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CLINICO-EPIDEMIOLOGICAL PROFILE AND PROGNOSTIC FACTORS IN THE PATIENTS OF INTRA CEREBRAL HEMORRHAGE (ICH) IN A TERTIARY CARE HOSPITAL IN BUNDELKHAND REGION [CENTRAL INDIA]

General Medicine

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ABSTRACT

Background: Intracerebral hemorrhage (ICH) is associated with high mortality and morbidity. Various clinical and imaging predictors of mortality have been observed in previous studies.

Aims: To study factors associated with mortality in patients with ICH and observe the disability status of patients [assessed by modified Rankin scale (mRS)] at the time of discharge and at 4 weeks. Design: Prospective observational study.

Materials And Methods: All consecutive patients with acute hypertensive ICH admitted during the study period were enrolled. Data recorded included: Demographics, clinical, biochemical and cranial computed tomography (CT) findings. Primary outcome was defined as either death or survival and also morbidity among survivors. mRS was used to assess outcome at discharge and at 4 weeks.

Results: Of the total 120 patients with ICH (107 supratentorial and 13 infratentorial), 39 (32.5%) patients died by the end of 4 weeks. On bivariate analysis, low GCS score, higher hematoma volume, midline shift, and infratentorial hematoma were associated with mortality. ICH scores was higher in patients who died (P < 0.001). Independent predictors of mortality included a higher baseline hematoma volume (P <0.01 OR 1.37, 95% CI 1.08-1.73), lower GCS (P <0.01 OR 8.46, 95%CI 2.14-17.56), midline shift (p=0.01 OR 52.65, 95%CI 2.01-384.20), infratentorial bleed (p=0.03 OR 7.47, 95% CI 1.25-99.26). Among survivors (n = 81), 60(50%) patients had mRS 1-3, and 21(17.5%) had mRS of 4-5 at the end of 4 weeks.

Conclusions: Low GCS, higher baseline ICH volume, presence of midline shift and infratentorial bleed are independent predictors of mortality.

KEYWORDS

GCS glasgow coma score, ICH intracranial hemorrhage, mRS modified rankins score

INTRODUCTION

Spontaneous intracerebral hemorrhage (ICH) accounts for approximately 4-14% of all strokes with a higher reported incidence in Asian countries compared to west and is associated with a high mortality and morbidity[1-2]. Between 32% and 50% of patients die within the first month and only 20% are independent at 6 months[3-4]. The burden of stroke occurrence, morbidity and mortality is much higher in developing nations. There has been considerable interest in predicting outcome after ICH and a number of studies have investigated the relationship of various clinical and radiological factors and poor outcome[5] Few hematological and biochemical parameters at the time of onset of ICH have also been associated with outcome in these patients. Most of the literature on morbidity and mortality predictors is available from the West and some East Asian countries. This prospective observational study was designed to assess clinical, biochemical and radiological predictors of mortality in patients with spontaneous ICH. We also aimed to observe the disability status of survivors as assessed by modified Rankin scale (mRS) at the time of discharge from the hospital.

MATERIAL AND METHODS

It is a prospective study,done on all consecutive patients of intracerebral hemorrhage, admitted between march 2019 and October 2020, under emergency/OPD of neurology department and internal medicine department at M.L.B. medical college Jhansi U.P. We excluded patients with subdural and epidural hematoma, aneurysmal, arteriovenous malformation (AVM), anticoagulant or coagulopathy-related hemorrhage and patients who denied informed consent.

Detailed history of the presentation including headache, vomiting, seizures, loss of consciousness and focal neurological deficits was obtained. History of risk factors was recorded. At admission, details of examination including vitals, systemic examination, Glasgow Coma Scale (GCS), ICH score [8] were recorded. Baseline hematological and biochemical parameters were assessed. All subjects underwent a plain computed tomography (CT) head at the time of admission, after 24 h and later as when required. Imaging details on CT scan including volume of hematoma (using formula ABC/2), site of hematoma, intraventricular extension (present or absent), hydrocephalus (present or absent), mid line shift (measured as maximum deviation of septum pellucidum in millimetres from midline) were recorded. Primary outcome was either death or survival within the hospital.

Statistical Analysis:

Data was coded and entered in Microsoft excel work sheet and statistically analysed using SPSS software version 25. All continuous/quantitative data were represented in mean or median and analysed using unpaired 't' test for normally distributed data and Mann-Whitney U test for skewed data. Categorical variables were represented in percentages and analysed using Chi-square testbor fisher exact test. Multivariate logistic regression analysis was performed to find independent predictors of mortality and bad outcome. Odds ratio (OR) and 95% confidence intervals (CI) were calculated. A P value of less than or equal to 0.05 was considered statistically significant.

RESULTS

Of the 120 patients with ICH, 107 (89.1%) were supratentorial. The mean age was 56.07±10.134 years and 76 (63.3%) were males. The sites of hematoma included ganglionic (51.7%), lobar (21.7%), thalamic (15.8%), brainstem (5.8%) and cerebellar (5.0%). Of the total cohort, 81 (67.5%) patients survived and 39 (32.5%) died [Table 1]. Univariate analysis of the variables is outlined in [Table 1]. Among clinical variables, there were a higher number of patients with diabetes, hypertension and smokers, a significantly lower GCS (dichotomized at 8), and higher ICH scores among the patients who died. The mortality rates observed with individual ICH scores was 0 (0%), 1 (0%), 2 (31%), 3 (44%), 4 (78%), 5 (75%), 6 (100%). The radiological features associated with mortality included a higher baseline hematoma volume, higher midline shift (dichotomized at 6mm), and intraventricular extension of hematoma. Risk factors included hypertension in 94 (78.3%), diabetes 55 (45.8%), smoking 70 (58.3%)

and alcohol intake 56 (46.6%). The mean systolic and diastolic blood pressure was 184.21 ± 34.47 and 104.46 ± 17.69 mmHg, respectively. The median of GCS was 10, mean hematoma volume , survived vs expired was 9.88±7.56 vs 41.33±11.27 midline shift was observed in 35 (29.17%) patients and intraventicular extension of hematoma was observed in 48 (40.0%) patients. Higher ICH score was significantly associated (p=<0.001) with mortality and morbidity (table2). Upon multivariate analysis using logistic regression analysis (table3), the independent predictors of mortality included a higher baseline hematoma volume (*P* = <0.01 OR 1.37, 95% CI 1.08-1.73), lower GCS (*P* <0.01 OR 8.46, 95% CI 2.14-17.56), infratentorial bleed (p=0.03 OR 7.47, 95%CI 1.25-99.26), ICH score at admission (p=0.01, OR 0.17, 95% CI 0.04-0.07). Among survivors (*n* = 81), 60 (50%) patients had a modified Rankin score of 0-3 whereas others 21 (17.5%), were moderate to severely disabled (mRS 4,5) by the end of 4 weeks.

Table 1: Demographic, Etiological, Clinical And Radiological Characteristics Of Patients With Outcome And Mortality

	Total	Expired (n=39)	Survived (n=81)	P value	Poor outcome (n=21)	Good outcome (n=60)	P value
Gender							
Male	76	26(34.2%)	50 (65.8%)	0.59	10 (20.0%)	40 (80.0%)	0.12
Female	44	13 (29.5%)	31 (70.5%)		11 (35.5%)	20 (64.5%)	
Age in years		62.95±9.85	52.75±8.51	<0.001	57.67±9.39	51.03±7.53	<0.01
Age category							
<70 years	102	24 (23.5%)	78 (76.5%)	<0.001	18 (23.1%)	60 (76.9%)	0.01
≥70 years	18	15 (83.3%)	3 (16.7%)		3	0	
Area of residence							
Rural	92	30 (32.6%)	62 (67.4%)	0.96	15 (24.2%)	47 (75.8%)	0.55
Urban	28	9 (32.1%)	19 (67.9%)		6 (31.6%)	13 (68.4%)	
DM	55	25 (45.5%)	30 (54.5%)	<0.01	9 (30.0%)	21 (70.0%)	0.52
Hypertension	94	37 (39.4%)	57 (60.6%)	<0.01	15 (26.3%)	42 (73.7%)	0.90
Smoker	70	30 (42.9%)	40 (57.1%)	<0.01	16 (40.0%)	24 (60.0%)	<0.01
Alcoholic	56	19 (33.9%)	37 (66.1%)	0.75	7 (18.9%)	30 (81.1%)	0.21
Type of bleed							
Supratentorial	107	31 (29.0%)	76 (71.0%)	0.02	19 (25.0%)	57 (75.0%)	0.60
Infratentorial bleed	13	8 (61.5%)	5 (38.5%)		2 (40.0%)	3 (60.0%)	
Volume >70 ml	35	31 (88.6%)	4 (11.4%)	<0.001	4 (100.0%)	0 (0.0%)	<0.01
Mean volume		41.33±11.27	9.88±7.56	<0.001	18.52±7.38	6.85±5.60	<0.001
Midline shift							
No	85	7 (8.2%)	78 (91.8%)	<0.001	18 (23.1%)	60 (76.9%)	0.01
Yes	35	32 (91.4%)	3 (8.6%)		3 (100.0%)	0	
IVH							
No	72	6 (8.3%)	66 (91.7%)	<0.001	10 (15.2%)	56 (84.8%)	<0.001
Yes	48	33 (68.8%)	15 (31.2%)		11 (73.3%)	4 (26.7%)	
ICH score at admission	2 (0-4)	4 (4-4)	1 (0-2)	<0.001	4 (4-4)	3 (3-6)	<0.001
GCS score at admission	10 (5.25-15)	3 (3-6)	14 (10-15)	<0.001	1 (0-2)	14 (10-15)	<0.001
GCS score at admission							
≤8	53	39 (73.6%)	14 (26.4%)	<0.001	11 (78.6%)	3 (21.4%)	<0.001
>8	67	0	67 (100.0%)		10 (14.9%)	57 (85.1%)	

Table 2: ICH Score With Mortality And Morbidity

ICH score	Total	Expired (n=39)	Survived (n=81)	Poor outcome (n=21)	Good outcome (n=60)
0	40	0	40 (100.0%)	0	40 (100.0%)
1	17	0	17 (100.0%)	3 (17.6%)	14 (82.4%)
2	16	5(31.2%)	11 (68.8%)	6 (54.5%)	5 (45.5%)
3	9	4(44.4%)	5 (55.5%)	5(100.0%)	0
4	33	26(78.8%)	7(21.2%)	6(85.7%)	1(14.3%)
5	4	3(75.0%)	1(25.0%)	1(100.0%)	0
6	1	1(100.0)	0		

Table 3: Logistic Regression Of Factors Influencing Mortality And Outcome

Parameters	Mortality			Poor Outcome		
	Odds ratio	95% CI	P value	Odds ratio	95% CI	P value
Age >70 years	3.68	0.23-57.54	0.35	2.02	1.21-14.12	0.02
DM	20.31	0.72-167.90	0.07			
Hypertension	1.36	0.06-31.81	0.84			
Smoker	1.31	0.09-17.45	0.84	1.21	0.15-11.24	0.13
Infratentorial bleed	7.47	1.25-99.26	0.03	5.55	0.32-12.68	0.12
Volume >30 ml	1.37	1.08-1.73	<0.01	1.31	1.02-1.65	<0.01
Midline shift	52.65	2.01-384.20	0.01			
IVH	3.54	0.21-58.01	0.37	9.75	0.62-51.77	0.10
ICH score at admission	0.17	0.04-0.71	0.01	0.06	0.01-0.29	<0.001
GCS <8	8.46	2.14-17.56	<0.01	3.25	0.36-29.10	0.29

DISCUSSION

ICH still remains a grave medical emergency with high mortality and morbidity. Inspite of improvement in outcomes in ischemic stroke, outcomes in patients with ICH still remain poor with no specific medical treatment and poor consensus and controversial outcomes of surgical interventions[6]. The mortality rate in the present study was 32.5%. The 30-day mortality from ICH ranges from 35 to 52%, with one-half of these deaths occurring within the first 2 days[7]. In a recent analysis using National Hospital Discharge Survey from USA, mortality rates of about 34% were reported and did not seem to change over the past two decades. Mortality was associated with race, female

sex, age greater than 65 years, black women younger than 45 years, and middle-aged black men[8]. Predictors of outcome in early studies of ICH included age, ICH location, electrocardiographic abnormalities, and history of hypertension. More recent studies have also identified lesion size, level of consciousness, midline shift, blood pressure or pulse pressure, kidney dysfunction, IVH and pupillary abnormality, as factors influencing outcome[9]. Review of these studies reveals considerable variability in the factors identified. This is likely as many of the factors are likely to interact strongly with each other. In our study, independent predictors for mortality were low GCS score, larger volume of hematoma on CT scan, presence of IVH, infratentorial bleed, midline shift, hypertension, diabetes and history of smoking. Radiological findings seem to be closely associated with prediction of mortality and also clinical behavior[10]. As in our results, baseline hematoma volume, IVH, hydrocephalus and midline shift are important variables influencing prognostication. Demchuk and colleagues in the recently published PREDICT study, observed that Spot Sign observed on CT-angiography was independently associated with a poor outcome[11]. This radiological parameter is currently being studied in two Factor VII A therapy trials in relationship to hematoma growth and outcome.

In conclusion, intracerebral hemorrhage is associated with high mortality and morbidity. Low GCS, higher baseline hematoma volume, presence of intraventricular hemorrhage and infratentorial bleed independently predicted mortality in the present cohort.

CONCLUSION

Spontaneous Intracerebral Hemorrhage predominantly affects a younger population in India in comparison to the Western population. Age>70 years, GCS<8 on admission, clot volume above 30ml, and intraventricular extension and infratentorial bleed remain the most consistent predictors of death and poor outcome following spontaneous intracerebral hematoma. Further studies are needed to assess the risk of SICH among hypertensive patients and to prognosticate outcome after SICH using novel predictors, including bio markers.

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