A RETROSPECTIVE STUDY ON IN-HOSPITAL TIME MANAGEMENT OF ACUTE STROKE PATIENT IN THE EMERGENCY DEPARTMENT HOSPITAL KUALA LUMPUR

By

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In the name of Allah,most Gracious , most Merciful

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CT	Computed Tormography
ED	Emergency Department
DM	Diabetes Mellitus
EMS	Emergency Medical Service
HKL	Hospital Kuala Lumpur
HUSM	Hospital Universiti Sains Malaysia
LIT	Localised intra-arterial thrombolysis
MOH	Ministry of Health
MTC	Malaysian Triage Category
NIHSS	National Institutes of Health Stroke Scale
NINDS	National Institute Of Neurological Disorder And Stroke
OR	Odd ratio
t-PA	tissue Plasminogen activator

ABSTRAK

KAJIAN RETROSPEKTIF TERHADAP MASA PENGURUSAN DI HOSPITAL

UNTUK PESAKIT 'STROKE' DI JABATAN KECEMASAN HOSPITAL

KUALA LUMPUR

Pengenalan:

'Stroke' adalah antara kes yang paling kerap diterima di Jabatan Kecemasan Hospital Kuala Lumpur. Kebanyakan dari mereka akan dihantar untuk ujian imbasan CT bagi pengesahan diagnosa. Walaubagaimana pun bagi pesakit yang disahkan menghidapi 'stroke' akibat iskemia, didapati tiada diantara mereka yang mendapat rawatan 'fibrinolysis' atau penggunaan r-tpa. Ini memandangkan kebanyakan dari pesakit ini dikatakan tiba lewat dari tempoh yang paling berkesan untuk mendapatkan rawatan tersebut iaitu 3 jam dari bermulanya symptom.

Objektif:

Tujuan kajian retrospektif ini adalah untuk menilai sejauh mana kebenaran mengenai kelewatan pesakit yang dikatakan penyebab kebanyakan dari mereka gagal mendapatkan rawatan r-tpa tersebut. Kajian akan melibatkan pengesahan tempoh bermulanya symptom sebelum tiba di hospital, jarak waktu sebaik tiba di hospital sehingga bertemu dengan pegawai perubatan, jarak waktu tiba di hospital hingga di hantar untuk imbasan CT dan sehingga filem imbasan CT diinterpretasi. Selain dari itu kajian demografi terhadap pesakit 'stroke' serta jenis 'stroke' yang dialami juga dijalankan. Kajian ini juga akan melihat faktor-faktor demografi dan factor risiko penyakit 'stroke' yang mempunyai hubung kait dengan tempoh ketibaan pesakit di hospital.

Methodologi:

Seramai 200 orang pesakit telah terlibat dalam kajian ini. Kesemua mereka adalah berumur 18 tahun ke atas dan tiba di hospital dengan tanda-tanda penyakit 'stroke'. Kesemua mereka akan dihantar untuk imbasan CT. Sejarah pesakit, dokumentasi masa ketibaan, masa bertemu doctor dan masa dihantar untuk imbasan CT akan diperolehi melalui nota pesakit yang di perolehi dari Unit Rekod, Jabatan Kecemasan. Keputusan lapuran imbasan CT diperolehi dari unit radiology Hospital Kuala Lumpur.

Keputusan

Daripada 200 orang pesakit, bangsa Melayu mencatatkan peratusan tertinggi iaitu sebanyak 42% diikuti dengan bangsa Cina (36.5%), India (18.5%) dan lain-lain (3.0%). Mean usia pesakit adalah 58.3 tahun dengan 58.5% melebihi usia 55 tahun. Seramai 65% adalah merupakan pesakit lelaki manakala selebihnya (35%) adalah pesakit perempuan. Penemuan dari imbasan CT menunjukkan sebanyak 42.5% dari pesakit mengalami 'infarct', 39% menunjukkan penemuan normal dan 18.5% mengalami pendarahan. Peratusan pesakit yang tiba lewat dari 3 jam adalah 73%, manakala 27% pesakit tiba kurang dari 3 jam dari bermulanya symptom. Mean untuk interval 'door to medical consultation' adalah 24.2 minit, mean untuk interval ' door to CT adalah 52.3 minit . Kebanyakkan pesakit telah di masukkan ke zon kuning(semi kritikal) iaitu sebanyak 45.5%, diikuti zon hijau (tidak kritikal) iaitu 41.5% dan zone merah sebanyak 13%. Didapati pesakit yang mempunyai hipertensi adalah paling ramai iaitu sebanyak 52.5% diikuti diabetes (41.5%), sejarah keluarga (23%), merokok (21%), penyakit jantung

iskemia (14.5%), sejarah 'stroke' terdahulu (8%) dan hyperlipidaemia (3.5%).Terdapat hubungan yang significant diantara waktu ketibaan ke hospital dan usia pesakit dimana nilai p adalah kurang dari 0.05. Tiga variabel yang mempunyai pengaruh terhadap ketibaan pesakit ke hospital adalah usia (OR 1.83,95% CI 0.958,3.502), Hipertensi (OR 1.99,95% CI 0.989,3.906) dan penyakit jantung iskemia.

Kesimpulan

73% dari pesakit 'stroke' tiba di jabatan kecemasan Hospital Kuala Lumpur melebihi 3 jam dari bermulanya symptom. Pesakit juga didapati mengalami kelewatan sewaktu berada di dalam jabatan kecemasan yang boleh menggagalkan peluang pesakit untuk mendapat rawatan fibrinolisis.Oleh itu adalah di sarankan agar satu laluan kritikal dapat dirangka untuk pesakit 'stroke' di jabatan kecemasan HKL agar kelewatan dapat diatasi dan berpeluang untuk rawatan fibrinolisis.

ABSTRACT

THE RETROSPECTIVE STUDY OF IN HOSPITAL TIME MANAGEMENT OF ACUTE STROKE PATIENT IN THE EMERGENCY DEPARTMENT HOSPITAL KUALA LUMPUR

Introduction:

The Emergency Department Hospital Kuala Lumpur commonly receives cases of patients presented with signs and symptoms of acute stroke in which majority of them are send for CT Brain for confirmation of diagnosis. However in a case of acute ischaemic stroke none of them had been given fibrinolytic therapy or r-tpa in which assumption made that the patient had missed the beneficial period of the therapy which is within 3 hours from the onset of symptoms.

Objectives:

The objectives of the study are to analyse the in-hospital time taken for stroke patients when arrives in the Emergency Department until the diagnosis of stroke is confirmed. This will include the time interval from door to medical consultation,door to CT scan performed till door to CT scan film interpreted.Besides this the time of symptoms onset is also studied as well as the demographic profile of the stroke patients.The association between the demographic factor and stroke risk factors with the time of hospital arrival is also include in the study.

Methodology :

A total of 200 patients were involved in the study. All subjects were those age more than 18 years old who presented to the emergency department with the signs and symptoms of acute stroke and had CT brain done.The data analyse will be collected retrospectively through case notes in which the detail of the patients, demographic factor, history of presenting complaint, past medical history, social history, time documentation when seen by doctor till CT film interpretation will be reviewed. In this study the data analysed are stroke patients presented to the Emergency Department Hospital Kuala Lumpur in a period of 1 year from 1st April 2007 until 31st March 2008

Result

From 200 patients 42% of them are Malay followed by Chinese (36.5%), Indian (18.5%) and others (3.0%). Male accounted for 65% while female accounted for 35%. The mean age was 58.3 years old with 58.5% were more than 55 years old. The CT brain finding shows infarct in 42.5% of patients, normal CT finding accounted for 39% and haemorrhagic stroke in 18.5% of patients. The percentage of patients who arrived more than 3 hours from the onset of symptoms was 73% while less than 3 hours was 27% . Most of the patient is triaged to the yellow zone which accounted for 45.5%, followed by the green zone which is 41.5% and the red zone (13%) . As for the in-hospital time analysis, it is found that the mean time interval for door to medical consultation is 24.2 minutes and the mean time interval for door to CT is 52.3 minutes. Hypertension occurs highest most among the patients (52.5%) followed by diabetes (41.5%),family history of

stroke (23%), smoking (21%), ischaemic heart disease (14.5%), previous history of

stroke (8%) and hyperlipidaemia (3.5%).

There is a significant association between time of hospital arrival and age in which p-

value is less than 0.05. The significant independent predictors for time of hospital arrival

is age (OR 1.83,95% CI 0.958,3.502), Hypertension (OR 1.99,95% CI 0.989,3.906) and

ischaemic heart disease (OR 0.424,95%CI 0.174,1.036).

Conclusion

73% of stroke patients arrives late to the Emergency Department Hospital Kuala

Lumpur.There is also an in-hospital delay in which may jeopardise the chance of patient

for fibrinolytic therapy. Critical pathway might need to be structured in the emergency

department to overcome the delay, hence improving the care of stroke patient.

1.INTRODUCTION

Stroke is defined by the World Health Organisation (WHO) as *'rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin'.* Stroke is a challenging disease for health care providers, patients and the community. It has been found to be a leading cause of morbidity and the third leading cause of death in developed and developing countries. (American Heart Association statistical update, 2006)

1.1 Incidence and Prevalence of Stroke

The incidence and prevalence of stroke varies widely in various countries. In Malaysia, stroke was consistently the third commonest cause of death in 1990's (South East Asia Medical Information Centre 2000). Statistics on cerebral vascular diseases in Malaysia reflect an increasing trend in the total admissions since 1992, where as, the inpatient hospital mortality rates are decreasing (Information and Documentation System Unit, Ministry of Health 2004). However, specific local data regarding the incidence and prevalence stroke is lacking due to the absence of a national stroke registry.

In Malaysia hospital records do show progressive increase in stroke discharges and deaths at government hospitals. Every year about 2,500 deaths and 12,000 stroke discharges are recorded in government hospitals (Ministry of health report 2004). A study done by Hanip Rafia et al., (1998) shows that Kuala Lumpur Hospital (HKL) received 1,000 stroke cases per year with 30-35% acute mortality. Cerebral infarcts formed 60.8% of cases (53% large vessels, 7.8% small vessels) and 33% were due to haemorrhage. As the country progress, the importance of stroke will increase because of improved longevity and higher proportion of elderly population. The life expectancies at birth of males and females in Malaysia had increased from 55.8 years and 58.2 years respectively in 1957 to 71.6 years and 76.8 years respectively in 2006, and the proportion of people above 60 years old was 6.1% (Department of statistic Malaysia 2007). In future as longevity continues to improve, the proportion of senior citizens will reach 15-20% or more as in developed countries now.

1.2 Triaging system in emergency department.

The triaging system in Emergency department Hospital Kuala Lumpur for patient with acute stroke is based on the Malaysian Triage Category (MTC). Malaysian Triage Category is a scale use for rating clinical urgency designed for use in Ministry Of Health Emergency Service (Quality In Medical Care, Medical Development Division, Ministry Of Health Malaysia 2007). According to MTC the triage is categorized as red, yellow and green which differ in response time and clinical description. Condition in red category is describe as conditions that is life threatening, condition serious enough or deteriorating so rapidly or condition in which potential for time-critical treatment to make a significant effect on the clinical outcome. The response time for patient to be assessed and treated in this category is 5 minutes. Yellow category is for condition which is needed to be treated and assessed within 30 minutes. Clinical description for this category is a condition that may progress to life threatening, may lead to significant morbidity or potential for adverse outcome if time-critical treatment is not commenced within 30 minutes. Green category is category where the assessment and treatment should be started within 90 minutes. The clinical condition describe in this category is condition that may deteriorate, or adverse outcome may result, if assessment and treatment is not commenced within 1 hour of arrival.

In Hospital Kuala Lumpur patient with signs and symptoms of acute stroke may come in various degree of clinical state and will be triaged accordingly. The decision of requesting CT brain will be made by the attending medical officer in Emergency Department. Once the CT brain is ordered the patient will be called by the radiographer as immediate as possible. The CT brain film will be released immediately after the imaging done. Once the diagnosis confirmed the patient will be referred to the respective department based on the CT brain finding.The interpretation of the film will be made by the attending medical officer and if any doubt occur the emergency physician will be consulted for the confirmation of the diagnosis An official report by the radiologist for the CT brain finding will be released 3 days later and this report will be compiled and kept in the radiology unit in Emergency Department.

1.3 The Role of Emergency Department in the stroke chain of survival

The goal of stroke care is to minimize brain injury and maximize the patient's recovery. It links action to be taken by patients, family members and healthcare providers to maximize stroke recovery. This links are

- Rapid recognition and reaction to stroke warning signs

- Rapid EMS dispatch

- Rapid EMS system transport and pre-arrival notification to the receiving hospital

- Rapid diagnosis and treatment in the hospital

(Advanced life support guideline 2005,part 9:Adult stroke)

In Malaysia, no study had been done in assessing the public awareness and the pre-hospital care for patient with stroke. Even the in-hospital management data is lacking, therefore the level of stroke care in hospitals in Malaysia is still unknown. However the ability of emergency department in handling stroke patient can be evaluated by assessing the time flow of the patient from the arrival till the diagnosis is made. This is because patient with acute stroke has a time dependant benefit for fibrinolysis therapy. Therefore the most important role of the emergency department is to ensure the in-hospital time is not one of the factors that can further contribute the delay and reduce the chance for patient to get the fibrinolysis therapy. The National Institute of Neurological Disorder And Stroke (NINDS) has established a time goal for management of patients with acute stroke. During the National Symposium in 1996 the Emergency Department Panel reached consensus on time-frames that need to be established as goals for those responding to acute stroke :

1.Immediate general assessment by the stroke team,emergency physician,and or another expert within 10 minutes of arrival

2.Neurologic assessment by stroke team or designee and CT brain performed within 25 minutes of hospital arrival

3.Interpretation of the CT scan of brain film within 45 minutes of ED arrival

4.Initiation of fibrinolytic therapy in appropriate patient within 3 hours from symptoms onset

(National Symposium on Rapid Identification and Treatment of Acute Stroke,1996)

Improved in-hospital care and the advent of time-dependent treatments for stroke have increased the value of reducing delays from the onset of symptoms to acute stroke therapy (Evenson K et al.,2001). Pre-hospital patient delay for stroke has been well studied with generally consistent findings but no data available from Malaysia. In addition, even when knowledge about stroke is present, the skills and motivation to take action are frequently missing in the stroke victim and those around him or her (William et al.,1997). It is apparent that action by a witness, whether a relative, co-worker, or bystander significantly reduces delay (Evenson K et al., 2001). It is also well recognized that the use of emergency 911 reduces delay to treatment (Albert M J, 1992). Much is known about pre-hospital patient delay in responding to symptoms of stroke. This knowledge could be used to guide a public information program aimed at improving awareness and inspiring appropriate action resulting in more timely access to medical care.

2.OBJECTIVES

2.1 GENERAL OBJECTIVES

2.1.1 To evaluate the time taken in assessing and diagnosing of stroke patient from time the patient arrives and until the CT brain is complete

2.1.2 To obtain demographic profile of stroke patients in Emergency Department, HKL

2.2 SPECIFIC OBJECTIVES

2.2.1 To evaluate the time of patient arrival to hospital after the onset of signs and symptoms of stroke in Emergency Department HKL

2.2.2 To evaluate the time for door to medical consultation interval for patient with acute stroke in Emergency Department HKL

2.2.3 To evaluate the time for door to CT scan interval for patient with acute stroke in Emergency Department HKL

2.2.4 To obtain the causes of stroke based on CT scan finding.

2.2.5 To find the most significant predictors correlated with time of arrival

2.2.6 To find the association between time of hospital arrival with demographic factors and medical risk factors for stroke

3. LITERATURE REVIEW

With an incidence between 150 and 300/100.000/year and a mortality between 32 and 164/100.000/year ischemic stroke is the leading cause of disability worldwide and an enormous burden to economy (Murray et al., 1997). Until recently, very little treatment to improve neurologic outcome could be offered and the attitude toward acute ischemic stroke was predominantly nihilistic. In developed countries, the incidence of stroke has been steadily decreasing since 1960's and the initial fall in incidence was largely attributed to better control of hypertension. Subsequent fall in incidence was due to better control of other risk factors such as heart disease, diabetes, smoking and obesity (Shahar et al.,1997). However stroke remains a major cause of death and consistently the third most common cause of death after heart disease and cancers. The economic and psychosocial cost of stroke is tremendous. (American Heart Association Stroke Statistics ,2006).

3.1 Hospital arrival time factor for stroke patients

Patients who experience a sudden ischemic stroke can benefit from administration of intravenous tissue plasminogen activator (tPA) to reduce the resulting disability, yet few arrive in time to be eligible for tPA administration. Few studies had been done to assess factors associated with the hospital arrival time. These studies covers the pre-hospital factors and in-hospital factors. As for pre- hospital factors, the area studied will involved the behavioural, knowledge, perception as well as logistic factors while the in-hospital factors will covers the emergency department management. In pre-hospital factors many studies had discovered that the mode of transportation plays an important role for early

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arrival. It is proven that arrival by EMS does help in reducing the pre-hospital delay in many of the studies (Farzaneh et al., 2002, Maimoona et al., 2007). Linda et al., (1997) found that patients arriving by private car or taxi and those perceiving their incomes as comfortable had the longest arrival times, suggesting public education efforts also should target people from higher socioeconomic groups. The non-significant associations between hospital arrival time, warning signs, and other demographic characteristics of initiators suggest there may be other unmeasured behavioural factors that play a more important role in reducing hospital arrival time for stroke patients. Further study of additional factors associated with early hospital arrival time is recommended to support educational efforts for early stroke treatment and prevention. Although the number of people affected by stroke is large, the public's awareness of stroke symptoms and the need for immediate treatment evaluation is poor (Hickenbottom et al., 2002; Williams et al., 1997). Pancioli et al., (1998) found that 57% of the general public was able to identify only one of the warning signs of stroke, 28% were able to identify two signs, and only 8% were able to identify three signs. Although Schneider et al., (2003) reported a significant improvement in the identification of warning signs by the general public between 1995 and 2000, those who are most at risk for stroke, such as people older than 75 years, African-Americans, and males, are the least knowledgeable about the warning signs and risk factors for stroke. Accomplishing all of these things within 3 hours requires early hospital arrival time and prompt action by healthcare providers once the patient has arrived. Although recent treatment options include the administration of intra-arterial tPA, which can extend the time window to 6 hours, this intervention is limited to specialized institutions. Consequently, early hospital arrival time is still essential (Jovin

et al., 2002). Studies have documented that fewer than half of stroke patients are admitted within 3 hours. Kothari et al., (1999) found only 30% of their stroke patients arrived in 3 hours, and Williams et al., (1997) found that less than 25% arrived within 3 hours. In 2001, Lacy et al., found that 46% of stroke patients arrived to the emergency room within 3 hours. These findings suggest a need for further information about factors associated with early hospital arrival. More information about these factors may guide public educational efforts in this context.

3.2 The creation of Stroke Team

Reactive tissue plasminogen activator (r-TPA) has been shown to work within the first 3 hours of onset of symptoms, making stroke treatment a true emergency. The short treatment windows require rapid evaluation of patients who may have had a stroke. Stroke teams have been created for this purpose (Helmi L,2007). The members of a stroke team vary depending on the needs of the individual hospital, although code team personnel often include one or more neurologist and nurses. To achieve maximal efficiency, the team must integrate itself with all services involved in the care of patients with acute stroke, which include the local community, emergency medical services (EMS), the emergency department (ED), computed tomography (CT), scanning and pharmacy. The team educates the public and care providers about stroke warning signs and availability of stroke treatment, evaluates and streamlines services, provides stroke treatment rapidly, and continuously monitors the efficacy of its work.