

# Clinical and Demographic Properties of the Acute Stroke Patients Admitted to Emergency Department of a Tertiary Referral Center

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## Abstract

**Objective:** Stroke is an important cause of morbidity and mortality and has an increasing trend in the emergency department. It has become crucial to treat ischemic stroke with thrombolytic therapy. We reviewed the findings of the initial examinations, arrival times, clinical and demographic characteristics of stroke patients in our emergency department.

**Material and Methods:** One hundred forty-seven stroke patients who registered at the emergency department within the first 24 hours were included in this study. Parameters, such as stroke type, age, gender, medical history, arrival complaints, application time, hospitalization department, and time, were recorded.

**Results:** Patients' mean age was 66.01±13.07 years (ischemic stroke: 85.7%, hemorrhagic stroke: 14.3%). No significant difference was observed between the ages, arrival complaints, and stroke types. The main risk factor was hypertension. While ischemic stroke patients were typically brought in the morning time, the hemorrhagic stroke patients were brought in the afternoon. While the common complaint of ischemic stroke patients was hemiparesis/plegia, hemorrhagic stroke patients mostly complained of impairment/loss of consciousness.

**Conclusion:** The majority of stroke patients came with numerous clinical hallmarks that help in the diagnosis. Since early medical intervention is life-saving, evaluation of these clinical clues of the patient in a short time is the key to lifesaving treatment. (*JAEM 2014; 13: 135-8*)

**Key words:** Ischemic stroke, hemorrhagic stroke, gender, hypertension

## Introduction

Stroke, which is one of the leading causes for mortality and morbidity in the world, is responsible for 10% of all deaths in industrialized societies. Stroke victims constitute a large ratio of emergency department applicants and healthcare costs (1-3). According to a multicenter stroke study conducted in Turkey, it is estimated that 125,000 new stroke cases are seen every year, with a mortality ratio of 24% (4). The main neurological symptoms observed during or after stroke are sensory-motor disorders, cognitive impairment, tone disorders, visual impairments, speech disorders, coordination disorders, and swallowing problems (4, 5). The increased development of thrombolytic therapies and neuroprotective drugs for acute ischemic stroke in recent years suggests that the rates of death and disability caused by stroke may decrease in the future. Besides, the necessity of treatment strategies, rapid evaluation of stroke patient clinical clues, and results interpretation is equally important for emergency stroke management (6, 7).

Obtaining clinical and demographic information from patients allows clinicians to act rapidly for stroke treatment and prognosis. In

this study, the initial examination findings, arrival times, and demographic characteristics of patients coming to the emergency department due to stroke are reviewed.

## Materials and Methods

This retrospective study included 147 patients who came to our emergency department within the first 24 hours of acute stroke symptoms between September 2013 and January 2014. After the required tests and treatments were performed, patients were admitted to the neurological service and intensive care unit. The clinical parameters of patients, such as stroke type, age, gender, previous diseases, arrival complaints and hours, the rate of patients who received intensive care, and the time of hospitalization, were recorded. We investigated the differences between the ischemic and hemorrhagic stroke patients, and the effect of gender on stroke, previous clinical parameters, and initial time of disease. As defined in The Paul Coverdell National Acute Stroke Registry (PCNASR), arrival times of patients were classified as follows: the four intervals were defined as 6-hour periods with the arrival time

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taken as the earliest hour; that is, 6 AM (morning), noon (afternoon), 6 PM (evening), and midnight (overnight) (8, 9).

### Statistical Analysis

Chi-square test was used to compare categorical variables in this study. Categorical variables were named as number (n) and percent (%). Continuous variables were analyzed to determine the normal distribution by using the Kolmogorov-Smirnov test of normality. An independent two-sample t-test was used to compare continuous variables. On the other hand, Mann-Whitney U-test was used for variables not meeting normal distribution. Continuous variables were shown as mean (M) and standard deviation (SD). P-values were con-

**Table 1.** The comparison of male and female stroke patients in terms of age, duration of hospital stay, and other clinical features

	Male	Female	P
Age	64.71±12.55	67.78±13.65	0.17
Arrival time	11.64±5.44	11.40±4.09	0.78
Length of stay	10.92±12.31	8.88±8.20	0.54
Ischemic stroke (%)	84.3	87.5	0.81
Hemorrhagic stroke (%)	15.7	12.5	

**Table 2.** The rates of medical history of the patients with ischemic and hemorrhagic stroke

	Ischemic Stroke (%)	Hemorrhagic stroke (%)
HT	32	31.3
DM	7.2	23.5
CHD	4.1	5.9
HT+DM	8.2	5.9
HT+CHD	5.2	-
HT+DM+CHD	9.3	11.8
HT+CHF	5.2	-
Previous stroke history	11.3	5.9
Atrial fibrillation	6.2	5.9
Valvular heart disease	1	-

HT: Hypertension, DM: Diabetes mellitus, CHD: Coronary heart disease, CHF: Congestive heart failure

sidered as statistically significant when they were calculated as less than 0.05. Calculations were performed by using statistical software from IBM SPSS Statistics 19 (SPSS Inc., an IBM Co., Somers, NY, USA).

### Results

A total of 147 acute stroke patients were registered at our emergency department. The mean age was 66.01±13.07 (min: 30; max: 97). While 83 (56.5%) patients were men, 64 patients (43.5%) were women. Women and men were compared in terms of age, initial complaint, and stroke types (Table 1). The mean age of patients who were hospitalized in the neurology intensive care was 76.08±10.65 and was significantly higher ( $p<0.0001$ ) compared to patients who were hospitalized in the inpatient service, whose average age was 64.00±12.64. A total of 87.5% of all stroke patients were ischemic stroke patients, and only 14.3% were hemorrhagic stroke patients. There was no significant difference between men and women ( $p>0.05$ ) in terms of ischemic and hemorrhagic stroke types. Some men (15.7%) and women (17.2%) were registered at our emergency department and hospitalized in the intensive care unit. There was no significant difference between men and women in terms of prognosis and the hospitalization department (service-intensive care) ( $p=0.982$ ).

In terms of stroke subtypes, the mean age was 66.88±12.89 for ischemic stroke and 61.35±13.72 for hemorrhagic stroke. When all patient medical histories were evaluated, hypertension (HT) was the most common risk factor in both ischemic and hemorrhagic stroke patients. Ischemic stroke patients (59.9%) and hemorrhagic stroke patients (54.9%) had a history of HT. Other important risk factors of all stroke patients were diabetes mellitus (DM) (27.1%), coronary artery disease (18.6%), previous stroke history (10.2%), and atrial fibrillation (5.2%), respectively. Table 2 illustrates the medical history of ischemic and hemorrhagic stroke patients. There was no significant difference ( $p>0.05$ ) between ischemic and hemorrhagic stroke patients in terms of discharge rate, hospitalization duration (ischemic: 10.23 days, hemorrhagic: 9.24 days), and hospitalization rates of intensive care.

Ischemic stroke patients were admitted to our emergency department often in the early hours of the morning. Ninety-four percent of stroke patients who were admitted at 6 AM-12 AM were ischemic stroke patients. This rate was statistically significant and different from the hemorrhagic stroke rate ( $p<0.05$ ). Hemorrhagic stroke patients were admitted to our emergency department often at 12-6 PM (63.2%). When stroke patients first came to the emergency department, their first complaint was hemiparesis/plegia (36.2%), and subsequent complaints were loss of consciousness and speech disorder (Table 3).

**Table 3.** Stroke types (ischemic, hemorrhagic) and the main complaints of patients registered in the emergency department

Stroke Type		Complaint						
		Speech disorder	Speech dis. + hemiparesis	Impairment/ loss of conscious.	Hemiparesis/ plegia	Seizure	Vertigo or headache	Pure sensory finding
Ischemic	Number	10	25	25	45	4	7	4
	Ratio	8.3%	20.8%	20.8%	37.5%	3.3%	5.8%	3.3%
Hemorrhagic	Number	2	2	7	6	0	3	1
	Ratio	9.5%	9.5%	33.3%	28.6%	0.0%	14.3%	4.8%
Total	Number	12	27	32	51	4	10	5
	Ratio	8.5%	19.1%	22.7%	36.2%	2.8%	7.1%	3.5%

Speech dis.: Speech disorder, Loss of conscious.: Loss of consciousness

## Discussion

Strokes are one of the most common death causes in the world. Also, strokes result in serious defects and bring about social and economic problems (10, 11). It is known that age is the most important risk factor for stroke patients. After age 55, the stroke incidence doubles every 10 years (12). In addition, strokes are observed more frequently in men compared to women (13, 14). In our study, the rate of male stroke patients was slightly higher, as well (Table 1). Furthermore, there was no significant difference between female and male patients in terms of stroke type. In a comprehensive study conducted in 2009 by screening approximately 40,000 stroke patients, there was no significant difference between male and female patients in terms of rates of hemorrhagic and ischemic stroke (15). Other studies examining patients hospitalized in stroke units determined no significant difference in terms of stroke severity and type (16, 17). It has been reported that female patients have a stroke at older ages compared to men, and their long-term prognosis is worse due to this reason or other accompanying factors (18, 19). Moreover, it is stated that the age of female stroke patients is significantly higher compared to men (19). Female patients in our stroke group were older, as well, but this difference was not statistically significant. There was no significant difference between female and male patients in terms of mortality rate during their hospital stay, but their long-term prognosis was not followed up. At our emergency clinic, the mean age of stroke patients was 66. This is in line with results of other studies conducted on similar subjects in Turkey (13, 20-22). Recently, Demirci et al. (23) conducted a study on 714 stroke patients. The mean stroke age was 67.6 (range of the age: 17-98) for women and 54.9 (range of the age: 14-93) for men. In addition, the clinical course of elderly patients was worse than in young patients. Hospitalization rates of elderly patients were higher in the intensive care unit in our study. In the literature, many studies stated age as an important prognostic factor. Our findings were in good agreement with these studies (21, 24-26).

In clinical practice, strokes are classified as two main groups according to lesion pathology (12). According to a study conducted at Ege University (13), 77% of all strokes were ischemic stroke, and 37% of these ischemic strokes were caused by atherosclerosis. In the same study, the mean age was 63.0±12.0 for ischemic stroke patients and 59.0±12.0 for hemorrhagic stroke patients. According to another study that was performed outside our country, the mean age was 73.1 years for all stroke patients, but the mean age of hemorrhagic stroke patients was reported as lower compared to ischemic stroke patients (27). In our patient group, the mean age of hemorrhagic stroke patients was lower (ischemic stroke: 66.88, hemorrhagic stroke: 61.35), but this difference was not statistically significant ( $p=0.08$ ).

Hypertension is one of the main modifiable risk factors for stroke, and it is known that it is the major risk factor of ischemic and hemorrhagic strokes (12, 28, 29). In studies, the HT rate of ischemic stroke patients was reported to be about 75% (14, 30). Up to the present, many clinical and epidemiological studies have been conducted on HT patients. These studies have demonstrated that successful anti-hypertensive treatment can significantly decrease the risk of every type of stroke, (31-33). In this study, HT was the main risk factor for both ischemic and hemorrhagic strokes.

Our patients had hemorrhagic stroke, especially during mid-day (between 12 PM-6 PM), when people are most active (physically and mentally). Ischemic stroke patients were admitted to our emer-

gency clinic in the early hours of the day. A large part of hemorrhagic strokes were hypertensive intracerebral hemorrhage. Hemorrhagic stroke is an expected result when patients are awake and active with high tension or stress (34). In our clinic, complaints of hemorrhagic stroke patients were mainly loss of consciousness, hemiparesis/plegia, speech disorder, and headache. Clinical symptoms of ischemic stroke appear within hours or even within a few days (12, 34, 35). The main complaints of ischemic stroke patients were focal neurological symptoms, such as hemiparesis/plegia, while loss of consciousness or cognitive impairment was the second complaint.

### Study Limitations

Due to the retrospective nature of the study, we could not determine the onset time of the patient's initial symptoms while we obtained the arrival time to the emergency room. Therefore, we could not determine the number of patients who are candidates for thrombolytic therapy in our center.

### Conclusion

Presently, thrombolytic therapy is the best treatment for acute ischemic stroke. This treatment should be applied to patients within 3-4.5 hours from the onset of stroke (36-38). Therefore, we need to intervene and make predictions as soon as a stroke patient comes into the emergency department. The majority of stroke patients comes to the emergency department with various clinical stroke hallmarks, such as initial complaint, arrival time, age, state of consciousness, and medical history, that help in the diagnosis. The initial clinical data collection should be a guide to evaluate all clues about the patient to decide the final diagnosis and type of stroke.

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