Original Article

Intracerebral Hemorrhage

Predictive Value of Glasgow Coma Scale (GCS) Scores in Patients Presenting with Spontaneous Intracerebral Hemorrhage

Muhammad Mushtaq[1], Zar Khan[2], Nazar Muhammad Afridi[3] and Arshad Wahab Shah[4]

ABSTRACT

Objective: To determine the Glasgow coma scale scores in patients presenting with spontaneous intracranial hemorrhage.

Study Design: Descriptive study,

Place and Duration of Study: This study was conducted at the Department of Neurosurgery, Ayub Medical College, Abbottabad from July 2014 to June 2015.

Materials and Methods: All those patients who were between the ages of 40-70 years, who had a GCS of ≥ 5 and who had an intracranial hemorrhage for less than 72 hours duration were included in this study. All those patients with a GCS score of < 5, or who presented after 72 hours of onset of intracranial hemorrhage, or who were on anticoagulant therapy were excluded from the study. Detailed history was taken especially about hypertension, Diabetes mellitus, hyperlipidemia, lifestyle, smoking etc. and clinical examination was performed. Level of consciousness of all patients was assessed by calculating their GCS scores. All patients underwent CT scan brain (unenhanced) to confirm the intracranial hemorrhage. Data was managed and analyzed using SPSS version 21.

Results: There were 140 patients in this study. As per the gender, there were 77 males, 55%, and 63 females, 45%, representing that males were affected more than females. Mean age of study participants was 54.89±7.42 years, (range: 43 – 68 years). Age-wise stratification of patients showed that most of the patients, 52.14%, belonged to 40 – 55 years of age showing higher predilection for this age group. Mean GCS scores of the patients was 7.02±1.45. As per the blood pressure of patients, mean systolic blood pressure was 178.79±11.49 mmHg and mean diastolic blood pressure was 102.69±5.32 mmHg. Most of our patients presented with complaints of headache and vomiting followed by loss of consciousness or focal neurological deficits.

Conclusion: GCS provides valuable information regarding the level of consciousness of patients with intracerebral hemorrhage. Hypertension remains to be a common cause of stroke in our country. Large multi-centric studies should be conducted to check validity of GCS scores as well as it should be compared with new and more objective scoring systems. Masses should be educated about the risk factors leading to hypertension as well as ways to modify these risk factors so as to reduce the incidence of hypertension and improve blood pressure control in these patients.

Key Words: Glasgow coma scale, intracerebral, hemorrhage

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INTRODUCTION

Non-traumatic intracerebral hemorrhage (ICH) is a major health problem which is associated with higher morbidity and mortality.[1] The incidence of intracerebral hemorrhages is estimated to be 10-30 per 100,000 population per year and rises with age.[2]

[1.] Department of Neurosurgery / Surgery[2] / ENT[3] / Community Medicine[4], Frontier Medical & Dental College, Abbottabad.

Correspondence: Dr. Muhammad Mushtaq, Assistant Professor, Department of Neurosurgery, Frontier Medical & Dental College, Abbottabad.
Contact No: 0312-5776119
Email: Mohammad.mushtaq22@yahoo.com

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It is an emerging health issue as there is an 18% increase in the number of hospital admissions in the last decade which are attributed to intracerebral hemorrhage.[3] This rise in hospital admissions could be due to the rising population of elderly people especially in developed countries as well as increased incidence of hypertension.[4]

ICH is characterized by hemorrhage into the brain parenchyma due to rupture of blood vessels. This bleeding can extend into the surrounding brain structures e.g. ventricles and rarely into subarachnoid space.[5] The two most common causes of primary intracerebral hemorrhages are hypertension and cerebral amyloid disease while secondary intracerebral hemorrhages are associated with anticoagulant therapy and abnormal vasculature.[5] In case of hypertension, bleeding occurs at the sites of bifurcation of smaller penetrating arteries while cerebral amyloidosis affects small to medium blood vessels of the cerebral cortex.[6, 7]

The Glasgow comma scale, (GCS), has been employed in 1974 and since then, its widely used as a tool to assess severity of head injury and level of consciousness of comatosed individuals.[8] GCS incorporates different functions of central nervous system and comprises of eye-opening, verbal and motor responses.[9] Currently, it is the most commonly used method of assessing the severity of head injury in medical research. It provides an added advantage of comparing the severity among different patients. Despite the fact there are many new and more reliable scoring systems available for this purpose, but many clinicians still prefer GCS.

We have conducted this study to evaluate the severity of spontaneous ICH in our patients using GCS as a scoring system.

MATERIALS AND METHODS

This descriptive study was done at Department of Neurosurgery, Ayub Medical College, Abbottabad from July 2014 to June 2015. It was a consecutive non-probability sampling. All those patients who were between the ages of 40-70 years, who had a GCS of ≥ 5, who had an intracranial hemorrhage for less than 72 hours duration were included in the study. Those patients with a GCS score of < 5, or who presented after 72 hours of onset of intracranial hemorrhage, or who were on anticoagulant therapy were excluded from the study. Detailed history was taken especially about hypertension, Diabetes mellitus, hyperlipidemia, lifestyle, smoking etc. and clinical examination was performed. Level of consciousness of all patients was assessed by calculating their GCS scores. All patients underwent CT scan brain (unenhanced) to confirm the intracranial hemorrhage. Data was entered, managed and analyzed using SPSS version 21. For numerical values, mean±SD were computed while for categorical variables, frequencies and percentages were calculated.

RESULTS

Total of 140 patients were included in this study as per inclusion and exclusion criteria. Socio-demographic and clinical characteristics of study participants are given in Table 1. As per the gender, there were 77 males, 55%, and 63 females, 45%, representing that males were affected more than females. Mean age of study participants was 54.89±7.42 years, (range: 41 – 70 years). Age-wise stratification of patients showed that most of the patients, 52.14%, belonged to 40 – 55 years of age showing higher predilection for this age group. Mean GCS scores of the patients was 7.02±1.45, (range: 5 - 9). As per the blood pressure of patients, mean systolic blood pressure was 178.79±11.49 mmHg, (range: 160-195 mm Hg) and mean diastolic blood pressure was 102.69±5.32 mmHg, (range: 93-110 mm Hg).

Figure 1 delineates the chief presenting complaints of the patients. Most of our patients presented with complaints of headache and vomiting associated with or followed by loss of consciousness or focal neurological deficits.

Table No. 1. Socio-demographic and clinical profile of patients, (n=140)

Variable	Number	Percentage
Gender		
Male	77	55%
Female	63	45%
Total	140	100%
Age groups (years)		
40 – 55	73	52.14%
56 – 70	67	47.86%
Total	140	100%
Blood pressure	**Mean±SD**	**Range**
Systolic blood pressure	178.79±11.49	160-195 mm Hg
Diastolic blood pressure	102.69±5.32	93-110 mm Hg
GCS	7.02±1.45	5-9

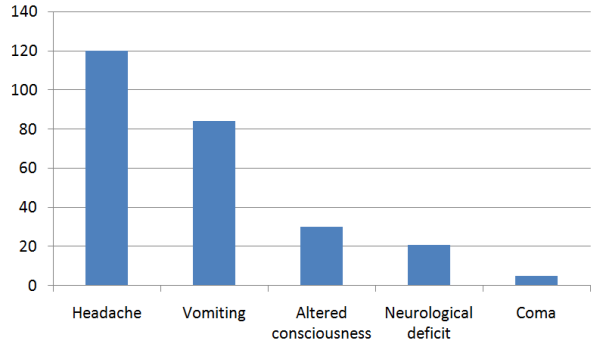

Figure No.1: Presenting complaints of patients, (n=140)

DISCUSSION

Intracerebral hemorrhage constitute significant health and economic burden as the number of patients admitted to hospital because of intracerebral hemorrhage are increasing while there is no change in mortality rate despite advances in diagnostic techniques and treatment modalities.[1, 3] Early diagnosis and treatment of ICH is of pivotal importance as it reduces mortality and functional loss in these patients.[5]

GCS is commonly employed in clinical practice to assess the severity and extent of brain injury. GCS is very helpful prognostically as well as it helps to monitor the state and condition of patient which can be assessed from serial GCS scores, whether the scores are improving or deteriorating.[9] But, it has its own limitations. The most important criticism levied against GCS was its inability to include brainstem reflexes and pupillary reactions.[8, 10] Furthermore, in cases of acute stroke, any focal neurological deficit causing dysphasia also affects GCS.[11]

In this study, most of the patients were males, 55%, and the mean age was 54.89±7.42 years. Majority of patients were between the ages of 40–55 years. Mean GCS scores of the patients was 7.02±1.45. Regarding

their blood pressure measurements, mean systolic and diastolic blood pressures were 178.79±11.49 mmHg and 102.69±5.32 mmHg respectively which were significantly higher than normal. This is in accordance with what Qureshi et al have reported. According to them, hypertension was the main cause of spontaneous intracerebral hemorrhage and patients who were 55 years of age or younger were at an increased risk of intracerebral hemorrhage.[5] Likewise, Sang Joon et al have also reported that the intracerebral hemorrhage was more common among male gender and with increasing age.[12]

Chief presenting complaint of our patients was headache followed by vomiting, altered consciousness and neurological deficit. Larger hematomas are mostly associated with headache and this is because of pressure on meninges, bleeding into cerebrospinal fluid or raised intra-cranial pressure. Headache is scarcely present in cases of smaller bleeds. Vomiting is mostly seen in patients with hemorrhage in cerebellar area and it is caused by raised intracranial pressure. Larger ICH leads to raised intracranial pressure as well as compression of thalamic and brainstem areas which in turn causes altered consciousness. Larger ICH involving brainstem reticular activating system leads to coma.[12, 13] Therefore, altered consciousness especially if associated with headache and vomiting is a harbinger of severe ICH and any such patient should be managed promptly.

GCS is an important diagnostic and prognostic tool in patients with spontaneous ICH. It helps to ascertain the level of consciousness of the patient at the time of presentation as well as helps to monitor the state or condition of patient. Changes in serial GCS scores overtime will help clinician to realize whether condition of patient is improving or not.

CONCLUSION

GCS provides valuable information regarding the level of consciousness of patients with intracerebral hemorrhage. Hypertension remains to be a common cause of stroke in our country. Large multi-centric studies should be conducted to check validity of GCS scores as well as it should be compared with new and more objective scoring systems. Masses should be educated about the risk factors leading to hypertension as well as ways to modify these risk factors so as to reduce the incidence of hypertension and improve blood pressure control in these patients.

Author's Contribution:

Concept & Design of Study:	Muhammad Mushtaq
Drafting:	Nazar Muhammad Afridi
Data Analysis:	Arshad Wahab Shah
Revisiting Critically:	Zar Khan
Final Approval of version:	Muhammad Mushtaq

Conflict of Interest: The study has no conflict of interest to declare by any author.

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