table III).

Table III: The distribution of points taken from Framingham Stroke Scale (FSS) according to sexuality

	Couples of stroke patients		Controls	
	Women (n)	Men (n)	Women (n)	Men (n)
FSS	7.34±4.4		7.73±5.54	9.83±6.40
p value	0.09		0,128	

*Statistical significance p<0.05

In this present, datas we gain suggests that variation of environmental factors at patients with high risk for cerebrovascular diseases act as synchronizers to influence stroke.

So personal behaviours became more important for individuals while calculating the 10-year stroke probability profile. Even sharing some part of life, environment and maybe some behaviours with stroke patients, don't mean that the couples of them have the same risks for the vascular disease especially for stroke.

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