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Research Article

Clinical features and predictors of in hospital mortality in patients with intra cerebral haemorrhage

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ABSTRACT

Background: Intracerebral haemorrhage (ICH) accounts for 15-20% of all strokes and is associated with significant morbidity and mortality. The present study was done to assess the risk factors for ICH and determine the factors responsible for poor outcome in ICH.
Methods: Consecutive patients of ICH were assessed for modifiable and non-modifiable risk factors, followed by detailed examination with emphasis on ICH score and CT scan findings.
Results: There were 200 patients with ICH; 108 males and 92 females. The prevalence of ICH was maximum in the age group of 61-70 years (34%). Hypertension was present in 68% of the patients and was the single most important modifiable risk factor. The most common presenting symptom was altered sensorium present in 58% patients. The mean hematoma volume in our study was 44+/-45 cm^3. 45 patients with a GCS <5 and both the patients with ICH score 5 expired. On multivariate analysis, there was a significant correlation of mortality with GCS and hematoma volume.
Conclusions: Hypertension is the commonest risk factor for ICH. Patients with a low GCS score, large hematoma volume and a higher ICH score have a poor prognosis and higher probability of mortality.

Keywords: Intracerebral haemorrhage, Hypertension, ICH score, GCS, Hematoma volume

INTRODUCTION

Cerebrovascular accidents result from loss of brain function due to disturbances in the blood supply of the brain. This can be due to ischemia or hemorrhage. Ischemic stroke accounts for 80-85% of all strokes while hemorrhagic strokes constitute the remaining 15-20% cases. Stroke is one of the leading causes of morbidity and mortality and comes only next to heart diseases and cancer.[1,2] Intracerebral hemorrhage (ICH) involves a phase of initial hemorrhage followed by hematoma expansion and peri-hematoma edema. The initial hemorrhage is caused by rupture of cerebral arteries influenced by various risk factors. The disease outcome depends primarily on the latter two phases of progression.[3] Modifiable risk factors for ICH include hypertension, anti-coagulant therapy, thrombolytic therapy, high alcohol intake, previous history of stroke, and illicit drug use (particularly cocaine). Hypertension is by far the most common cause of hemorrhagic stroke, accounting for up to 60% of all ICH cases. Non-modifiable risk factors for hemorrhagic stroke include advanced age, negroid ethnicity, cerebral amyloidosis, coagulopathies, vasculitis, arteriovenous malformations (AVMs), and intracranial neoplasms.[3,4] ICH is more likely to be fatal compared to ischemic stroke. The various predictors of poor outcome in patients of ICH are low GCS at the onset of symptoms, age, infratentorial

bleed, bleed with ventricular extension, increased hematoma volume and raised mean arterial pressure.[5] Various risk stratification scores are used of which ICH score is the scale used most commonly in clinical practice.[6]

The present study was done to assess the pattern of hemorrhagic stroke, its risk factors and determinants of outcome of ICH.

METHODS

Consecutive patients more than 15 years of age, admitted to the medicine department of BRD medical college, Gorakhpur with the diagnosis of stroke secondary to spontaneous non traumatic hemorrhage as shown by a CT scan of the brain were included in the study. The study period was between September 2012 to August 2013. Those who had a clear history of trauma prior to the ictus, hemiparesis secondary to ischemic stroke, infections or space occupying lesions and those who did not consent for the study were excluded. All included patients underwent a detailed history with specific emphasis on modifiable and non-modifiable risk factors, followed by a general and neurological examination and a note of the GCS at admission and other systemic associations was made. They underwent a complete blood count, tests for liver and renal functions, blood sugars, thyroid function tests, viral markers, coagulation profile, electrocardiogram, serum electrolytes and fasting lipid profile. An urgent CT scan of the head was performed in all patients and MRI brain was done in case of diagnostic dilemma. Imaging details on CT scan included volume of hematoma measured by the method as described earlier,[7] its site, any intra ventricular extension. ICH score was determined for all patients. Primary outcome was taken as either death or survival within the hospital.

Statistical analysis

Wherever possible, the data was analyzed for statistical significance by calculating the probability by using the percentage difference between the data and the standard error. Multivariate analysis using logistic regression was used to determine the significance. P value <0.05 was taken as significant. The study was approved from the ethical committee at BRD medical college, Gorakhpur.

RESULTS

Two hundred patients were included in the study. There were 108 males and 92 females with a mean age of 61 years. The prevalence of ICH was maximum in the age group of 61-70 years (34%). The prevalence of risk factors is as outlined in Figure 1. Hypertension as a risk factor for ICH was present in 68% of the patients and was the single most important modifiable risk factor. The most common presenting symptom was altered sensorium present in 58% patients. Headache prior to the onset of ICH was seen in 50 % cases. 54 patients succumbed to the illness (Table 1).

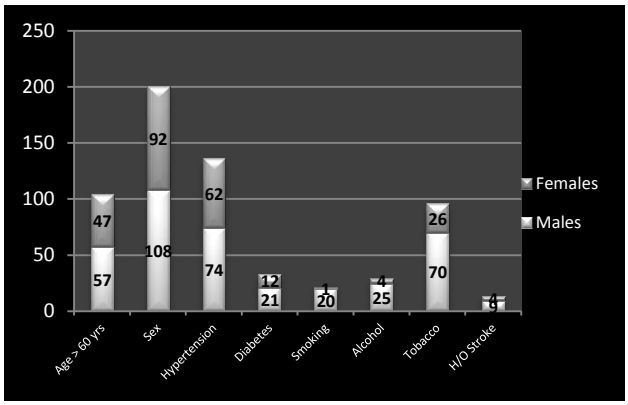

Figure 1: Bar diagram showing distribution of risk factors in males and females.

Table 1: Clinical features and outcome.

Clinical features	Total	Males	Females
Headache	101 (50.5%)	62	39
Altered Sensorium	116 (58%)	54	62
Unconsciousness	40 (20%)	28	12
Seizures	14 (7%)	12	2
Vomiting	43 (21.55)	21	22
GCS			
3-4	55	36	19
5-12	108	52	56
>13	37	20	17
Outcome			
Improved/discharged	120	59	61
Left against advice	26	14	12
Expired	54	35	19

Table 2: CT scan findings and ICH score.

Site of H'ge	Total	Males	Females
Thalamo ganglionic	152	78	74
Pons	6	3	3
Cerebellar	5	3	2
Frontal	14	11	3
Occipital	5	5	0
Parietal	18	8	10
IV extension			
Present	126	69	57
Absent	74	39	35
Volume			
<30cc	106	52	54
>30cc	94	56	38
ICH score			
0	26	24	2
1	30	14	16
2	46	23	23
3	47	24	23
4	49	31	18
5	2	2	0

Table 3: Predictors of mortality using multivariate logistic regression analysis.

Variables	Total	Mortality	Alive	P value
Age >80 yrs	20	4	16	NS
GCS <5	55	45	10	<0.01*
Volume >30 cc	94	46	48	0.01*
Intra ventricular extension	126	50	76	NS
Infratentorial site	11	3	8	NS

The details of the CT scan findings and ICH score are shown in Table 2. The mean hematoma volume in our study was 44+/-45 cm3 (range 1.5-257 cm3). 45 patients with a GCS <5 expired while patients with a score <13 were discharged in a stable condition. Both the patients with ICH score 5 expired while 80% of those with ICH score 4 succumbed to the illness. All 26 patients with ICH score 0 were discharged in a stable condition. On multivariate analysis, there was a significant correlation of mortality with GCS and hematoma volume (Table 3).

DISCUSSION

Intracerebral hemorrhage (ICH) is defined as bleeding into the brain parenchyma. Prognoses of hemorrhagic strokes depend on the initial clinical presentation, rapidity of diagnosis and time to initiation of intervention. We analyzed the various risk factors associated with ICH and determined the immediate factors determining the prognosis in cases of ICH admitted to the medicine ward.

Risk factors

We found the incidence of ICH to be high with increasing age group with the maximum number of cases presenting in the sixth decade of life. Our results are similar to the earlier study by Kojic et al where 303 patients with ICH were analyzed. The average age at presentation in their study was 62 +/- 11 years with slight male preponderance.[8] Among the modifiable risk factors, hypertension was the single most important risk factor seen in our patients with ICH (68%). This is in line with the previous studies that report hypertension to be the most important risk factor and was associated with 3 to 5-fold increased risk of ICH in different studies.[8-10] Heavy drinking defined as >60 gm of alcohol per day for men and 40 gm per day for women was associated with increased risk for ICH.[11] Similarly, a Japanese study documented an increased risk of ICH in those with alcohol consumption of >450 gm alcohol per week.[12] We found alcohol consumption to be related to 15% of ICH in our study. Cigarette smoking has been documented as a risk factor for ICH in earlier studies. There is a graded increase in the risk depending on the number of cigarettes smoked per day. In the inter stroke study, current smoking was a significant risk factor for stroke, both ischemic and hemorrhagic (OR, 99% CI: 2•09, 1.75–2.51).[13] 16% of our patients were diabetic. Diabetes was seen as an independent risk factor for ICH with an odds ratio of 2.4 in the hemorrhagic stroke project.[9] The inter stroke study failed to detect any association of diabetes with ICH on univariate analysis.

Clinical symptoms

The commonest symptoms of patients presenting with ICH were hemiparesis and altered sensorium seen in 58% and seizures in 7% patients. As per the initial studies on ICH by the Harvard Cooperative Stroke Registry, patients with ICH presented gradually over 5 to 30 minutes with a decreased alert levels seen in 60% cases of which 2/3rd were comatose, seizures in their series were seen in 7% cases quite similar to our observations.[14] The frequency of headache as a presenting symptom is 20-30% in different studies.[14,15] Half of our patients had headache at onset. The higher frequency in our patients can be due to the fact that we enquired about the symptoms at onset from the relatives unlike other studies where the symptoms were asked from patients themselves who were alert enough to give detailed history.

CT scan Findings

Thalamic and ganglio capsular region was the site of hematoma in 152 patients (76%). Of this, 86 patients had putaminal bleed and 42 patients had a thalamic hematoma. The 330 cases studied by Smith et al showed ganglio capsular bleed in 34% and lobar bleed in 35% cases.[16] Similarly, Aguillar et al found 35-70% bleeds in the ganglio capsular region.[17] Primary intra ventricular bleed was not seen in any of our patients. The above mentioned anatomical sites have a vascular distribution of small, perforating intracerebral arteries, the lenticulostriate and thalamoperforating; most ICHs originate from the rupture of these small, deep arteries with diameters between 50 and 200 microm. These end arteries become the target of chronic hypertension and rupture leading to ICH.[18] Intraventricular hemorrhage may occur as an extension of parenchymal bleed. The risk factors for ventricular extension are old age, higher hematoma volume, hypertension and primary location of the bleed. Most common mechanism of extension is a slow leakage of blood dissecting along the course of adjacent white matter fibers. Direct communication occurs in massive bleeds which may lead to hydrocephalus and a poor prognosis.[19]

ICH Score

J Claude Hemphill et al had used ICH score as an outcome predictor model for ICH patients.[6] The ICH score is the sum of individual points assigned as follows: GCS score 3 to 4 (=2 points), 5 to 12 (=1), 13 to 15 (=0); age >/=80 years yes (=1), no (=0); infratentorial origin yes (=1), no (=0); ICH volume >/=30 cm (Table 3) (=1), <30 cm (Table 3) (=0); and intraventricular hemorrhage yes (=1), no (=0). In their study, 26 patients with an ICH Score of 0 survived, and all 6 patients with score of 5 died similar to our observations. Thus, ICH Score is a

simple clinical grading scale allowing risk stratification on presentation with ICH.

Outcome

The mortality rate in the present study was 27% which is comparable to the available studies.[20-22] ICH score was used as a predictor of outcome in our study. Similar to other observations, higher the score, greater was the chance of mortality.[6,20] Ahmad et al showed a GCS <12 and intra ventricular extension of the hematoma as significant predictors, quite contrary to our observations.[21] Bhatia et al evaluated 214 patients with ICH and concluded that independent predictors of mortality included a higher hematoma volume, intra ventricular extension, low GCS and ventilatory requirement.[22] Similarly, other variables have been identified such as age, ICH location, mid line shift, blood pressure and pupillary abnormalities.[5,22,23] Review of these studies reveals considerable variability in the factors identified. This is likely as many factors interact with each other. After statistical analysis in our study, the independent predictors of mortality during hospital stay were a GCS <5 and hematoma volume >30 cc.

CONCLUSIONS

ICH, even in the present era is a medical emergency with high morbidity and mortality. Hypertension is the single most important risk factor for ICH. Gangliocapsular region is the commonest site for spontaneous non-traumatic hemorrhage. Patients with a low GCS score, large hematoma volume and a higher ICH score have a poor prognosis and higher probability of mortality.

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