VALIDITY OF SIRIRAJ STROKE SCORE IN AFGHANS

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Back Ground: Afghanistan is an under developed country financially crippled by war, lacks the facility of Computed tomography in provinces neighboring Khyber Pakhtoonkhwa and all stroke patients are referred to Peshawar for brain imaging resulting in treatment delay and increased morbidity and mortality.

Objective: To study the sensitivity and specificity of Siriraj Stroke Scoring (SSS) and to validate the accuracy of SSS in acute stroke syndromes in Afghan patients.

Design: Non interventional descriptive study.

Place and Duration of Study: Department of Medicine, Hayat Abad medical complex Peshawar, from January 2010 to June 2011.

Subjects and Methods: A total of 118 stroke patients of Afghan nationality residing in Peshawar are received directly from Afghanistan were included in this study. Demographic information, social history, past medical history and information about events around the time of the stroke were recorded. Siriraj stroke score was calculated by obtaining details of each clinical variable Presented within seven days of onset of stroke. CT brain was performed in all Patients. The results of CT scan were compared with clinical diagnosis on case to case basis and precision of clinical diagnosis was ascertained. Patients with subarachnoid haemorrhage and transient ischemic attacks were excluded from the study. The findings were recorded, compared and statistically analyzed.

Results: A total of 118 Afghan stroke patients were enrolled in this study. Calculation of gender distribution showed 69.4% male patients and female were 330.6%.The mean (SD) age was 55(+ 15).Hypertension was noted in 50% patient, DM in 30.5%, ischemic heart disease in 21%, smoking in 16%, congestive cardiac failure in 11% and rheumatic heart disease in 9% patients. According to the SSS, 26% cases were classified as probable haemorrhagic stroke, 52% patients as probable ischaemic stroke and 21% patients as equivocal. Out of 62 clinically suspected of cerebral infarction by SSS, only 48 proved to have infarction on CT scan reflecting 77% agreement. Hemorrhagic stroke was suspected in 31 patients clinically by SSS, Out of these only 25 had hemorrhage on CT scan showing 80% agreement. Statistical analysis revealed 88% sensitivity and specificity of 60% for SSS.

Conclusion: The Siriraj stroke scoring system is a valid and specific scoring system for the diagnosis of subtypes of stroke in afghan patients.

INTRODUCTION

Stroke is define as rapidly developing clinical syndrome of focal disturbance of cerebral function lasting longer than 24 hours (unless interrupted by surgery or death), presumably of vascular origin.[1] Stroke accounts for substantial morbidity and death in the developing world.[2] Worldwide, stroke is the third commonest cause of death after coronary heart disease and all Cancers.[3] Stroke caused an estimated 5·7 million deaths in 2005, and 87% of these deaths were in low-income and middle-income countries.[4]

Early detection of intracranial bleed is essential for the rational use of antihemostatic drugs in stroke patients. Clinical differentiation of stroke types is often challenging even for experienced physicians.[5] To be sure clinically about the type of stroke (Hemorrhagic or ischemic) in majority of cases as there is no specific differentiating feature.[6] Computed tomographic (CT) scan has now become the main component of the diagnosis.[7]

Developing countries like have been burdened not only with infectious diseases but also with non-communicable diseases such as diabetes mellitus, hypertension, heart disease, stroke, and cancer. With highly refined technologies becoming increasingly available worldwide physicians must be selective in applying these to patients. The cost constraint is greater in developing countries. Investigative procedures in neurology, notably computerized brain scanning and magnetic resonance imaging are prohibitively expensive in both the initial investment and the maintenance, requiring careful consideration in their acquisition and usage. In areas with limited brain imaging facilities, scoring models have been proposed to clinically distinguish hemorrhage from infarction.[8, 9]

The Allen and Siriraj stroke (SSS) and Greek scores are the three main existing models derived from logistic regression techniques and devised to differentiate clinically between hemorrhagic and ischemic stroke.[10] Despite initial reports of favorable accuracy, their clinical use has proved limited by the conflicting results observed in the following validation studies.[11]

Accordingly, the application of these models to a different population can be done only once they have

been tested and validated on that population because demographic and ethnic differences could have a significant effect on their performance. Afghanistan is an under developed country crippled by war, lack the facility of CT brain in provinces neighboring Khyber Pakhtoonkhwa and all stroke patients are referred to Peshawar for brain imaging. Our teaching hospital is first on the road from Jalal Abad to Peshawar and receive bulk of these stroke patients. We therefore aimed to validate and compare the SSS in a large independently selected group of Afghan patients.

METHODOLOGY

This study was conducted on 118 consecutive afghan patients with acute stroke, admitted in Medical A unit of Hayat Abad Medical Complex Hospital Peshawar Pakistan, from January 2010 to June 2011 meeting the inclusion criteria. Patients were declared afghan by possession of afghan refugee card or afghan national identity card or other identity document.

Inclusions Criteria

- Patients with acute stroke i.e. rapidly developing symptoms and/or signs, of focal or global loss of cerebral function lasting for more than 24 hours, with no apparent cause other than that of vascular origin (WHO criteria).[13]
- Presented within seven days of onset of stroke, irrespective of age and severity of deficit.
- Patient in whom the pathological subtype of stroke was confirmed by CT scan within one week after the onset of stroke.

Exclusion criteria:

Patients with any one of following conditions were excluded from the study:

- Stroke onset of more than one week.
- Patient dying or leaving the hospital in less than 24 hours after admission.
- CT scan done after two weeks of onset of stroke.
- CT Scan showing subarachnoid haemorrhage.
- Patients receiving anticoagulant therapy.
- Patients with bilateral motor weakness.

Demographic information, social history, past medical history and information about events around the time of the stroke were recorded. Siriraj stroke score testing five clinical variables, was developed at Siriraj Hospital Medical School, Mahidol University, Bangkok to differentiate between cerebral haemorrhage and infarction. Cut off level for Siriraj stroke score validated by original study was used in this study[8] (Table 1).

- Score greater than +1 = Haemorrhage
- Score less than -1 = Infarction
- Score between +1 and -1 = uncertain

Siriraj stroke score was calculated by obtaining details of each clinical variable. If any variable was not available e.g. if patient was aphasic or unconscious, information from a valid surrogate respondent was taken. A valid surrogate respondent was considered a spouse or first degree relative that was living in the same home or was self-identified as aware of the

Table 1: Siriraj Stroke Scoring System[8]

Variable	Clinical Feature	Score
Consciousness	Alert	0
	Drowsy or stupor	2.5
	Coma or semi coma	5
Vomiting	Yes	0
	No	2
Diastolic blood pressure (in mm Hg)	Times	0.1
Atheroma markers (history of diabetes, intermittentclaudication, or angina)	None	0
	One or more	-0.3
Constant		-12

Table 2: Accuracy of the Siriraj score* in distinguishing between infarction and hemorrhage (Comparison with CT scan)

	CT Brain result		
Siriraj Stroke Score	Infarction hemorrhage	Cerebral hemorrhage	total
Suggestive of infarction	48	16	62
Suggestive of hemorrhage	6	25	31
total	54	41	93

*excluding equivocal scores

Sensitivity=88%

Specificity=60%

Likelihood ratio of a positive test=77%

Likelihood ratio of a negative test=80%

Table 3: Comparison of this study* with previous studies on Siriraj stroke score

Author	Settings	Sensitivity	Specificity
Poungvarin et al.[9]	Bangkok	89 %	93%
Celani et al.[27]	Italy	68%	64%
Hawkins et al.[28]	Auckland	48%	85%
Hui et al.[29]	Hong Kong	91%	90%
Weir et al.[10]	Glasgow	68%	64%
Nouira et al	Tunisia	60%	95%
Shah et al[19]	Islam Abad	71%	85%
Sherin et al[25]	Peshawar (Pakistani)	67%	94%
Amin et al*	Peshawar (Afghans)	88%	60%

patient's previous medical history and current therapies. If the valid surrogate respondent was unaware of the particular variable, then the variable score was adjusted as zero. We tried to record BP and conscious level of every patient at the base line and 24 hours after admission. If due to any reason the record at 24 hours. Systolic BP was determined by the first heard sound (Korotkoff phase I) while diastolic BP was recorded at the level when the sound just disappeared (Korotkoff phase V). History of hypertension was obtained from patient himself or attendants. They were asked about use of antihypertensive drugs or patient's old record showing BP reading of > 140/90 mm Hg[14] on two different occasions before the onset of stroke. Patients were assumed to be fully conscious if they had a score of >13 on the Glasgow Coma Scale (GCS); drowsy if they had a GCS score of 8–13 and unconscious if they scored <7.[15]

Diabetes mellitus (DM) was considered when the patient or his attendants confirmed the history of DM or use of insulin or oral hypoglycemic agents or if patient had a random blood sugar level of 11.1mmol /L or more.[16] History of intermittent claudications was taken from patient or his attendant by considering following criteria: calf pain which is atherosclerotic in origin, induced by exercise and relieved within 10 minutes by rest. Atrial fibrillation was confirmed by ECG recording at arrival. Cardiomegaly was considered if cardiothoracic ratio was more than 0.5 on chest x-ray.

CT scans were analyzed independently by a general radiologists. In the event of a difference of opinion with regard to diagnosis, a consensus was reached. An intracerebral bleed was classified as stroke due to cerebral haemorrhage. Findings of ischaemia, haemorrhagic infarct, or no evidence of stroke were classified as ischaemic stroke. No evidence of stroke on the CT scan was taken as evidence of ischaemic stroke.

RESULTS

A total of 118 stroke patients of Afghan nationality residing in Peshawar are received directly from Afghanistan were included in this study. Calculation of gender distribution showed 82(69.4%) male patients and female were 36(30.6%).The mean (SD) age was 55(±15) years ranged from 24years to 90years.

Hypertension was noted in 59(50%) patient, DM in 36(30.5%) patients, ischemic heart disease in 25(21%) patients, smoking in 19(16%) patients. Congestive cardiac failure in 14(11%) patients land rheumatic heart disease in 11 (9%) patients. According to the SSS 31(26%) cases were classified as probable haemorrhagic stroke, 62(52%) patients as probable ischaemic stroke and 25 (21%) patients as equivocal.

Out of 62 clinically suspected of cerebral infarction by SSS, only 48 proved to have infarction on CT scan reflecting 77% agreement.Rest of the 16(23%) patients were diagnosed as hemorrhagic stroke by CT scan. We suspected hemorrhagic stroke in 31 patients clinically by SSS, Out of these only 25 had hemorrhage on CT scan showing 80% agreement, while the rest 6(20%) had infarction. Twenty five patients were equivocal on siriraj stroke scoring system with 16(64%) cerebral infarctions and 9(36%) cerebral haemorrhages. statistical analysis revealed 88% sensitivity and specificity of 60% for SSS.

DISCUSSION

Stroke is an important public health problem that dramatically affects millions of people annually and incurs enormous and direct costs.[17] A number of lives can be saved and disability averted if ischaemic stroke is promptly treated with thrombolytic and antiplatelet

therapy Intracranial haemorrhage may not be accurately ruled out by history and physical examination. Because rural hospitals often lack the facility for CT scan, researchers have tried to create and validate scores to distinguish between ischaemic and haemorrhagic stroke.[18]

In our study Stroke was more common in male gender similar observation was reported by Khan et al[6] and shah et al.[19] Mean age in our study was 55 years while Badam et al[2] and walker et al[20] reported 57 and 67 years respectively. Computed tomography proven cerebral infarction out numbered cerebral bleed (75% v 25%) similar figures were reported by soman et al[21] and Nouira et al.[12] Hypertension followed by DM were the leading risk factors for stroke in our study also verified in previous studies as by walker et al[20] and Owolabi et al[22]

Studies have noted the roles of race and genetics, and of racial differences in socio-economic status, diet and lifestyle, in predicting stroke.[23] In countries with limited health care facilities, it is clear that not all victims of stroke will have access to brain imaging procedures.[17] The Siriraj score is the "poor man's computed tomography" in terms of reliability. Siriraj stroke score has inspired a number of studies.[24] Various studies on different racial and geographical populations from all over world have reported conflicting figures. (Table 3). We found sensitivity of 88% and 60% specificity for SSS in correctly diagnosing the subtypes of stroke compare to 67%, 94% by local study by Sherin et al[25] on Pakistani population in Peshawar and Iqbal et al[26] from Lahore found 87% and 71% respectively. (Table 2), (Table 3).

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