ORIGINAL ARTICLE

National Stroke Registry (NSR): Terengganu and Seberang Jaya Experience

S Norsima Nazifah, BPharm*, I Khairul Azmi, MMed*, B B Hamidon, MMed**, I Looi, MRCP**, A A Zariah, MMed*, M R Hanip, MMed*****

*Hospital Sultanah Nur Zahirah, Terengganu, **Hospital Seberang Jaya, Pulau Pinang, ***Hospital Kuala Lumpur, Kuala Lumpur,****Universiti Putra Malaysia, Serdang, Selangor

SUMMARY

The National Stroke Registry (NSR) was established in 2009 under National Neurology Registry (NNeuR) . The main objectives of NSR were to describe the demographic and disease pattern of stroke patients in Malaysia, to examine the risk factors and evaluate the specified treatment and outcomes.

This prospective observational study was carried out from August 2009 until December 2010 using a standardized case report form which involved two participating hospital, namely Hospital Sultanah Nur Zahirah, Kuala Terengganu and Hospital Seberang Jaya, Pulau Pinang.

There were 1018 patients registered. Ischemic stroke accounted for the majority of cases (73.3%). The most common risk factor was hypertension (75.5 %), followed by diabetes mellitus, previous stroke or Transient Ischemic Attack (TIA), hyperlipidemia and active smoker: 45.6%, 25.1%, 22.4%, and 19.4%, respectively.

Overall, our stroke management, based on nine stroke key performance indicators (KPI) still needs to be improved. There was a total of 121 mortality cases with the main contributing factor was massive cerebral bleed (21.6%).

In conclusion, the findings highlight the important of primary and secondary stroke management. Further and continuous observation with more site date provider (SDP) involvement is needed to get a more comprehensive data on stroke in Malaysia.

KEY WORDS:
Stroke, Risk Factors, Subtypes, Management, Complication, Mortality, Outcome

INTRODUCTION

World Health Organization (WHO) defined stroke as a clinical syndrome characterized by rapidly developing clinical symptoms and/or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. Every year, 15 million people worldwide suffer a stroke. Of these, 5 million die and another five million are left permanently disabled[1]. It is among the top four leading causes of death in ASEAN countries, with the crude death rate ranging from 10.9 per 100,000 in Thailand to 54.2 per 100,000 in Singapore[2]. In Malaysia, stroke was the top two leading causes of death reported by Malaysian National Burden of Disease Study. Mortality because of stroke constituted 8.9% in males and 12.1% in females of total certified deaths[3]. There have been no comprehensive databases on the incidence of stroke in Malaysia.

Epidemiological studies have found that stroke, history of transient ischemic attack, diabetes mellitus, poorly controlled hypertension, smoking and male sex were the independent risk factors identified for stroke[4]. However, the major risk factors of stroke in Malaysia have not been widely studied.

Lack of Malaysian data is also hampering evidence-based efforts to improve patient's care, access to treatment, and to provide and plan the healthcare policy. Hence, the National Stroke Registry (NSR) will provide a continuous and systematically collected data on stroke patients in Malaysia. This patient registry will assist healthcare professionals or clinicians in evaluating the specified treatment and outcomes, examining factors that influence prognosis and quality of life, and describing disease patterns which relevant to stroke in Malaysia. It will also help in terms of budget planning and allocation; enable us to compare our treatment outcome with the rest of the world and as a tool in planning stroke awareness and health education program.

OBJECTIVES

The main objective of this registry is to collect a national data on stroke patient in Malaysia.

The specific objectives are as follows:

1. To determine the demographic pattern of the stroke patients admitted to the MOH hospital in terms of gender proportion, age distribution, racial proportion, and socio-economic status/educational level.
2. To determine the stroke sub-types which based on

a. WHO classification: hemorrhagic (intraparenchymal, subarachnoid), ischemic or Transient Ischemic Attack (TIA).
b. Oxfordshire Community Stroke Project (OCSP) classification for ischemic stroke – Total Anterior Circulation Infarct (TACI), Partial anterior circulation infarct (PACI), Posterior Circulation Infarct (POCI) , lacunar infarct (LACI), and unclassified.

This article was accepted: 20 May 2012
Corresponding Author: Norsima Nazifah Sidek, Jabatan Farmasi, Hospital Sultanah Nur Zahirah, Jalan Sultan Mahmud, 20400 Kuala Terengganu, Terengganu Email: cma_scorpy82@yahoo.com

c. Trial of ORG 10172 in Acute Stroke Treatment (TOAST) classification – large artery, small vessels, cardioembolic, stroke of determined cause, stroke of undetermined cause
d. Location of stroke – right hemisphere, left hemisphere, brainstem, cerebellar.

3. To determine the risk factors of stroke for further planning of the stroke prevention.
4. To determine stroke management in terms of non-pharmacological and pharmacological treatments.

MATERIALS AND METHODS

This is an ongoing, prospective observational study of the cases seen in the referral hospital setting. All acute stroke patients aged more than twelve years old with the onset of stroke within two weeks, in participating hospitals namely; Hospital Sultanah Nur Zahirah (HSNZ), Kuala Terengganu and Hospital Seberang Jaya (HSJ), Pulau Pinang, were included.

Data on demographic, vital signs, risk factors, clinical presentation at the onset of event, physical examinations, stroke classifications, types of treatment, investigations done, and patient's outcome (upon discharge and follow up) and complications were collected in the registry. Data were entered into a specified case report form and later into the web application at http://app.acrm.org.my/nneur. Subsequently, the descriptive statistics for each variable were obtained. The data transferred to the web application were kept strictly confidential with access limited only to authorized individuals.

RESULTS AND DISCUSSION

Between August 2009 to December 2010, there were 1018 acute stroke patients registered in HSNZ and HSJ with 54.3% were men. The racial composition of the patients were Malays (83.7%), followed by Chinese (11.1%), Indians(4.2%) and other races(1.0%) represented the ethnic distribution of the population in Terengganu and Seberang Jaya, Penang. The mean age of patients was 62.5 years with the highest distribution seen in 55 - 64 years group (31.1%). Specifically, the male had the higher number of stroke but the proportion was inverted after age of 75 years (Figure.1). These finding can be explained by the fact that female's hormone being a protector during their reproductively active age[5].

Ischemic stroke accounted for the most common type of stroke (73.2%). The second most common type of stroke in this registry was ICH (20.9%), followed by TIA (4.2%) and SAH (1.7%). For ischemic stroke specifically based on OCSP classification, 43.4 % of patients had PACI, followed by LACI 27.4%, TACI 16.0 %, POCI 7% and uncertain 6.2%. Majority of ischemic stroke patients had large vessel infarct (60.4%). We also classified ischemic stroke based on TOAST, and based on this classification, 439(58.9%)were large vessel cases, 211(28.3%) small vessel cases, 25 (3.4%) cardioembolic cases, and were 75 (10.1%) undetermined cases . The location of stroke was almost equal between the right (38.0%) and left hemispheres (35.7%). 17.6 % of patients had their stroke at both hemispheres, the remaining 6.3% were in cerebellar or brainstem and 2.4% were uncertain.

Our data showed that hypertension (75.1 %) was the most prevalent risk factor for stroke in our population. Other risk factors were diabetes mellitus (DM) (45.7%), previous stroke or TIA (22.0%), hyperlipidemia with mean LDL of 4.1 (± 1.6) (21.8%), and active smoker (19.0%). The risk factors based on stroke subtype are shown in Figure 2. Overall, hypertension showed the highest percentage in all stroke subtypes. This finding highlights the significant relationship between stroke and hypertension and the need for prevention of this important risk factor.

For stroke management, Malaysia has established a standard and quality measurement system called nine stroke key performance indicators (9KPI), adapted from CDC PCNASR[6] in order to improve stroke healthcare delivery system in our country. These nine indicators comprised of thrombolytic therapy administration, antiplatelet therapy within 48 hours of admission, venous thromboembolism prophylaxis (VTE), anticoagulation therapy for atrial fibrillation (AF), discharged on antiplatelet therapy , discharge on statin medication, dysphagia screening , stroke education, and assessement for rehabilitation. However, thrombolytic therapy administration was not measured since the drug not yet available in MOH Drug Formulary.

From our observation, 85.7% of patients were given antiplatelet medication within 48 hours of admission and 84.4% discharged on it. Withdrawal of therapy due to gastrointestinal bleeding complication might be the possible cause of the slightly percentage reduction(1.3%). Our data regarded statin medication also showed similar percentage as antiplatelet administration with 87.0% of our patients were prescribed at least one type of statin during discharge. Adherence to venous thromboembolism prophylaxis (VTE) and anticoagulation therapy for atrial fibrillation (AF) was very poor in our population with 38.6% and 39.4% respectively. These two measurements needed to be improved since not adhering to these therapies may expose patient to stroke complication.

For non pharmacological management, dysphagia screening was done in 83.0% of cases, patient education have been given to 75.7% of patients or caregivers and 76.7% of patients received the rehabilitation or plan for rehabilitation.

The mean length of hospital stay in this study was 5.1 days which was shorter than previous study, 7.5 days[7]. We believed the better hospital management nowadays and the local cultural practice of family taking responsibility of long term care and inadequate nursing home facilities probably accounts for the short hospital stay in this study compared to other studies such as [8,9,10] 52 days, 28 days, and 37 days, respectively.

The overall mortality rate was 11.1%, which was lower than other previous local studies [7,11,12]. However, specifically, our mortality rate in haemorrhagic stroke (24.9%) patients were higher than ischemic stroke (8.1%). Our finding was consistent with study done by Andersen *et al*[13] with mortality rate of haemorrhagic stroke 1.5 times compared to ischemic stroke (HR, 1.564; 95% CI, 1.441–1.696). Study done by Xian *et al* [14] . also reported the mortality rate of 11.3% for ischemic

stroke and 37.3% for intracerebral hemorrhage. Our complication rate (25.9 %) also found to be lower than many previous studies, with ranged over 59 % to 85% [9,10,15,16]. The frequencies of individual complications are shown in Table I. The most common complication was pneumonia (20.9%) which was comparable to previous published reports[15,16]. A reported probable reason for the high incidence of pneumonia was that the patients were usually fed before admitted to the hospital and unaware of swallowing problem among patient or relatives[7]. Three main causes of mortality were massive cerebral bleed (41.6%), sepsis secondary to aspiration pneumonia (23.9%) and massive cerebral infarct (21.2%).

At this moment, only two sources of provider are actively contributing the data collection via web application, causes limitation to our National Stroke Registry. However, the recruitment of the site data provider is still actively in progress.

CONCLUSION:

Even though this report did not represent the whole Malaysian stroke data, the findings from this registry strongly suggest the need for more efficient public health education on signs, symptoms and risk factors of stroke and should concentrate more intensely on the important of seeking the medical attention as soon as possible.

In addition, unsatisfied finding on stroke pharmacological and non pharmacological managements highlight the need for continuing coordinated programs and more site data provider's recruitment to improve the stroke quality of care of stroke patients.

ACKNOWLEDGEMENT

We would like to thank the Ministry of Health Malaysia for financial support, the Clinical Research Centre for technical support and advice, as well as all physicians and staffs of the participating hospitals, who contributed to this registry.

REFERENCES

1. World Health Organization. The World Health Report. Geneva, Switzerland. 2004. pp.190-195.
2. Venketasubramian N. The epidemiology of stroke in ASEAN countries-a review. Neurol J SEA 1996; 3: 9-14.
3. Ministry of Health. Malaysian Burden of Disease and Injury Study. Kuala Lumpur, Malaysia. 2004 pp.42.
4. Kaarisalo MM, Immonen-Raiha P, Marttila RJ, Lehtonen A, Torppa J & Tuomilehto J. Long-term predictors of stroke in a cohort of people aged 70 years. Arch Gerontol Geriatr 2000; 31(1): 43-53.
5. Saini M, Shuaib A. Stroke in women,. Recent Pat Cardiovasc Drug Discov 2008 Nov; 3(3): 209-21.
6. CDC. Consensus stroke performance measures. Atlanta, GA: US Department of Health and Human Services, CDC; 2010. Available at http://www.cdc.gov/dhdsp/docs/pcnasr_performance_measures.pdf.
7. Hamidon B B, Raymond A A. Risk Factors and Complications of Acute Ischaemic Stroke Patients' at Hospital Universiti Kebangsaan Malaysia (HUKM). Med J Malaysia. 2003; 58:499-505.
8. Dromerick A, Reding M. Medical and neurological complications during inpatient stroke rehabilitation. Stroke 1994; 25: 358-61.
9. Van Straten A, Van Der Meulen JH, Van Den Bos GA, Limburg M. Length of hospital stay and discharge delays in stroke patients. Stroke 1997; 28: 137-40.
10. Davenport RJ, Dennis MS, Wellwood I, Warlow C Po. Complications after acute stroke. Stroke 1996; 27: 415-20.
11. Hamidon BB, Raymond AA. Predictors of in-hospital mortality after an acute ischaemic stroke. Neurol J Southeast Asia 2003; 8: 5-8.
12. Fauziah J, Nyunt Win M, Mohd Riduan A, Mohd Rusli A, Jafri MA. Stroke Patterns in Northeast Malaysia: A Hospital-Based Prospective Study. Neuroepidemiology 2002;21:28-35 .
13. Andersen K K, Olsen T S, Dehlendorff C, Kammersgaard L P. Hemorrhagic and Ischemic Strokes Compared: Stroke Severity, Mortality, and Risk Factors. Stroke.2009; 40; 2068-2972.
14. Xian Y, Holloway RG, Pan W, Peterson ED. Challenges in Assessing Hospital-Level Stroke Mortality as a Quality Measure.Comparison of Ischemic, Intracerebral Hemorrhage, and Total Stroke Mortality Rates. Stroke2012;STROKEAHA,111.648600
15. Langhorne P, Stott DJ, Robertson L, *et al*. Medical complications after stroke: a multicenter study. Stroke 2000; 31: 1223-29.
16. Kumar S, Selim MH, Caplan LR. Medical complications after stroke. Lancet Neurol 2010; 9: 105-18.