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Demographic Characteristics of Stroke Types in Adıyaman

Adıyaman İlinde İnme Tiplerinin Demografik Özellikleri

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Abstract

Objective: We aimed to investigate the etiologic, demographic, clinical features, and risk factors of patients who were hospitalized, followed up, and treated due to stroke in our hospital.

Materials and Methods: In this study, the hospital records of patients diagnosed as having stroke or cerebrovascular disease (CVD) between January 2013 and January 2015 in Adıyaman University Training and Research Hospital, where patients with stroke are frequently admitted or transferred, were retrospectively investigated.

Results: In the past two years, 683 patients were followed-up or treated for stroke and CVD in our hospital. Stroke patients constituted 0.06% of all emergency admissions. Of these patients, 87.8% were diagnosed as having ischemic stroke and 8.6% were diagnosed as having hemorrhagic stroke. The sex distribution was almost equal (50.8% were males and 49.2% were females). Based on the results of brain scans performed during admission, radiologically, 498 (81.1%) patients showed evidence of anterior system involvement and 116 (18.9%) patients showed evidence of posterior system involvement. No focal areas were observed in computed tomography scans in 508 patients. However, diffusion magnetic resonance findings of these 508 patients were pathologic. Most of the patients with stroke were aged above 65 years (74.9%). The most common symptom during admission was unilateral muscle weakness (63.3%), and 58.6% of the patients were brought to the hospital by ambulance.

Conclusion: As well as the results of our study being parallel to previous studies, our study also reflects the majority of stroke data in Adıyaman, Turkey, and provides significant results regarding our geographic region.

Keywords: Stroke, epidemiology, risk factors, mortality

Öz

Amaç: Hastanemizde inme nedeniyle yatıp, takip ve tedavisi yapılan hastaların etiyolojik, demografik, klinik özellikleri ve risk faktörleri açısından incelenmesi amaçlandı.

Gereç ve Yöntem: Bu çalışma Ocak 2013 ve Ocak 2015 yılları arasında, inme hastalarının sıklıkla başvurduğu ve sevk edildiği Adıyaman Üniversitesi Eğitim ve Araştırma Hastanesi'nde inme ya da beyin damar hastalığı (BDH) tanısı alan hastaların hastane kayıtları retrospektif olarak incelenerek yapılmıştır.

Bulgular: Son 2 yıllık sürede hastanemizde 683 kişinin inme ya da BDH tanılarıyla takip ve tedavi edildiği tespit edildi. İnme hastaları tüm acil başvurularının %0,06'sını oluşturdu. Bu hastaların %87,8'i iskemik, %8,6'sı hemorajik inme tanısı aldı. Cinsiyet dağılımı yaklaşık olarak eşitti (%50,8 erkek ve %49,2 kadın). Başvuru esnasında yapılan beyin görüntüleme sonuçlarına göre radyolojik olarak; hastaların 498'i (%81,1) ön sistem tutulumu, 116'sı (%18,9) arka sistem tutulumu olarak değerlendirildi. Beş yüz sekiz hastada bilgisayarlı beyin tomografi görüntülemesinde fokal lezyon izlenmedi. Fakat bu 508 hastanın difüzyon manyetik rezonans bulguları patolojikti. İnme hastalarının çoğunluğu 65 yaşın üstündeydi (%74,9). En sık başvuru yakınmasının tek taraflı kas güçsüzlüğü (%63,3) olduğu görüldü. Hastaların hastaneye getiriliş şekline bakıldığında %58,6'sının ambulans ile getirildiği tespit edildi.

Sonuç: Çalışmamızın sonuçları daha önceki çalışmalarla büyük paralellikler göstermekle birlikte ilimiz inme verilerinin çoğunluğunu yansıtmakta ve bölgemiz açısından önem arz eden sonuçlar vermektedir.

Anahtar Kelimeler: İnme, epidemiyoloji, risk faktörleri, mortalite

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Introduction

Stroke is a sudden onset, focal neurologic syndrome caused by cerebrovascular disease (CVD) (1). Stroke is the third most frequent cause of death following cardiac diseases and cancer. Stroke is a major medical and economic problem that causes severe disability (2,3,4). Stroke can be ischemic or hemorrhagic. The incidence of ischemic stroke (IS) increases with age (5), and the incidence of hemorrhagic stroke (HS) also increases with age and doubles with every decade (6). Although HS constitutes only 10-15% of all strokes, it has higher morbidity and mortality compared with IS and subarachnoid hemorrhage (SAH) (7). Stroke is the third cause of disability with a rate of 5.9% in Turkey (8). The incidence of stroke differs between countries and also differs between people living in a country who belong to different races or live in different regions. Studies performed in the last 20 years showed the incidence of stroke as 1-3/1000 and the prevalence as 6/1000 (9). According to the results of the Turkish Multicenter Stroke Study performed by the Turkish Cerebrovascular Diseases Society; IS constitutes 71.2% of all strokes and HS constitutes 28.8% of all strokes (10). Despite our data of stroke epidemiology belonging to the 2002-2004 period, these data shed light on the present (11). But for today, our epidemiologic data come from Western sources. The distribution of stroke subtypes in Turkey differs from Europe and the United States. Establishing stroke units, melting the clot or recanalizing occluded vessels by intravenous thrombolytic treatment and interventional treatments are important in stroke management. In addition, mass media and/or social media tools are important in recognizing and preventing stroke.

Despite high morbidity and mortality rates due to acute stroke, very few studies have investigated the epidemiologic, demographic, and clinical characteristics of patients with stroke in our country. The reported studies were prepared in a regional manner. We aimed to define the etiologic, epidemiologic, demographic, clinical characteristics, and seasonal distribution of patients with stroke admitted to our emergency service between 2013 and 2015 to make a contribution to acute stroke data in our country.

Materials and Methods

We retrospectively evaluated 683 consecutive patients who were admitted to our emergency service with IS and HS and without any exclusion criteria between January 2013 and January 2015. The study was approved by the Ethics Commitee of Adıyaman University Training and Research Hospital (2016/4-11). Between these dates, 1,135,415 patients (563,937 males and 571,478 females) were admitted to our emergency department. To reach their records, we obtained the protocol numbers of patients with ICD-10 codes of IS and HS from the bureau of computing. We retrieved the medical records from the archive using the protocol numbers.

Patients were classified in 4 groups according to their anamnesis, neurologic examination, neuroimaging [cerebral tomography (CT) and/or diffusion magnetic resonance imaging (DW-MRI)] and lumbar puncture features: 1-IS, 2-HS, 3-SAH, 4-Transient ischemic attack (TIA). Of 683 patients, 600 had IS, 59 had HS, 7 had SAH and 17 had TIA. Patients with SAH and TIA were excluded. Patients with IS were classified into two groups: Patients with anterior circulation infarctions who had infarctions in the territory of the internal carotid artery and patients with posterior circulation infarctions in the territory of vertebrobasilar arteries. Also, patients with HS were classified according to imaging findings: Basal ganglion, thalamus, lobar, cerebellar, and brain stem. Patients were classified according to sex, age, with or without public insurance, method of transport to emergency service, duration of stay in the emergency service, and concomitant diseases. The frequency of strokes according to months and seasons, duration of stay in the hospital, and mortality rates were evaluated. Patients were classified into 3 groups: Patients aged below 45 years, between 45-65 years, and those above 65 years.

Arterial tension was evaluated at the time of arrival. Hypertension was defined as 'systolic >140 mmHg, diastolic >90 mmHg', normotension was defined as 'systolic=90-140 mmHg, diastolic=60-90 mmHg,' and hypotension was defined as 'systolic <90 mmHg, diastolic <60 mmHg'.

Statistical Analysis

The Statistical Package for the Social Science (SPSS) 21.0 was used to analyze the data. In addition to descriptive statistics; Student's t-test was used if the data fitted normal distribution and the Mann-Whitney U test was used if the data did not fit normal distribution in inter-group comparisons. One-Way ANOVA was used to compare more than one group. P values <0.05 found in comparisons were defined as statistically significant.

Results

The patients included in the study constituted 0.06% of all admissions to the emergency service in two years. Six hundred eighty-three patients were included in the study. Of these patients, 600 had IS and 59 had HS. Of the 683 patients, 347 (50.8%) were males and 336 (49.2%) were females. Of the 600 patients with IS, 304 (50.7%) were males and 296 (49.3%) were females. Of the 59 patients with HS, 24 (40.6%) were males and 35 (59.4%) were females. The mean age was 71.74±11.02 years (range, 20-101 years). The mean age of patients with IS was 72.47±11.07 years, and most of them were aged over 65 years. The mean age of patients with HS was 65.74±13.78 years. HS, TIA, and SAH were more common in patients aged over 65 years (Table 1).

The most common presenting symptoms at admission to the emergency service were unilateral weakness (63.3%), speech disturbances (24.5%), and loss of consciousness (23.1%) (Table 2). The findings of neurologic examination were hemiplegia or hemiparesis (58.1%), aphasia or dysarthria (24.5%), loss of consciousness (23.1%), and normal findings (12.3%). According to radiologic findings depending on CT and DW-MRI; anterior circulation infarction was detected in 498 patients (81.1%) and posterior circulation infarction in 116 patients (18.9%). No focal lesion was detected in cranial CT in 508 patients.

Risk factors were as following: hypertension in 448 patients (65.6%), diabetes mellitus in 202 patients (29.6%), hyperlipidemia in 230 patients (34.7%), prior cardiac disease in 242 patients (35.4%), and prior IS in 60 patients (8.8%). Atrial fibrillation (AF) was detected in 93 (13.6%) of the electrocardiographs (Table 3).

Females constituted 50.3% (571,478 patients) of the patients who were admitted to the emergency service. The mean age was 71.7±11.02 years. Of the patients, 75.4% had 'Sosyal Güvenlik Kurumu (SGK)', 15.5% had 'Bağkur,' 8.3% had 'yeşil kart,' which were the names of different types of public insurances in Turkey, and 0.6% had not public insurance. Of the patients, 50.2% were admitted to the emergency service during working hours and 49.8% were admitted out of working hours. The distribution of ischemic and HS according to months are summarized in Table 4.

Of all the patients, 130 (19%) had a stroke in spring, 204 (29.8%) in summer, 166 (24.3%) in autumn, and 159 (23.2%) in winter, which indicated that patients are more likely to have a stroke in the summer. Especially in patients with IS, 118 (19.6%) had a stroke in spring, 192 (32%) in summer, 146 (24.3%) in autumn, and 144 (24%) in winter, which indicated that the incidence of IS is higher in summer (Graphic 1). Of the patients with HS, 12 (20.3%) had stroke in spring, 12 (20.3%) had a stroke in summer, 20 (33.8%) had a stroke in autumn, and 15 (25.4%) had a stroke in winter. No statistically significant difference was found between the seasons (p=0.06), but statistically significant differences were found between spring and autumn (p=0.009) and between summer and autumn (p=0.02) (Graphic 1).

The mean duration of hospitalization time was 6.5±9.2 days (range, 1-110 days) in all patients. It was 6.4±8.6 days in the patients with IS and 8.6±10.31 days in patients with HS. No difference was found between patients with IS and HS in terms of hospitalization (p=0.14). Also, we found no difference between age groups (<45, 45-65 and >65 years) and hospitalization times (p=0.26).

The mortality rate was 12.7% (n=84) among all patients, 10.3% (n=68) in patients with IS, and 2.4% (n=16) in patients with HS. No difference was found between sex and mortality (p=0.56). We found that mortality increased as age increased (p=0.03). The mean duration within which the patients were admitted to the emergency department was 175 minutes. Fifteen patients (2.2%) arrived at hospital within 3 hours of symptom onset. Of all the

Table 1. Distribution of patients with stroke according to age groups

Age (year)	≤45 years	Between 45-65 years	>65 years	Total
Diagnosis	n (%)*	n (%)*	n (%)*	n (%)**
IS	16 (2.7)	123 (20.5)	461 (76.8)	600 (87.8)
HS	8 (13.5)	15 (25.4)	36 (61)	59 (8.6)
TIA	1 (5.9)	5 (29.4)	11 (64.7)	17 (2.5)
SAH	0 (0)	3 (42.8)	4 (57.1)	7 (1.0)
Total	25 (3.6)	146 (21.3)	512 (74.9)	683 (100)

IS: Ischemic stroke, HS: Hemorrhagic stroke, TIA: Transient ischemic attack, SAH: Subarachnoid hemorrhage, *: Row percentage, **: Column percentage

Table 2. Presenting symptoms of patients with stroke admitted to the emergency department

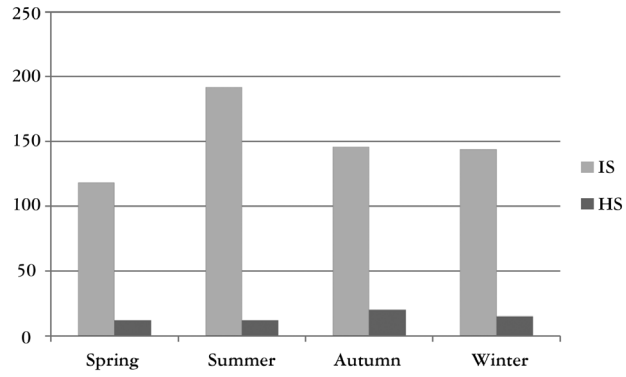
Presenting symptom	Number of patients (%)
Unilateral weakness	432 (63.3)
Speech disturbances	167 (24.5)
Loss of consciousness	158 (23.1)
Vertigo	72 (10.5)
Headache	52 (7.6)
General debility	40 (5.9)
Visual disturbances	13 (1.9)
Epileptic seizure	2 (0.3)

Table 3. Distribution of risk factors in the patient population

	Male/ female	Number (n)	Percentage (%)
Hypertension (+)	216/232	448	65.6
Diabetes mellitus (+)	89/113	202	29.6
Hyperlipidemia (+)	130/100	230	33.7
Prior cardiac disorder (+)	140/102	242	35.4
Prior stroke (+)	24/36	60	8.8
Atrial fibrillation (+)	28/65	93	13.6

Table 4. Distribution of ischemic, hemorrhagic and other types of strokes according to months

	January	February	March	April	May	June	July	August	September	October	November	December
Ischemic	66	40	30	44	44	58	73	61	63	49	34	38
n (%)	11	6.7	5	7.3	7.3	9.7	12.1	10.1	10.5	8.1	5.7	6.3
Hemorrhagic	5	6	5	4	3	2	3	7	4	11	5	4
n (%)	8.5	10.2	8.5	6.8	5.1	3.4	5.1	11.9	6.8	18.6	8.5	6.8
All strokes	71	46	35	48	47	60	76	68	67	60	39	42
n (%)	19.5	16.9	13.5	14.1	12.4	13.1	17.2	22.0	17.3	26.7	14.0	13.1



Graphic 1. Distribution of patients with ischemic and hemorrhagic strokes according to seasons
IS: Ischemic stroke, HS: Hemorrhagic stroke

patients, 400 (58.6%) were brought to the hospital by ambulance and 283 (41.4%) were brought by themselves or their relatives. The mean duration of follow-up in the emergency department was 1.5±8.5 hours. Of all the patients, 4.4% were followed up in the emergency department for 24 hours. Twenty-four percent of all patients (n=164) were hospitalized in the intensive care unit and 495 (72.4%) in the neurology ward. Two patients (0.3%) were sent to other intensive care units because we did not have bed in our unit; 5 (0.7%) left to go to another emergency department of their own will, and 17 (2.5%) were discharged from the emergency department after their follow-up and treatment were completed.

Discussion

The lack of studies or having only regional studies investigating even the demographic data of the most common diseases in Turkey, a developing country that has land in both Asia and Europe with a growing population, indicates how hard it is to perform such studies. Moreover, stroke is a very important and preventable health issue in our country, which has an increasingly aging population.

Stroke, which causes devastating personal and social impacts, is at the front among the causes of disability and loss of workforce. Stroke is the third cause of death in Western countries and the second cause of death in Turkey (8). Epidemiologic studies in stroke play an important role in determining priorities in health policy, which supports the importance of community-based studies.

Patients with stroke constitute one-half of all patients hospitalized for neurologic diseases and two-thirds of patients with stroke are first evaluated in emergency departments (12,13). Patients with stroke can present to emergency departments with different symptoms. In two studies Çığşar and User (14) and Kıyan et al. (15), unilateral weakness was found to be the first and speech disturbances were found to be the second most frequent symptoms. Our results are in line with these studies.

Age is the most important risk factor for stroke. Approximately 70% of patients with stroke are older than 65 years (16,17). In our study, 3.6% of the patients were aged below 45 years, 21.3% were between 45 and 65 years, and 74.9% were aged over 65 years. Our results support the relationship between age and stroke. İnanç et al. (18) showed that the mean age for IS was 68.62 years and 64.73 years for HS. The mean ages in other studies were 70±11 Yoneda et al. (19), 65.3±8.2 Reganon et al. (20), 64±3 Williams et al. (21), 63.5±13.6 Hakbilir et al. (22) and 68.6±14.6 years Gürger et al. (23). A study performed in the Aegean region showed that 77% of all strokes were IS. The mean age for IS was 63±12 and 59±12 years for HS (24). A recently published study showed that the mean age for IS was 41.5 and 57.2 years for HS (13). In our study, we found that the mean age of all patients with stroke was 71.74 years, 72.47 years for IS, and 65.74 years for HS, which are in line with the literature.

In a study performed 10 years ago, it was shown that cardiovascular diseases and stroke ranked first and second (21.7% and 15%, respectively) in the top 10 list of diseases causing death in Turkey (11). Of the patients who had stroke, one-third died and one-third remained handicapped at the end of first year (25). The mortality rate of the patients who were followed up during hospitalization was 12.7%. The mortality rates were 2.4% for HS and 10.3% for IS. The low mortality rates in patients with HS compared with IS in our study are incompatible with the literature (26,27,28). Also in the study of Selçuk et al. (29), the mortality rates were 26.6% for IS and 11.25% for HS in Cyprus. A literature search did not reveal the low mortality rates of HS in our study.

Hypertension, diabetes mellitus, and hypercholesterolemia are the most common risk factors for stroke (21,22), which were also found in studies from Turkey (23,30,31,32). We found that hypertension (65.6%), prior cardiac disease (35.4%), hyperlipidemia (33.7%), and diabetes mellitus (35%) were the most common risk factors for stroke in our study. Our results are compatible with the literature.

In patients with AF, risk for embolism in the whole body is increased. AF was the most frequent cardiac pathology with a rate of 13.6% and this result is compatible with the literature (14,15,33).

Of the patients, 75.4% had 'SGK' and 8.3% had 'yeşil kart', which shows the attention people give to public insurance.

Hemiplegia and hemiparesis were found as the most common neurologic examination findings in studies (14,15,33). Our findings are in line with these studies and hemiplegia and hemiparesis were the most common neurologic findings found in our study with a rate of 58.1%. Also, loss of consciousness was one of the most common findings in our study, different from these studies.

In a regional study published recently, it was found that IS was more common in summer (29.5%) and HS was more common in winter (44.3%), which are in line with our study (18). However, different from these studies, we found that HS was more common in autumn. The effect of seasonal changes on the incidence and mortality rates of stroke has been reported in many studies from different countries (34,35). Significantly increased mortality and longer durations in hospital were reported in patients with stroke in winter in some studies (35,36). However, a new study showed that seasonal changes had no effects on the incidence of stroke (37). A study by Anlar et al. (38) showed that both IS and HS were more common in summer in Van. Seasonal changes between regions, genetical differences between ethnicities, and parameters such as moisture, temperature, and pressure could

account for these conflicting results. Our findings about IS are compatible with the literature but were different from the literature regarding HS. A significant increase was found in the number of patients with stroke in May, June, and July, which is related with very high temperatures in Turkey (Graphic 1, Table 3). Hot weather triggers hypertension and hypertension increases the risk of stroke. Higher IS rate in Adıyaman, which has hot summers, suggest that seasonal changes could effect the development of stroke.

Having prior stroke and comorbid diseases are factors that prolong the duration of seeking medical help in patients with stroke (39). Our results showed that having comorbid diseases significantly prolonged the duration of seeking medical help in patients with stroke. Çığşar and User (14) showed that 79.5% of patients with stroke admitted themselves to hospital, whereas 14.9% were brought by ambulance, but according to our results, 58.6% were brought by ambulance, and 41.4% admitted themselves to hospital. In our study, the vast majority of patients came to hospital by ambulance, which showed that people were aware of pre-hospital healthcare services. A delay in starting acute stroke treatment could result from different stages of the process, especially from the pre-hospital stage (40). The delay between the initiation of stroke symptoms and calling for an ambulance constitutes most of the pre-hospital delay (39,41,42,43).

For an ideal epidemiologic study, we are aware that we should perform the study both in stroke globally and in stroke with subtypes. However, it is difficult to seperate subtypes reliably in a community-based epidemiologic study, which limits our study. Also, as another limiting factor, we could not obtain data regarding the patients' tobacco and alcohol use, which are important risk factors for CVD.

Conclusion

As a result, stroke constitutes 0.06% of patients admitted to hospital. In our study, we showed that in Adıyaman, unchangeable risk factors such as age and sex had effects on stroke as they have on other people living in different countries. In our study, we found that seasonal changes could be a risk factor for stroke and there are delays before starting treatment. Accordingly, people should be informed by experts through mass media and social media. In addition, social media tools should be used to increase the awareness of people about stroke. Moreover, the increasing incidence of stroke every year is noteworthy and urges the importance of fighting against risk factors.

Ethics

Ethics Committee Approval: The study was approved by the Adıyaman University Training and Research Hospital Local Ethics Committee (Approval number: 2016/4-11).

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Concept: Y.A., A.A., Design: Y.A., Data Collection or Processing: Y.A., A.A., Analysis or Interpretation: Y.A., İ.A., Literature Search: Y.A., İ.A., Writing: Y.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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