

ARAŞTIRMA YAZILARI**ORIGINAL ARTICLE****EVALUATION OF HOSPITAL ARRIVAL TIME AND FACTORS DELAYING HOSPITAL ADMISSION IN ACUTE STROKE**Abdulkadir KOÇER¹, Nurhan İNCE², Eren GÖZKE³, Haluk İNCE⁴¹MD; Department of Neurology, Dr. Lütfi Kırdar Kartal Teaching Hospital, İstanbul/Turkey.²MD; İstanbul University, İstanbul Medical Faculty, Department of Public Health, İstanbul/Turkey.³MD; Department of Neurology, PTT Teaching Hospital, İstanbul/Turkey MD; İstanbul University,⁴MD; İstanbul University, İstanbul Medical Faculty, Department of Forensic Medicine, İstanbul/Turkey**SUMMARY**

This study investigated patients referred to the hospital for cerebrovascular strokes in order to distract attention of relevant authorities and institutions to this important issue.

The study was realized in patients (n=122) referred to the Emergency Clinics of Hospital with diagnoses of stroke. The patients were evaluated in three groups in terms of their presentation to the hospital within the first 3 hours, 3-24 hours and later than 24 hours from the start of their clinical manifestations. The results were obtained from face to face interviews with the patients relative s using a semi-formulated structured form.

The onset of symptoms of nearly half of the patients with stroke started between 06:00 A.M. and 11:59 PM and 32% (n = 39) of them reached the hospital at an early stage of stroke.

31% of the patients (n = 38) referred to the hospital within 3-24 hours and 37% (n = 45) of the cases were delivered to the hospital more than 24 hours after the onset of the symptoms. Early referrals to the hospital weren't influenced by variables of age, gender, foci of involvement and types of stroke (P > 0.05). However unconscious patients had been brought to the hospital at an earlier stage of stroke (P< 0.05). Cases in our study group have lost their chances of effective treatment either for underestimation of the condition (37 %) or due to inadequate facilities of their previous health care center (31 %).

Public and health care personnel must be educated about recognition of early symptoms of stroke.

Key words: Stroke, hospital, delaying.

İNME OLGULARINDA HASTANEYE ULAŞMA SÜRESİNİN VE GECİKME NEDENLERİNİN DEĞERLENDİRİLMESİ

Çalışma inmeli olguların hastaneye erken başvurularının önemine, konu ile ilgili kurum ve kuruluşların dikkatini çekmek amacıyla planlanmıştır.

Araştırma acil servise gelen inmeli hastalarla (n=122) gerçekleştirilmiştir. Olgular klinik belirtiler başladıktan sonra hastaneye başvuru sürelerine göre; ilk üç saat içinde, 3-24 saatte ve 24 saatten sonra olmak üzere üç grupta değerlendirilmiştir. Bulgular, hasta veya yakınlarıyla yan-yapılandırılmış bir görüşme formu yardımıyla ve yüz yüze görüşme yöntemi ile sağlanmıştır.

Hastaların yaklaşık olarak yansında inme semptomları saat 06.00 ile 11.59 arasında başlamış ve %32 (n=39)'si hastaneye erken dönemde ulaşmıştır. Hastaların %31 (n=38)'i semptomlar başladıktan sonra 3 - 24 saat içinde, %37 (n=45)'si 24 saat sonra başvurmuştur. Hastaneye erken başvuru, yaş, cinsiyet, inme tipi ve tutulum olan bölge ile ilişkili bulunmamıştır (P>0.05). Bununla birlikte bilinci kapalı hastalar hastaneye erken dönemde getirilmektedir (P<0.05). 24 saatten sonra başvuran %37 oranda olgunun %31'i, önce başvurduğu sağlık kuruluşunun yetersizliği yüzünden etkin tedavi şansını yitirmiştir.

Toplum ve sağlık çalışanları inmenin erken belirtileri konusunda eğitilmelidir.

Anahtar Sözcükler: İnme, hastane, gecikme

INTRODUCTION

Among most commonly seen diseases leading to death, as an important socio-economic problem stroke ranks second after heart disorders and results in disability suspending the individual

from productivity. In our country currently 300-400.000 individuals are trying to sustain their lives with sequelae of stroke. Epidemiologic studies have shown that the incidence of stroke will rise within forthcoming 20 years due to increases both in aging population and number of recurrent

episodes in surviving patients after therapeutic innovative interventions (1). Although interesting and promising advances in prevention of stroke have been introduced, the only means of overcoming these unfavorable outcomes is the application of recombinant plasminogen activators within the first 3 hours of onset of symptoms (2-4). However for various reasons only a small portion of these patients refer to a hospital within time interval required for the application of these therapies (5).

This study was performed to investigate reasons of late arrivals in the hospital in a group of patients with stroke in order to distract attention of relevant authorities and institutions to this important issue.

MATERIAL AND METHOD

This prospectively conducted descriptive study was realized in 122 sequential cases with established diagnoses of stroke who arrived in the Emergency Department of Hospital between 07/01/2001 and 12/31/2001 which is providing first and second stage care with its 400 beds since 1977. Hospital gives primary and secondary health care services to pensioners and their families in Istanbul in which 1/10 of

Turkish population is currently living. The hospital providing outpatient and hospitalised health care services to 500 patients annually. Patients experienced their stroke during sleep were not included in this study if the event is not seen or understood by himself or relatives. Marital status has been recorded. The diagnosis of stroke was made by a neurologist according to the criteria of World Health Organisation who defined stroke as rapidly developing clinical symptoms lasting more than 24 hours or leading to death without any other etiology other than a vascular abnormality (6). The severity of stroke (NIHSS) and consciousness have been taken into consideration and recorded. The patients were evaluated in three groups namely, as arrivals within 3 hours, 3-24 hours and more than 24 hours after the onset of their symptoms. Patients brought to the hospital within the first 3 hours or later than that time interval were classified as "early" and "delayed" arrivals respectively. The patients were classified as having hemorrhagic or ischaemic cerebrovascular diseases according to their findings in their cranial CT 's taken on an

emergency basis. The cases were investigated with respect to their ages, gender, type of stroke (hemorrhagic, ischaemic), the state of their consciousness on admission to the hospital (conscious or unconscious), time intervals in which strokes occurred (eg: 00:00 -05:59~ 06:00 -11:59~ 12:00-17:59~ 18:00 - 23:59) and reasons for delayed arrivals. The reasons for late arrivals were evaluated under the following titles such as underestimation of disease and the patient (some example sentences to Id by patient or patient' s relatives e.g. thought it was an irreversible unfortunate event, expected it would be fine, 'it is normal for this ages and you can not do anything so no need to go to hospital'), inability to contact a specialist who could promptly establish the diagnosis and institute the necessary treatment, referral of the patient for some reason (inadequate facilities of the original hospital e.g. primary health care unit, no neurologist or no inpatient clinics), the physician refraining from visiting home, transportational drawbacks and other reasons.

This information was obtained from the patient and his/her intimates after explanation of the purposes of the study and obtaining their signed informed consent during face to face interviews using semi-structured forms. The findings were evaluated using SPSS 7.0 software program. Independent, continuous numeric variables were evaluated with Student t test, and ANOV A test. Categorical variables were assessed using chi-square and if required Fisher's exact tests (7).

RESULT

The age distribution of the cases is evaluated by Kolmogorov - Smirnov and found out that it is similar to normal distribution. In the working group, the average age of the women is 70.25 ± 10.3 , the average age of the men is 66.33 ± 10.1 . The difference in the age average is found statistically significant. ($P= 0.038$; $T=-2.09$).

Demographic and clinical characteristics of 122 patients of the research are summarized on Table-1. In cases with different states of consciousness (conscious or unconscious) and the time to arrival in hospital (early, late) mean ages were similar ($P=0.47$; $T=0.71$ and $P=0.35$;

$T=0.93$). Mean ages of hemorrhagic cases were statistically significantly higher than those of ischaemic cases ($P=0.049$; $T=- 1.98$).

Time intervals in which symptoms of stroke had developed are shown on Table-1. As seen on Table-1, approximately half of the strokes occurred within 06:00 -11:59 and 32 % of them arrived in the hospital during "early" stage. Thirty seven percent of delayed cases had lost their chance of early treatment due to " underestimation" of the situation.

Table 1. Demographic Characteristics of Cases

	n	% of cases
Gender	51	42
Male	71	
Female		
Mean ages (years)	68.6±10.3	
Male	66.336±10.1	
Female	70.25±10.3	
Time of Occurrence of Stroke		
00:00 - 05:59	18	15
06:00 - 11.59	60	49
12:00 - 17:59	25	21
18:00 - 24:00	19	15
Type of stroke		
Occlusive	111	91
Hemorrhagic	11	9
Time to Arrival in Hospital		
< 3 hours	39	32
3 - 24 hours	38	31
>24 hours	45	37
Reasons of the Delay (n.83)		
Underestimation	31	37
Unfavorable conditions*	26	31
Failure to see a Doctor	7	9
Difficulties in transport	7	9
Others	12	14
Involvement		
Anterior system	105	86
Posterior system	17	14
State of Consciousness		
Conscious	107	88
Unconscious	15	12

*unfavorable conditions of the previous health care center

There was no correlation between variables of gender, age, involvement, stroke, marital status and early arrivals in the hospital. ANOVA variance analysis was used to compare mean ages of patients who developed stroke within four different time intervals (00:00-05:59; 06:00-11:59; 12:00-17:59; 18:00 -23: 59). No statistically significant difference was detected with respect to mean ages (P= 0.60; F=0.61). Still, there weren't any significant differences among mean ages with respect to time to arrival in hospital (P= 0.58; F=0.54).

However unconscious patients were brought to the hospital within statistically significantly earlier time intervals (Table 3). Fifteen patients referred to the hospital in unconscious state had ischaemic (73%) and hemorrhagic (27%) stroke. For conscious cases there rates were found to be 95% and 5% respectively. Proportional differences were detected to be statistically significant ($\chi^2= 6.49$ P= 0.011).

DISCUSSION

Diseases commonly seen in a population and also cause many cases of death, disability and loss of work power are important diseases. While providing health care services according to the Declaration of Primary Health Care Services (the Declaration of Alma-Ata) published in 1978 and signed by all of the member countries, important diseases should be prioritized. Especially stroke which is important for geriatric age group, should be prioritized owing to increasing rate of aging population in our country (8, 9).

In our study it was striking that only one third (32 %) of the patients arrived in a Training and Research Hospital within the time interval (<3 hours) in which they could benefit from the superiority and success of early therapy. Topalkara et. al. found that hospital arrival rates within the first 3 hours was 26.7 percent among 172 cases with stroke(5). Harper et. al. found that 25% and 75% of their patients reached health care centers within 2 and a half hour and 11 and a half hour respectively (10). From a Finnish study performed by Fogelholm et. al. in 1993 it was recognized that among patients who experienced their first episode of stroke and treated accordingly, only 43% of them arrived within the first 6 hours, and ages over 70, nightly occurrence of stroke, living alone, patient's referral to his/her physician instead of an emergency service are the main causes of delay (11). In our study group 45 percent arrival rates within the first 6 hours is in accordance with those of Fogelholm et al. The largest study ever performed relevant to presentation of patients to a hospital with stroke is a prospective Danish study conducted by Jorgensen et al. in 1197 cases of stroke. In that study, it was revealed that 25 percent of the cases arrived in health care centers within 3 and a half hour and lonely people, pensioners and patients with a mild stroke

Table 2. Characteristics of Stroke Categorised According to Gender of Patients

	Male		Female		Total		Chi-square	Degree of freedom	Two-tail P value
	n	%	n	%	n	%			
Time of Occurrence of Stroke									
00:00 - 05:59	7	39	11	61	18	100.0	0.650	3	0.88
06:00 - 11:59	25	42	35	58	60	100.0			
12:00 - 17:59	12	48	13	52	25	100.0			
18:00 - 24:00	7	37	12	63	19	100.0			
Mean ages (years)	66.33±10.1		70.25±10.3				T:-2.09	120	0.038
Time to Arrival in Hospital									
< 3 hours	17	44	22	56	39	100.0	0.48	2	0.78
3-24 hours	17	45	21	55	38	100.0			
> 24 hours	17	38	28	62	45	100.0			
Involvement									
Anterior system	40	38	65	62	105	100.0	4.25	1	0.039
Posterior system	11	65	6	35	17	100.0			
Type of Stroke									
Occlusive	47	42	64	58	111	100.0	0.14	1	0.70
Hemorrhagic	4	36	7	64	11	100.0			
State of Consciousness									
Conscious	45	38	62	62	107	100.0	0.023	1	0.88
Unconscious	6	67	9	33	15	100.0			

Table 3. Clinicodemographic characteristics of the cases upon arrival in

	Early (n:39)		Late (n: 83)		Total(n: 122)		Chi-square	Two-tail p-value
Gender								
Male	17	33	34	67	51		0.075	0.78
Female	22	31	49	69	71			
Mean ages (years)	69.89±10.49		68.01±10.27				0.93	0.35
Time of Occurrence of Stroke								
00:00 - 05:59	9	50	9	50	18	100.0	3.25	0.35
06:00 - 11:59	18	30	42	70	60	100.0		
17:00 - 18:59	7	28	18	72	25	100.0		
18:00 - 24:00	5	32	14	68	19	100.0		
Involvement								
Anterior system	35	33	70	66	105	100.0	0.64	0.42
Posterior system	4	24	13	76	17	100.0		
Type of Stroke								
Occlusive	34	31	77	69	111	100.0	1.01	0.31
Hemorrhagic	5	45	6	55	11	100.0		
State of Consciousness								
Unconscious	9	60	6	40	15	100.0	6.18	0.013
Conscious	30	28	77	72	107	100.0		

arrived in a hospital much more later. Patients experiencing transient ischemia and serious stroke cases were observedly arrived in a hospital earlier (12). In our study the state of patient's consciousness was found to be the only variable significantly effecting early arrivals. Unconscious patients were transported to a hospital earlier when compared with conscious patients. Earlier delivery of the cases to the hospital was not influenced by variables of gender, age, type of involvement and stroke, and previous stroke history.

The incidence of ischemic stroke which was the most frequently encountered type of stroke, was detected to be 91% and as seen on Table-1 the onset of stroke showed a circadian rhythm in our study. In various studies circadian rhythm was identical to those of acute myocardial infarction, sudden cardiac death and other vascular pathologies. In addition risk factors of patients and sociodemographic characteristics didn't influence this circadian rhythm(13). The evolution of nearly half of strokes during early morning hours might be associated with circadian changes in blood pressure and increasing rate of hypercoagulopathy in the morning (14,15). Therefore chronobiological therapeutic approaches must be developed by determining variables effecting circadian rhythm and risk factors.

The success of treatment in stroke most importantly depends on arrival times in a hospital. The most important clinical lesson learned up to now is that earlier the intervention the better the outcome. Therefore the main obstacle for therapeutic success is delay in application of treatment. Stroke must also dealt as an emergency case like myocardial infarction (16). Up to now, stroke with its limited therapeutic potentialities has been defined as "an irreversible unfortunate event" in the social memory of our society' and hasn't occupied the public agenda as much as other important diseases such as cancer, myocardial infarction. Besides, due to late arrivals in health care centers or delays in therapeutic interventions for various reasons, the patients can sometimes lose their chances of getting the privilege of "the highest standard of care and treatment or can consent to "a small proportion" of these services.

Cases in our study group have lost their chances of effective treatment either for underestimation of the condition (37%) or due to

inadequate facilities of their previous health care center (31%). In the study performed by Barsan et al. 59% of their cases consulted the hospital within 3 hours from the onset of their symptoms. In their study they emphasized that visit to a family practitioner instead of phoning emergency service, emergence of symptoms of stroke at home during nightly hours in contrast with working hours and environment cause delays in treatment (16).

Although scarcity of cases and inadequate interrogation about social status of the patients are the limitations of this study, it emphasizes the need for nationwide studies with the participation of multiple centers. Experiences gained from these studies will aid in solving other health problems. Besides, public and health care personnel must be educated about recognition of early symptoms of stroke. With improvement of first aid services and application of standardized

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