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Accuracy of Clinical Sub-typing of Stroke in Comparison To Computed Tomography at PRH, Loni

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Original Research Article

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Abstract: In India, stroke is associated with a high morbidity and mortality. It is important to distinguish between cerebral hemorrhage and infarction in cases of acute stroke, since management of these two disorders differs substantially. Because rapid access to CT is virtually impossible for all patients with a cerebrovascular event, more so in the rural set up several investigators have attempted to formulate scoring systems determining on the basis of clinical data the relative likelihood of infarction or hemorrhage as an aid to physicians involved in stroke management. This study assessed the Greek stroke score in differentiating cerebral hemorrhage from infarction and to correlate both scores with computed tomography (CT) scan of head. The study was conducted on 70 patients admitted with acute stroke over a period of one and half year. All relevant clinical data was collected and Greek stroke score was calculated. All patients were subjected to CT scan head within 72 hours of admission. The results were correlated and sensitivity, specificity, positive and negative predictive value of the score was calculated. Of the 70 patients admitted with acute stroke CT scan head showed infarction in 62 patients and hemorrhage in 8 patients. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value(NPV) for Greek stroke score were 83.88%,100%,100% and 44.44% for infarction and 100%, 83.88%,44.44% and 100% for hemorrhage respectively. CT scan head is an accurate, safe and noninvasive procedure for differentiating between cerebral hemorrhage and infarction. However, when CT scan facilities are not available, we suggest Greek stroke score as a simple method of screening patients for intracerebral hemorrhage given the high sensitivity and specificity of the scoring system for detection of ICH (Intracerebral hemorrhage).
Keywords: Greek stroke score, cerebral infarction, cerebral hemorrhage.

INTRODUCTION

Stroke is the second leading cause of death globally and is associated with up to 5.54 million deaths every year, two thirds of which occur in resource poor countries. It has two main subtypes, ischemic and hemorrhagic. For optimal management, a distinction must be made between the stroke subtypes since the therapy is different [1]. Ischemic stroke warrants institution of thrombolytic and/or antiplatelet therapy while in hemorrhagic stroke, hemostatic therapy may be given [2]. Ideally, either thrombolytic or hemostatic therapy should be given soon after the onset of stroke in order to improve outcome [3]. Computed tomography (CT) scan is the gold standard for distinguishing stroke sub-types [3]. It is cheaper than magnetic resonance imaging (MRI), but is still expensive and inaccessible for most resource poor settings. To overcome these difficulties and to enhance clinical bedside diagnosis, clinical stroke scores have been developed. The most commonly used ones include the Guy's hospital score (GHSS) [4], the Besson score [5], the Greek stroke score [6] and the Siriraj stroke score (SSS) [7]. In developing these scores, clinical variables that could potentially distinguish ischemia from hemorrhage in patients with acute stroke were used. Stroke is defined as an acute focal neurological deficit resulting from cerebro-vascular disease. In majority of cases stroke is due to cerebral infarction (85%) followed by cerebral hemorrhage. Despite the presence of long list of minor causes but still the major types are either ischemic stroke or hemorrhagic form. No specific differentiating feature and so it is difficult to be sure clinically about the type of stroke (Hemorrhagic or ischemic) in majority of cases [8]. There is a need for more accurate evaluation of patients presenting with acute stroke syndromes to enable treatment to be targeted with precision. New technologies such as diffusion weighted and perfusion weighted magnetic resonance imaging (MRI), xenon computed tomography (CT), single photon emission computed tomography (SPECT), and

positron emission tomography (PET) may guide treatment in the future, but these will not become widely available for many years. The most widely available approach to the assessment of patients with acute ischaemic stroke is a combination of standard CT and clinical assessment [9]. Stroke is a clinical diagnosis for which CT is the mainstay of investigation. The diagnostic comparisons between the clinical and the CT diagnosis of stroke and the impact of the latter on management are unclear in the local setting [10]. Thus, the present study was carried out to find the accuracy of Clinical Sub-typing of Stroke in Comparison to Computed tomography.

Aim

To Find Out Accuracy of Clinical Sub-typing of Stroke in Comparison To Computed Tomography At PRH Loni In Terms of Sensitivity And Specificity.

Objectives

To study the efficacy of Greek stroke scoring system in differentiating supratentorial infarction and ICH.

MATERIALS AND METHODS

This was evaluation of diagnostic test study type done in department of medicine between September 2016 to April 2018 done with 70 patient admitted with acute stroke. Inclusion criteria: Patients with neurological deficit lasting for more than 24 hours and presenting within 72 hours of onset of symptoms (WHO criteria for acute stroke syndrome), Patient or Relative giving consent for study, Patients whom CT scan shows supratentorial cerebral infarction or intracerebral haemorrhage Exclusion criteria: Stroke due to tumors, trauma, infections, Those on anticoagulant drugs, Those who refuse CT scan or consent, Transient ischemic strokes.

Institute Ethical committee approval was taken prior to the study. Written informed consent was taken from the study subjects before enrolling them in the study.

METHODOLOGY

The selected study subject was interviewed & examined. A detailed history was taken in each patient in relation to their name, age, sex, address, occupation, past and personal history etc. Stroke score was calculated for each patient individually. Results was certain for the presence of ischemic stroke or hemorrhagic stroke or equivocal using the Greek Stroke Score. Thus, the results were compared to CT scan results & sensitivity, specificity, positive and negative predictive values were calculated. Parameters studied: Recorded from patients at presentation and or during the first three hours of hospitalization: Clinical features (onset of neurological deficit, vomiting, loss of consciousness), Glasgow coma scale (GCS), Neurological deterioration within first 3 hours of hospitalization, White blood cell count (WBC), CT scan of Brain.

Interpretation of Greek store score [6, 11]

- Decreased level of consciousness – defined as a score less than 4 in the subscale of Glasgow coma scale regarding eye opening.
- Neurological deterioration (ND) within 3 hrs of admission. a) Decline from an initial Glasgow coma scale of >12 by > or equal to 4 points and / or b) New deficit i.e, not found at presentation.
- Vomiting 4.
- WBC >12,000 cells/cu.mm. Number of points : +3 to Decreased level of consciousness, +6 to ND within 3 hrs from admission, +4 to vomiting, +4 to WBC >12,000 cells/cu.mm. Scoring $\leq$ 3: Infarct, 4 – 10: Equivocal, $\geq$11:Intra-cerebral Hemorrhage.

RESULTS AND DISCUSSION

Variable of greek stroke score	Infarction	Hemorrhage
Decreased level of consciousness	56	8
Neurological deterioration	1	3
Vomiting	2	8
WBC >12000 /cu.mm	10	3

Correlation of Greek stroke score and CT brain:

Greek stroke score / CT brain	Infarction	Hemorrhage	Total
< or equal to 3	52	00	52
4-10	08	00	8
>11	02	08	10
Total	62	8	70

Correlation of greek stroke score and CT brain for cerebral infarct:

Greek stroke score / CT brain	Positive	Negative	Total
Positive	52	0	52
Negative	10	8	18
Total	62	8	70

Correlation of greek stroke score and CT brain for hemorrhage:

Greek stroke score / CT brain	Positive	Negative	Total
Positive	8	10	18
Negative	0	52	52
Total	8	62	70

Of the 70 patients admitted with acute stroke CT scan head showed infarction in 62 patients and hemorrhage in 8 patients. Greek Stroke Score gives unequivocal results in 62 cases and equivocal results in 8 cases. Thus it has applicability of 88.57%. It wrongly diagnosed 2 cases of ischaemic stroke as hemorrhage stroke.

The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) for Greek stroke score were 83.88%, 100%, 100% and 44.44% for infarction and 100%, 83.88%, 44.44% and 100% for hemorrhage respectively with diagnostic accuracy is 85.71%.

CONCLUSION

The CT scan remains as a gold standard in differential diagnosis of stroke and Greek scoring system may be used as a guide in management only when resources are limited and CT scan facilities are not available. As our study had a small cohort more studies are required with large sample of patients to further validate this score.

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