

Factors delaying hospital arrival of patients with acute stroke

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Abstract

Introduction: To determine the proportion of patients with acute stroke presenting late to hospital and to identify the factors that delay hospital arrival of patients with acute stroke.

Methods: A cross sectional study was carried out between Sept 2006 to Feb 2007 in the department of Neurology, Liaquat National Hospital Karachi. All patients of both genders, age >18 years with symptoms of stroke and neuro- imaging (CT scan/ MRI brain) findings consistent with stroke were included.

Results: A total of 165 patients attending the Emergency department were included. There were 86 (52%) males and 79 (47.9%) females. The mean age was 60.04±13.98 years, (males 58.2 years and females 61.9 years). The median delay from onset of symptoms to hospital arrival was six hours. Only 28.5% of the patients came within three hours while 71.5% after three hours. Attendants of 47 patients had a low threat perception, 53 (32%) of the patients did not know a single symptom of stroke and 63% (104) patients first contacted their General Practitioner who referred them to hospital. Similarly 60.6% of patients were first taken to a local hospital not equipped to handle major emergencies.

Conclusion: Time elapsed from onset of symptoms to hospital arrival is influenced by lack of knowledge of stroke symptoms, contact with a local doctor, low threat perception and non availability of ambulance services (JPMA 58:178;2008).

Introduction

Stroke is the second most common cause of death and the first leading cause of disability in developed and developing countries.^{1,2} Recent reports have established the importance of aggressive intervention in the hyperacute stage that has lead to decrease morbidity and disability. With the advent of time, dependant thrombolytic therapy for ischaemic stroke, has made it very important for stroke patients to arrive at the hospital in time. The phrase "time is

brain" emphasizes that human nervous tissue is rapidly and irretrievably lost as stroke progresses and that therapeutic interventions should be emergently pursued.³ Recombinant tissue plasminogen activator (r - tPA) is currently the only FDA approved therapy for treatment of patients with acute stroke.⁴ The therapeutic window is less than three hours and the best results can be achieved with administration within 90 minutes.⁴ However, it has been seen that patients with acute stroke are often admitted late and therefore are unable to receive thrombolytic therapy. Median time from onset to

admission in previous studies has ranged from four hours to more than 24 hours.^{5,6} Another promising option that has recently been available for patients with acute intracerebral haemorrhage is recombinant factor VIIa (rFVIIa) that has shown to decrease the growth of the haematoma, reduce morbidity and mortality among patients with haemorrhagic stroke, but again it is time bound.⁷ As effective treatment for acute stroke is available, it is important to analyze the factors that are responsible for delay. There are several studies from the western world that have evaluated the factors associated with delayed or early arrival of acute stroke patients to hospital. Factors like living alone, referral pattern, contact with local doctor, nocturnal onset, delayed arrival, while daytime stroke, haemorrhagic stroke, and previous history of stroke favours early arrival.^{5,6} The studies reported from India and China have shown similar results that patients usually present at the hospital after prolonged delays for multiple reasons.^{8,9} The treatment of acute stroke with thrombolytics has recently become available in Pakistan. Anecdotal experiences suggest that patients usually present late in hospital so that thrombolytic therapy cannot be offered to them. There is a dearth in the knowledge regarding the chosen topic in the local literature. We could identify only one prior study from Pakistan studying factors affecting stroke arrival time to emergency room (ER). This study showed that 21% of the stroke sufferers arrived within 3 hours of stroke onset.¹⁰ Therefore this study is designed to analyze the factors that are associated with pre - hospital delays after acute stroke in our population. If such factors are identified then strategies can be planned to expedite the arrival time at the hospital within the therapeutic window and receive tPA. The aim of this study was to determine the proportion of patients with acute stroke presenting late to hospital and to find out the factors that delay their hospital arrival.

Patients and Methods

This was a cross sectional study carried out between Sept 2006 to Feb 2007 in the department of Neurology, Liaquat National Hospital, Karachi. "Soft ware by WHO "Sample size determination in health studies¹¹ was used to determine the sample size. Considering confidence level of 95%, probability of patients presenting late to hospital as 70%^{12,13} and absolute precision of 7% our calculated sample size was 165 patients at least. Sampling technique was non probability convenience sampling. All patients of both gender, age >18 years with symptoms of stroke and neuro- imaging (CT scan/ MRI brain) findings consistent with stroke were included. Patients with in - hospital stroke were excluded from the study.

All patients who came to the Emergency Room (ER) of Liaquat National Hospital presenting with the symptoms

of stroke were evaluated by a Neurology resident who was the research associate. A thorough clinical examination was conducted. Time of stroke onset was defined as the time the patient or an observer first noted a neurological deficit. If the symptoms were present on waking, it was assumed that stroke had occurred during the night and the time of onset was taken when the patient was last seen without symptoms. The exact time of arrival at hospital is routinely marked on the form of ER. Delay was considered if the time of arrival at hospital was more than three hours from the time of onset of symptoms. The length of delay from onset to admission was calculated on the basis of the exact or estimated hour of onset and the time of arrival in the ER. A standard structured questionnaire was completed for every patient by interviewing the patient (if possible) and accompanying attendant / relative after taking verbal consent. The questionnaire documented the patients age, sex, past history of stroke, educational level, occupation (financial support) and whether living alone or not. The patient / attendant was asked whether he believed that the symptoms would improve spontaneously (low threat perception), and if he had first contacted his local doctor or tried an alternative medicine. For the purpose of this study, time elapsed between onset and casualty arrival was taken as an outcome variable.

Data was analyzed by using SPSS version 10. Descriptive statistics, frequencies and percentages were calculated for variables such as type of stroke, living conditions, time of onset of stroke (am, pm), status of financial support, low threat perception and time of arrival to hospital after development of symptoms (arriving late or in time). Mean +SD were used for continuous variable such as age of the patient.

To assess the associations of factors for delayed arrivals Chi-square test was used for qualitative data such as educational status, living conditions, time of onset, type of stroke etc. Odds ratios were calculated to assess the strength of association. For continuous data t-test was applied where appropriate such as for mean age of patients in relation to delayed or timely arrival to hospital.

Logistic Regression was used to control for confounding variables simultaneously.

Results

During the six months observational period, 165 patients that arrived in Emergency department were included. There were 86 (52%) males and 79 (47.9%) females. The mean age was 60.04±13.98 years, (males 58.2 years and females 61.9 years). Of all patients 62 (37.6%) were illiterate and 44.8% had some high school education. Of these 165 patients, 134 (81.2%) had ischaemic and 31

(18.8%) had haemorrhagic stroke. The demographic characteristics are shown in Table 1.

The median delay from onset of symptoms to hospital arrival was six hours. Only 28.5% of the patients came within three hours while 71.5% after three hours (24.5% within six hours, 28.5% within 24 hours and 18% more than 24 hours) Figure 1.

The mean distance from the residence to the hospital was 56.75km±123km. The distribution of time of onset was midnight to 6am 26.6% (44), 6am to noon 33.9 % (56), noon to 6pm 25.4% (42), and 6pm to midnight 13.9% (23). According to the statement, 31 (18.7%) of events occurs on awakening. Only 18(10.9%) of the patients were living alone at the time of onset of stroke (p<0.94). Forty seven of 165 attendants of patients had a low threat perception, though they recognized the symptoms as stroke but thought that it would resolve spontaneously (p=0.005, OR= 0.27 95%CI 0.10-0.7). Fifty three (32%) of the respondents did not know a single symptom of stroke, 18 (10.9%) reported knowing at least one stroke symptom before the event and the symptoms most familiar to them were hemiplegia (67%) and speech disturbance (61%).

Regarding the mode of transport only 46(27.9%) of patients came by ambulance while 119 (72%) came by public/private car (p<0.41), OR 0.72 95% CI 0.33-1.58). One very important factor deciding the length of delay was

Table 1. Demographic characteristics of patients.

	Number	Percentage	OR (95%CI)
Mean Age(±SD) in years	60(13.98)		
Male	58.26 (13.7)		P value=0.66
Female	61.9 (14.0)		
Gender			1.06 (.53-2.09)
Male	86	52	
Female	79	47.9	
Level of education			0.69(0.3-1.2)
Illiterate	62	37.6	
Middle	26	15.8	
Matric	31	18.8	
Inter	17	10.3	
Graduate	27	16.4	
Post graduate	2	1.2	
Occupation			P value=0.71
Labourer	12	7.3	
Education	8	4.8	
Business	11	6.7	
Technical	18	10.9	
Retired	32	19.4	
Others	84	50.9	

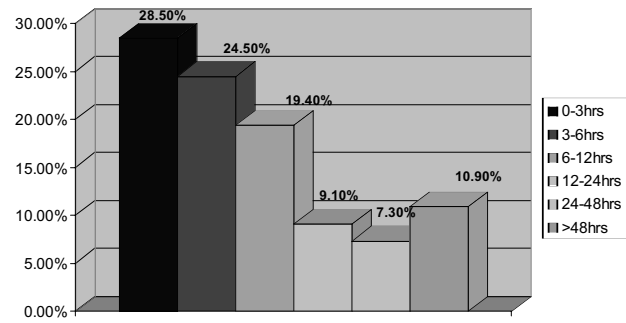


Figure 1. Time to presentation in A&E department.

Table 2. Factors affecting patient arrival to hospital

	Number	Percentage	OR (95%CI)
Level of awareness			0.73(0.61-0.87)
Knew No symptom	53	32.1	
Single symptom	18	10.9	
Hemiplegia	111	67	
Speech disturbance	99	60	
Vertigo	33	20	
Numbness	30	18.2	
Headache	25	15.2	
Vomiting	24	14.5	0.96(0.32-2.8)
Living alone	18	10.9	
Type of stroke	134		0.66(0.29-1.5)
Ischemic	31	81.2	
Haemorrhage		18.8	
Mode of transport			0.72(0.33-1.58)
Ambulance	46	27.9	
Public/private transport	119	72.1	
First care sought			
GP	104	63	0.23(0.11-0.47)
Another hospital	100	60.6	0.15(0.07-0.33)
Alternative medicine	21	12.7	1.2(0.87-1.66)
Hakim	5	23.8	
Homeopath	10	47.6	
Faith healers	6	28.5	

referral pattern. More than half of the patients who came late, 63 % (104) patients first contacted their GP and were then referred to Liaquat National Hospital. The median time from onset of symptoms and contact with general practitioner was 30 minutes while 86.5% within 60 minutes of onset of symptoms (OR=0.231, 95%CI 0.11-0.47). Similarly 60.6% of patients were first taken to another hospital mainly cardiac hospital and then referred here (OR= 0.15, 95%CI 0.075-0.33) and 12.7% of patients first opted for alternative medicines mainly homeopathic or hakimi treatment (OR=1.2, 95% CI 0.87-1.66). (Table: 2)

Discussion

Majority of the studies that have focussed on delay in seeking treatment among stroke patients have revealed that median delay time ranged from 3 - 6 hours. Delay in arrival was not only caused by organizational, educational and demographic factors but also by perceptual, social and behavioural factors.¹⁴

Our study showed that only 28.5% of patients came to ER within 3 hours and another 24% within 3-6 hours, which is similar to studies performed in other countries.^{8,9,13} One major determinant of delay is the referral pattern. Contact with the local doctor is associated with significant delay. This has been seen in other studies as well^{8,15,16} Majority of the patients 63%, who came to our hospital after three hours had contacted their local general practitioner first which contributed to significant delay. Therefore it is important to organize continuous medical education for health care professionals to increase awareness of importance of patient's transfer to an organized stroke centre. Public awareness should also be increased that once they recognize the symptoms of stroke they directly transfer the patient to hospitals where facilities to handle such patients are present. Some studies have shown stroke subtype (ischaemic vs haemorrhagic) to affect arrival but we did not find any significant relationship.^{17,18} Our data suggests that patient's attendant perception of severity of symptoms influence reaction times. Twenty eight percent of our patient's attendants had low threat perception. Only 18 (10.9%) of our patients were living alone at the time of event. This factor therefore does not contribute much in contrast to western literature.¹³ Another important contributing factor in our country is lack of transport facilities and availability of effective ambulance service. Majority of the patients 72% came to the hospital by private car/ public transport while only 27.9% patients availed ambulance services. Patient's gender, age, type of stroke, educational level and occupation was not associated with delay which is similar to findings in other studies^{13,19,20} except one study that has shown being a woman was associated with a 3-fold risk of delay in reaching the hospital.²¹

Conclusion

Time elapsed from onset of symptoms to hospital arrival is influenced by lack of knowledge of stroke symptoms, contact with a local doctor, low threat perception and availability of ambulance services. The results of this study will be helpful in strategic planning of stroke management. Educational programmes and stroke campaigns are needed to increase awareness of public and health care professionals and also arranging high speed,

easily available ambulance services to reduce delay in hospital arrival

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Disclosure

We report no conflict of interests

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