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VALIDITY OF INTRACEREBRAL HAEMORRHGE SCORE IN PREDICTING PROGNOSIS OF HEMORRHAGIC STROKE

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ABSRACT

Background: Stroke is a common neurological disorder, leading cause of death and disability worldwide. Intra cerebral hemorrhage comprises of 10-15% of all strokes but associated with high risk of morbidity and mortality than cerebral infraction .The ICH Score is a good prognostic tool calculated very easily, when it is used to predict 30 day morality. **Objective:**To determine the validity of Intracerebral hemorrhagic score in predicting prognosis (adverse outcome or death) in patients of hemorrhagic stroke.**Material&Methods:**This case series study was carried out at department of medicine Liaquat medical University Hospital Jamshoro and Hyderabad from June 16th 2012 to December 15th 2012.Eighty nine 89 patients were enrolled in the study, non-probability consecutive sampling technique was applied and data was collected after inclusion and exclusion criteria and structured proforma were designed for study.**Results:** Out of 89 patients 56 (62.9%) were male and mean age of the patients in our study was 65.14 years .In 32(36%) patients ICH score was ≥ 3 while 57 (64%) patients had ICH score was < 3. Out of total 32 patients who had ICH score ≥ 3, Adverse outcome i.e. death occurred in 25 (78.12%) patients and males were 16(80%) and 9(75%) were female patients.**Conclusion:** Frequency of adverse outcome (death) was found in 28.1% while ICH score predicted adverse outcome (death) in 36.1%. ICH score correctly predicted 77.77% adverse outcome, therefore we can conclude that ICH score is useful scale to predict mortality in patients suffering from intracerebral hemorrhage.

Key words: Intracerebral Hemorrhage, Intra cerebral hemorrhage score, Glasgow Coma Scale, Mortality

Introduction:

Stroke is defined as the sudden onset of focal neurological deficit due to a vascular cause. Stroke results from lack of blood flow to an area of the brain. Stroke is classified into ischemic and hemorrhagic stroke. Hemorrhagic stroke may be either cerebral haemorrhage or intra cranial haemorrhge and cerebral haemorrhge is either intra parenchymal haemorrhge or intra ventricular haemorrhge. Intracranial haemorrhge classified in to extra Dural hematoma, subdural hematoma and subarachnoid haemorrhge .Stroke is the common neurological disorder, leading cause of death in developing as well as in developed countries, prevalence in us is about 7 million (3.0%) and incidence varies according to age, sex, ethnicity and socioeconomic status [1].Worldwide 15 million people suffer from stroke each year, one third die and one-third are left permanently disabled[1][2].Stroke sub types vary in different parts of the world between different races but increased proportion of intracerebral haemorrhge and lacunar infarcts have been reported in Asia [3][4].Intra cerebral haemorrhge comprises of10-15% of all strokes but has a much higher risk of morbidity and mortality than cerebral infraction or subarachnoid haemorrhge (SAH) [5].Despite advances in the treatment of cerebral infraction and SAH, all hematomas are not surgically accessible or their drainage doesn't always improve outcome [6] and no known medical management strategy (like tissue plasminogen activator in ischemic stroke) in case of Intracerebral haemorrhge which improves the outcome of ICH so there should be some adequate scoring system which will help to predict prognosis of ICH [7].Standardization is a major issue for triage and subsequent management of such patients [8-9].Studies on ICH treatment has used a variety of selection criteria for patient's inclusion but inconsistency of selection criteria across studies emphasize that there is no standard or widely accepted early prognostic model or clinical grading scale for ICH that analogous to those used for cerebral infraction, SAH, or traumatic brain injury.[10] [11][12]. The excepted frequency of mortality in intracerebral haemorrhge is around 45% [13]. The prognosis of hemorrhagic stroke varies depending on the site and size of the haemorrhge. Lower Glasgow Coma Scale scores are associated with poorer

prognosis and higher mortality rate. A larger volume of blood at presentation is associated with a poorer prognosis. Growth of the hematoma volume is associated with a poorer functional outcome and increased mortality rate. Non aneurysmal peri mesencephalic has a less severe clinical course and in general better prognosis.The ICH Score utilizes combination of clinical information and CT scan recording [5], can be calculated very easily and this may be a good prognostic tool when used to predict 30 day morality in patients with intracerebral haemorrhge. In the prediction of mortality and short-term outcomes in patients with intracerebral haemorrhge (ICH), the ICH score is a simple, reliable, broadly accepted grading scale. The score is a composite of admission level of consciousness (Glasgow Coma Scale score), age, and initial neuroimaging findings (hematoma volume, location, and intra ventricular haemorrhge).Objective of this study to determine the frequency of adverse outcome (death) correctly predicted by the ICH scores in patients suffering from intracereabal haemorrhge. The ICH score was developed retrospectively and until now had not been validated for prediction of long-term functional outcome

MATERIAL& METHOD:

This case series study was carried out at department of medicine Liaquat medical University Hospital Jamshoro and Hyderabad for a period of six monthsfrom June 16, 2012 to December 15, 2012.All the admitted patients with stroke, suspected of having ICH were considered for enrollment in the study after obtaining the informed consent and according to the predetermined inclusion and exclusion criteria. Eighty nine 89patients were enrolled in this case series study and non-probability consecutive sampling technique was applied, Structured proforma was designed to fill the data on the basis of inclusion and exclusion criteria.Following is the inclusion criteria, Patients of stroke in adult age and confirmed cases of intra cerebral haemorrhge (Intra cerebral haemorrhge is defined as the presence of clinical focal neurological deficit>24 hours, altered sensorium, fluctuating consciousness and confirmed by CT scan findings by visualization of haemorrhge with in the cranial vault as per ICD 10, 161.x) were included in study. Patients with following criteria were excluded, Age<14 was excluded Patients of stroke other than intra cerebral haemorrhge, with meningo-encephalitis and intra cranial space occupying lesion were also excluded from study after clinical and radiological evaluation. Data was analyzed on SPSS version 20. Mean and standard deviation was calculated for age, RBS, ICH score, Mean arterial pressure and systolic blood pressure. Frequencies were calculated for categorical variables like gender, GCS score category, ICH volume category, IVH, Infratentorial origin of ICH, age category and mortality. Stratification was done about age and gender Other clinical and radiological parameters of enrolled patients in this study were also noted like Initial blood pressure, pulse pressure, mean arterial pressure and Glasgow Coma Scale (GCS) .On CT scan Brain intra cerebral haemorrhge volume (ICH hematoma volume was measured on the initial head CT scan with the use of the ABC/2 method, in which A is the greatest diameter on the largest haemorrhge slice, B is the diameter perpendicular to A and C is the approximate number of axial slices with haemorrhge multiplied by the slice thickness) was recorded and presence or absence of IVH was also noted as a component of ICH score. Patients were followed up to 30 days after hospital admission. Primary outcome was taken as death within 30 days of admission.

RESULTS:

Mean age of the patients in our study was 65.14 years with the standard deviation of ±6.43 years. The minimum age was 55 years, while the maximum age was 81 years, as shown in table 1.

Table 1: Age of the patient n=89

Age of the patients (Years)	Mean	S.D	Minimum	Maximum
	65.14	±6.43	55	81

Gender distribution shows that out of total 89 patients 56 (62.9%) were male while 33 (37.1%) were female patients as shown in figure 1.

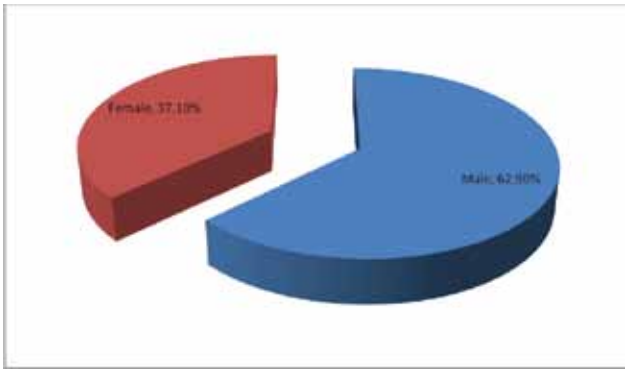

Figure 1: Gender Distribution

Regarding age distribution 83 (93.3%) patients were <80 years of age. (Figure 2).

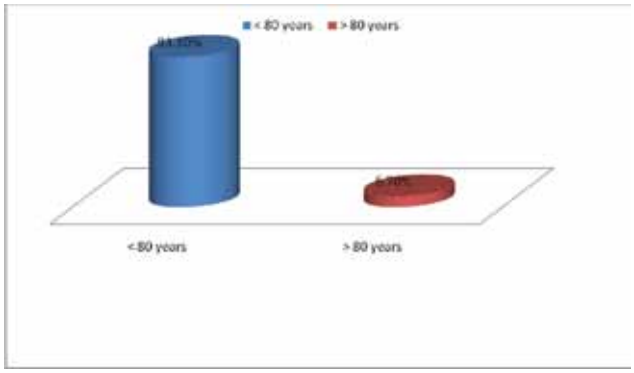

Figure 2: Age distribution

Mean RBS, Intracerebral Haemorrhge score, mean arterial pressure and systolic blood pressure were found to be 145.88±60.38 mg/dl, 4.49±0.740, 135.64±27.36 mm/Hg, and 172.13 ±22.18 mm/Hg as shown in tables 2, 3, 4 and 5 respectively.

RBS (mg/dl)	Mean	S.D	Minimum	Maximum
	145.88	60.38	85	300

Table 2: RBS n=89

ICH Score	Mean	S.D	Minimum	Maximum
	4.49	0.74	3	5

Table 3: ICH Score n=89

MAP (mm/hg)	Mean	S.D	Minimum	Maximum
	135.64	±27.36	92	170

Table 4: Mean Arterial Pressure n=89

SBP	Mean	S.D	Minimum	Maximum
	172.13	±22.18	140	220

Table 5: Systolic Blood Pressure n=89

In 71(79.8) patients Glasgow coma scale (GCS) was between 3-4, while in18 (20.2%) patient's GCS was between 5-12, as shown in figure 3.

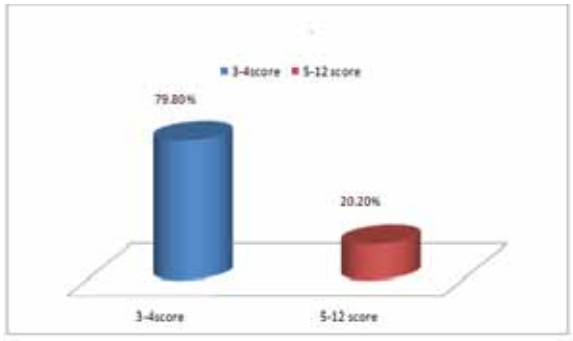

Figure 3: Glasgow coma scale

In this study Intracerebral haemorrhge volume was ≥30cm3 in 46(51.7%) patients as shown in figure 4 and 57(64%) patients had intra ventricular haemorrhge (IVH), while only 10 (11.2%) patients had infra tentorial haemorrhge, as shown in Figure 5 and 6.

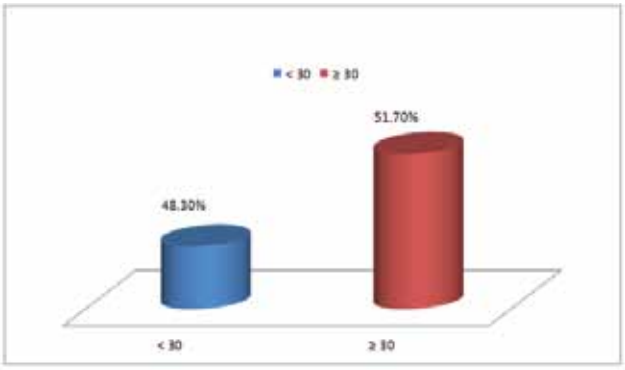

Figure 4: ICH Volume

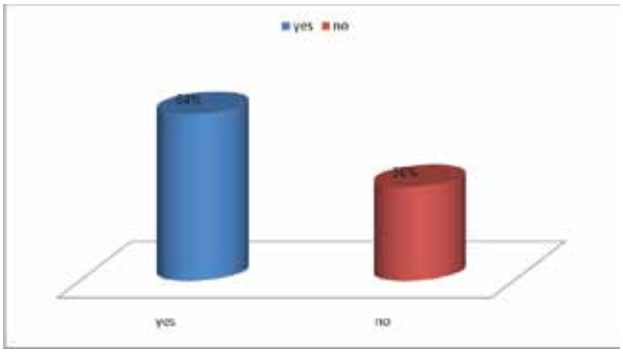

Figure 5: IVH IVH=Intra ventricular haemorr

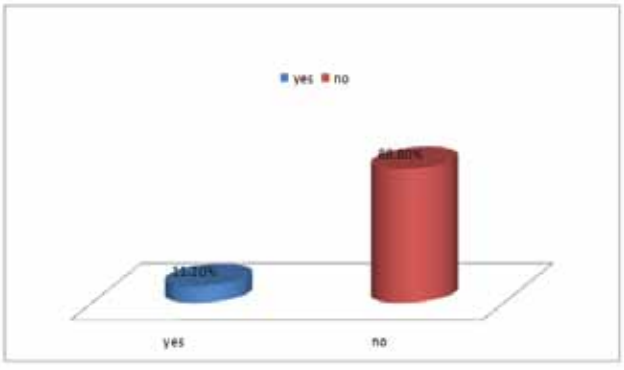

Figure 6: Infra tentorial haemorrhge

In our study 32(36%) patients had ICH score ≥ 3 while 57 (64%) patients had ICH score < 3 as shown in figure 7.

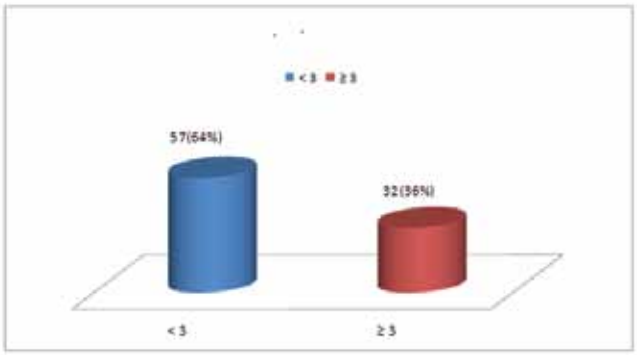

Figure 7: ICH Score ICH= Intracerebral haemorrhge

Out of total 32 patients who had ICH score ≥ 3, actual Adverse outcome, i.e. death occurred in 25 (78.12%) patients whereas 7(21.85%) patients remained alive as mentioned in Figure 8.

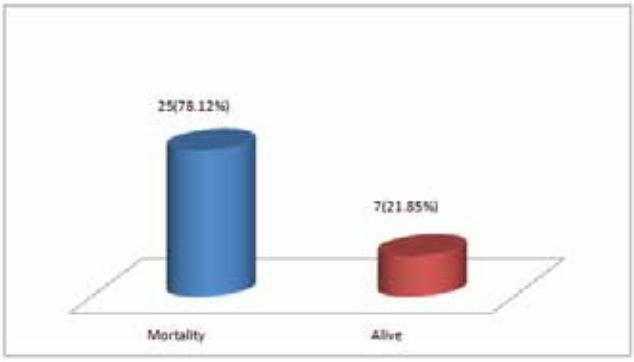

Figure 8: Mortality in patients with ICH score> 3

Out of 17 patients with age <80 years mortality occurred in 11 (64.70%) patients remaining 6(35.29%) were alive, whereas 14 (93.33%) patients had a mortality with age ≥80 years, as shown in Table 6

Age Distribution	Mortality		Total
	Yes	No	
<80 years	11(64.70)	6(35.29)	17(100)
≥80years	14(93.33)	1(6.66)	15(100)
Total	25(78.12)	7(21.87)	32(100%)

Table 6: Age categories and mortality in patients with ICH score ≥3 n=

Regarding gender distribution mortality with ICH score ≥3, male patients were 16(80%) and 9(75%) patients were females as shown in Table 7.

Gender Distribution	Mortality		Total
	Yes	No	
Male	16 (80)	4 (20)	20 (100)
Female	9 (75)	3 (25)	12 (100)
Total	25(78.12)	7(21.87)	32(100%)

Table 7: Gender Distribution and mortality in patients with ICH score ≥3 n=32

DISCUSSION:

Intracerebral haemorrhge (ICH) causing 10 to 15% of first-ever stroke, with 30-day mortality rate of 35 to 52% and half of the deaths reported within the first 2 days.[14] [15][16].Mean age of the patients in our study was 65.14 ±6.43 years. Similar results were published by patriota et al in 2009 , mean age in their study was 67.7±11.2 years [17]. Mean age of the patients in the study of Weimar et al was 67.4±12 years [18]. In our study 37.1% patients were females while most of the patients were males i.e. 62.9% but 51.4% patients were females in the study of Patriota et al [17].Gender distribution in the study of Weimar et al shows 43.9% patients were females in their study [18]. Mean RBS and systolic blood pressure in our study was found to be145.88± 60.38mg/ and 172.13±22.18mm/Hg respectively and almost Similar results were also reported 144.1 ±62.8mg/dl and 173.8±35.7 mm/Hg by Patriota et al[17].Out of total 32 patients who had ICH score was ≥ 3 actual adverse outcome i.e. death occurred in 25 (78.12%) patients, whereas in contrast the mortality was found to be 37.8% in another study [17]. In few studies ICH score was previously been validated in an independent dataset for prediction of good outcome but mortality rate during the initial hospitalization was high (95 of 243 patients) and higher ICH score was associated with a lower likelihood of favorable outcome [18][19]. The excepted frequency of mortality in Intracerebral haemorrhge is around 45%[13], Hemphill et al conducted a landmark study in which ICH was validated[5] and 161 patients with ICH score 5 were died whereas thirty day mortality rate for patients with ICH scores of 1,2,3 and 4 were 13%,26%, 72% and 97% respectively[.5]

CONCLUSION:

In this study frequency of adverse outcome (death) was found in 28.1% while ICH score predicted adverse outcome (death) in 36.1%. ICH score correctly predicted 77.77% adverse outcome, therefore we can conclude that the ICH score is a simple, reliable, broadly accepted grading scale. This study confirms the literature data about high mortality in ICH and reinforces the external validation of ICH Score as good prognostic tool to predict the adverse outcome in intra cerebral hemorrhagic stroke.

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Author's contribution:

Dr. Muhammad Aslam Rind: Protocol Writing Study Concept & Design, Data Collection, Data analysis, manuscript writing & Manuscript Review.
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Dr. Manzoor Ali lakhair: Protocol Writing Study Concept & Design, Data Collection, Data analysis, manuscript writing & Manuscript Review.
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Dr. Sadia Sheikh: Data Collection, Data analysis, manuscript writing & Manuscript Review.