ACİL SERVİSE BAŞVURAN İSKEMİK İNMELİ GENÇ ERİŞKİN HASTALARIN KLİNİK OLARAK DEĞERLENDİRİLMESİ

Clinical Evaluation of Young Adult Patients With Ischemic Stroke Applying To Emergency Department

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ÖZET

Amaç: Genç erişkinlerde görülen iskemik inmeler, tüm inmelerin % 10-15'ini oluşturmaktadır. Bu genç erişkinleri hayatlarının en üretken oldukları dönemde engelli bıraktığından aynı zamanda ciddi bir sosyoekonomik yüktür. Bu nedenle hastalığı tanıma ve önleme için altta yatan nedenleri araştırmak gerekmektedir. Çalışmamızın amacı, genç yaşlarda görülen iskemik inmelerin neden ve sonlanımlarını güncel literatür sonuçlarıyla karşılaştırmaktır.

Gereç ve Yöntem: Çalışma retrospektif olarak, 2014-2017 yılları arasında iskemik inme tanısı almış, 18-50 yaş arasındaki hastaları kapsamaktadır. Yaş, cinsiyet, acil servis şikayetleri, fizik muayenedeki nörolojik bulgular ve iskemik inme için birlikte bulunan hastalıklar her hasta için kayıt altına alındı. İnme alt tiplerini belirlemek için Trial of Org 10172 in Acute Stroke Treatment (TOAST) sınıflaması kullanıldı. Hastane sonlanımları modifiye Rankin Skalası (mRS) ile değerlendirildi. Grupların karşılaştırmasında Pearson Ki-kare testi kullanıldı. p <0.05 olması istatistiksel olarak anlamlı kabul edildi.

Bulgular: Dahil etme kriterini karşılayan 34 (%39.1)'ü kadın, 53 (60.9)'ü erkek toplam 87 hasta çalışmaya alındı. Hastaların yaş ortalaması 44.41 ± 6.96 (değişim aralığı; 18-50) idi. En sık görülen risk faktörleri hipertansiyon (% 55.2) ve dislipidemi (% 52.9) idi. TOAST kriterine göre değerlendirildiğinde en sık alt tip kardiyoembolik (% 28.7) bulundu. mRS skoruna baktığımızda hastaların % 54'ünün tamamen iyileştiğini görmekteyiz.

Sonuç: Genç ve üretken popülasyonu tehdit ettiğinden, nedenlerinin tespit edilmesi ve inme gelişmeden önce tedbir almak, hastalıkla mücadele etmenin en etkili yolu gibi görünmektedir. Irksal farklılıklar her milletin detaylı bir araştırma yapmasını gerektirmektedir.

Anahtar Kelimeler: *Acil Tıp; İnme; Genç erişkin*

ABSTRACT

Objective: Ischemic stroke in young adults constitutes about 10-15% of all strokes. It is also a serious socioeconomic burden since it leaves these young adults disabled at their most productive years. For this reason, it is necessary to investigate underlying causes in order to identify and prevent the disease. The purpose of our study was to compare causes and outcomes of ischemic stroke at young age with the results available in the literature.

Methods: The study retrospectively covers patients aged 18 to 50 diagnosed with ischemic stroke between 2014 and 2017 years. Age, gender, emergency department complaints, neurological findings detected on physical examination, and comorbid diseases which were risk factors for stroke were recorded for all patients. Trial of Org 10172 in Acute Stroke Treatment (TOAST) classification was used for identification of stroke subtypes. Hospital outcomes were assessed by the modified Rankin Scale (mRS). Pearson Chi-square test was used to compare the groups. p <0.05 was assumed for statistical significance.

Results: A total of 87 patients who satisfied inclusion criteria, 34 female (39.1%) and 53 male (60.9%), were included in the study. Mean age of the patients was 44.41 ± 6.96 (range 18-50). The highest risk factors were hypertension (55.2%) and dyslipidemia (52.9). When assessed according to TOAST criteria, the most frequently detected subtype was cardioembolic (28.7%). When we looked at the mRS scores, 54% of the patients were completely cured.

Conclusion: Since it threatens youngs and productive population, identification of etiologies and taking precautions before stroke development is the most effective way to fight the disease. Racial differences require every nation to conduct a detailed research.

Keywords: *Emergency Medicine; Stroke; Young adult*

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INTRODUCTION

Stroke is very important due to treatment costs and high work power losses as well as due to being the third most common cause of death in the world. Stroke in young adults may result in disabling consequences for the person's life in their most productive times by leaving sequelae (1). Therefore, it is important to determine and prevent stroke risk factors with epidemiological studies. Even though it is more common in the elderly population, stroke in young adults (under 50 years of age) constitutes about 5-13% of all ischemic stroke cases (2-4). Etiological causes and risk factors are different in general ischemic stroke population (5,6). Usual risk factors for stroke, such as hypertension and diabetes, are not common in young adults (5-8). However, some other permanent or temporary risk factors such as smoking, oral contraceptive usage, migraine, trauma, illegal drug use, and pregnancy play a more important role in this age group than older adults. The major clinical problem in the management of young adults with acute stroke is determination of the cause. The purpose of this study was to compare causes and outcomes of ischemic stroke at young age with the results available in the literature.

MATERIALS AND METHODS

Patient Selection

This study was carried out by investigating retrospectively the records of patients under the age of 50 who were admitted to Emergency Department of Rize Recep Tayyip Erdoğan University, Education and Research Hospital and diagnosed with ischemic stroke between 2014 and 2017. The study was approved by the local ethics committee and was planned in accordance with the Helsinki Declaration.

The inclusion criteria were only being under age 50 and having an ischemic stroke diagnosis. The diagnosis of ischemic stroke was made by the presence of focal neurological deficits in the patient and by neuroimaging (Diffusion Weighted-Magnetic Resonance Imaging (DW-MRI)) and identification of ischemic areas in the brain. The criteria for exclusion were i) patients with hemorrhagic infarcts (subarachnoid hemorrhage, intraparenchymal hemorrhage), ii) cerebral venous thrombosis, iii) iatrogenic stroke (due to neurovascular intervention or coronary angiography procedures), iv) patients with transient ischemic attack v) patients subjected to cardiopulmonary resuscitation. A transient ischemic attack was accepted as a sudden focal neurological deficit that resolved within 24 hours without any infarct in imaging (9). Eighty seven patients satisfying the criteria were included in the study.

Data Collection

All standard risk factors, review of medical records, laboratory records and neuroimaging reports were collected by accessing electronic health data records of our hospital. The following information about each patient was saved: Age, gender, complaints when they applied to emergency room, neurological sequelae detected on physical examination, usage of cigarette, alcohol and oral contraceptives, whether they had ischemic stroke previously, routine lab tests, brain computerized tomography (CT) and DW-MRIs, diseases that are risk factors for stroke such as hypertension, diabetes mellitus, dyslipidemia and atrial fibrillation (AF), coronary artery disease, congestive heart failure, valvular heart disease, cardiomyopathy, and finally, hospital outcome (discharge, death). Patients were divided into two groups according to their age: Group I: 18-35, Group II: 35-50.

Stroke Classification

In the light of the available data, the patients were classified according to the TOAST criteria, which includes etiology as well as clinical findings. Accordingly, 5 etiological groups were defined: (1) large artery atherosclerosis (thrombosis or embolism), (2) cardioembolism, (3) small vessel occlusion (lacunar), (4) other identified etiologies, (5) the ones a cause could not be identified (unknown cause).

Outcome

The patients were screened from the hospital automation system for 3-6 months following their application to emergency service and their diagnosis. Modified Rankin scale (mRS) was used to evaluate morbidity and mortality. Modified Rankin scale (mRS) is an assesment test in 0-6 scale that is used to measure the degree of disability and dependence in patients with stroke or other neurological disorders. According

to this scale: 0) no symptoms 1) despite the presence of symptoms, there is no meaningful disability (can do all the usual tasks of daily life) 2) slight disability (can't do some of the activities s/he used to do but does her/his job without help) 3) moderate disability (although s/he needs some help, s/he can walk without help) 4) moderate severe disability (can't walk without help, can't satisfy her/his physical needs without help) 5) severe disability (bedridden, incontinent and requires constant nursing care and attention) 6) dead

Statistical Analysis

All data obtained in our study were uploaded to SPSS 16.0 (SPSS Inc., Chicago, Illinois, USA) for statistical analysis. Continuous variables were expressed as average ± standard deviation and non-continuous variables as percentages. Pearson Chi square test was used because independent and dependent variables were categorical in analytical evaluation. Statistical significance was accepted as $p < 0.05$.

RESULTS

Eighty-seven patients who applied to emergency service and satisfying the criteria, 34 female (39.1%) and 53 males (60.9%), were included in the study. The mean age of the patients was 44.41 ± 6.96 (range 18-50). There was no significant difference between the genders. The main risk factors for ischemic stroke were shown in Table 1.

Table 1. Risk factors for ischemic stroke patients

Risk factors	n	%
Smoking	22	25.3
Dyslipidemia	46	52.9
Hypertension	48	55.2
Diabetes	16	18.4
Coronary artery disease	17	19.5
Valvular heart disease	28	32.2
Atrial fibrilation	11	12.6
Cardiomyopathy	15	17.2
Stroke in Family	0	0
Previous stroke	9	10.3
Oral contraceptive	3	3.4
Alcohol	3	3.4
Other	5	5.7

When the risk factors were evaluated to see if there is any difference between the genders, we found that there was no history of smoking in female patients and the only statistical difference was related to smoking ($p < 0.05$) (Table 2).

Table 2. Distribution of risk factors according to genders

Risk factors	Female n (%)	Male n (%)	p value
Smoking	0 (0)	22 (41.5)	0.001*
Alcohol	0 (0)	3 (5.7)	0.158
Dyslipidemia	18 (52.9)	28 (52.8)	0.992
Hypertension	21 (61.8)	27 (50.9)	0.322
Diabetes	7 (20.6)	9 (17.0)	0.672
Coronary artery disease	2 (5.9)	15 (28.3)	0.010
Valvular heart disease	10 (29.4)	18 (33.9)	0.166
Atrial fibrilation	5 (14.7)	6 (11.3)	0.643
Cardiomyopathy	5 (14.7)	10 (18.9)	0.161
Previous stroke	3 (8.8)	6 (11.3)	0.709
Other	3 (8.8)	2 (3.8)	0.323

According to TOAST criteria, the most common subtypes were cardiembolic (28.7%) and 'unknown cause' (26.4%) (Table 3).

Table 3. Etiological distribution according to TOAST criteria

TOAST subtypes	n	%
Large Artery Atherosclerosis	15	17.2
Cardiembolic	25	28.7
Minor Artery Disease	16	18.4
Other Specified Causes	8	9.2
Unknown Causes	23	26.4

Etiological classification was compared by dividing the patient groups into two: age 18-35 and age 35-50. According to this comparison, there was no statistically significant difference between the two groups ($p > 0.05$) (Table 4). When the distribution between the genders were investigated according to the TOAST criteria, there was no statistically significant difference between the male and female groups.

Table 4. TOAST classification by age groups

TOAST subgroup	Age 18-35 (n = 9) n (%)	Age 36-50 (n = 78) n (%)	p value
TOAST 1	2 (22.2)	13 (16.7)	0.676
TOAST 2	4 (44.4)	21 (26.9)	0.271
TOAST 3	0	16 (20.5)	0.133
TOAST 4	0	8 (10.3)	0.313
TOAST 5	3 (33.3)	20 (25.6)	0.620

The modified Rankin Scales of the patients were evaluated, 47 (54%) as mRS = 0-1, 24 (27.6%) as mRS = 2-3, 11 as mRS = 4, 3 as mRS = 5, and 2 as mRS = 6. No statistically significant difference was observed in the comparison of the genders and the age groups with mRS.

DISCUSSION

Ischemic stroke is considered a rare event in young adults. However, the growing evidence of increased stroke incidence in young adults and the devastating consequences of stroke sequelae in this population has prompted clinicians to investigate risk factors and ischemic stroke etiology in young adults.

The incidence of ischemic stroke at young age is known to be 3.4-11.4 per hundred thousand and there are reports of more frequent occurrence in males (10-14). Khan et al from Qatar, Nayak et al from India, and Kwon et al from Korea reported that ischemic stroke was more frequent in young men (80% vs. 20%, 76% vs. 24%, and 75% vs. 25%, respectively) (15-17). In agreement with previous studies, we also observed a higher frequency of ischemic stroke for males (60.9%) but we couldn't detect a statistically significant difference between the genders.

Regarding the risk factors for ischemic stroke, similar to recent studies, hypertension, dyslipidemia, and valvular heart diseases constitute the highest incidence of risk factors (18,19). Although hypertension was reported more frequently in male patients in previous studies, it had a higher frequency for female patients but no statistically significant difference was observed in the present study. Dyslipidemia was reported more in male gender, but in our study it was observed equally in both of the genders(18.19). Although smoking, which is more commonly observed in males, was found to be statistically significant for men, none of the female patients had smoking habit.

In a study conducted by Kwon et al., 149 young ischemic stroke patients were classified according to the TOAST criteria and they found large artery atherosclerosis 20.8%, small vessel diseases 18.1%, cardioembolism 18.1%, unclassified causes 16.8% and other causes 26.8% (17). Another study of 164 young ischemic stroke patients reported that it was more frequently observed in males and the most common etiologic group was atherothrombotic (48%) and the second cause was unknown cause (32%) (20). In another study of 177 patients in India, the most common cause was atherothrombotic (24%) and the second cause was cardioemboli (17%) (16). Lipska and colleagues reported that the most common cause was cardiac arrhythmia (25.2%) in a study of 214 young patients with ischemic stroke (21). Cardioembolic stroke rate was 30% in the study performed by Nedeltchev et al., 34% in the study of Rasura et al. and 20% in the report of Jovanovic et al (22-24). Our study also supports these findings and cardioembolic causes are the most common cause of stroke etiology with 28.7% rate. Among the causes of cardiembolic stroke, rheumatic heart disease takes its place with 14%-47% rate (25-27). In our study, in agreement with previous studies, we determined it as 32%. Close follow-up and medication of rheumatic heart diseases stand out in the prevention of stroke at young age.

According to the the TOAST criteria, small vessel diseases are classified only if subcortical lesions are smaller than 15 mm and large vessel atherosclerosis is classified if stenosis in the artery is more than 50%. Small arterial diseases were 6.8% in Dash et al.'s study, 8% in Renna et al.'s study, 9.4% in Ozer et al.'s Study, 14% in Puatala et al.'s study, 26% in Smajlovic et al.'s report and 17% in the study of Cerrato et al (1,5,13,28-30). In our case, it is 18.4%. These differences in the studies may be due to ethnic and/or regional differences. In a study including 440 patients and conducted by Dash et al., the 'other specified causes' subtype was reported

to be 17.3% (13). On the other hand, Smajlovic et al. reported rate of this subtype as 9% while Spengos et al. reported it as 27%. We calculated the rate of this subtype as 9.2% (19, 29). This difference in our work may be due to the fact that detailed laboratory tests have not been performed for all of our patients.

In our study, 'unknown cause' group was determined to be 26.4%. According to the literature, there are publications supporting our work as well as contradicting ones. 'Unknow cause' etiological group rate was reported by Putaala et al. as 33%, by Cerrato et al. as 24%, by Tancredi et al. as 27% and by Varona et al. as 36% (14, 30, 32, 33). The adequacy of the resources of the clinics in which the etiological investigation conducted may be considered as the reason of different outcomes.

In a prospective study of 198 young ischemic stroke patients, Nedeltchev et al. reported that 68% of patients had a 0-1 mRS score, 26% had 2-5 mRS score and 3% died within 3 months (22). In our study also, mortality rate of the patients was 2.3%. In a prospective study in which 968 patients were evaluated, a functionally independent outcome (mRS score = 0-2) was observed in 80% of patients (14). In the study performed by Dash et al., they observed that 89% of patients had good functional outcomes (mRS interval = 0-2) at discharge (13). When we looked at our mRS scores, 54% were in the mRS range = 0-2 and the rate of return to old life was significantly lower than the other two studies. This result suggests that the post-stroke patients in our country may not be receiving sufficient psychosocial and rehabilitation support.

CONCLUSION

Ischemic stroke in young adults has an important effect on the affected individuals, their families and their societies, as they are affected in an economically efficient period of their lives. The etiological differences between countries show that there is a need for wide-ranging and specific studies both in our country and worldwide. These studies will clarify the differences between the countries and the underlying etiological mechanisms, and will lay the groundwork for specific approaches to take preventive measures

Limitations

There were a few limitations in our study: The first one is that it has been performed only at one center. The second one is that it is retrospective. The last one is that our records were not complete for a broader study.

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