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Original Research Paper

General Medicine

CLINICAL PROFILE OF PATIENTS WITH INTRACRANIAL HEMORRHAGE

Dr Amarnath Shriram Saknure* Senior Resident, Department of Medicine, VMGMC Solapur, Maharashtra, India*Corresponding Author

Dr.Sachin Bangar Associate Professor) Department of Medicine,VMGMC Solapur

ABSTRACT

Background: Stroke is a major cause of morbidity and mortality worldwide. Intracranial hemorrhage (ICH), the second most common type of stroke after ischemic stroke, accounts for 7.5–30% of stroke cases and is associated with high morbidity and mortality. Identification of clinical, radiological, and prognostic factors is important for predicting outcomes and guiding management. Aim:To study the clinical and radiological profile of patients with intracranial hemorrhage and to evaluate prognostic indicators of outcome. Methodology: This prospective observational study was conducted in the ICU and general wards of the Department of General Medicine which included total of 125 patients aged >18 years with confirmed intracranial hemorrhage. Results: Among 125 patients, 60% were males, with the highest proportion in the 40–49 years age group (24.8%). Hypertension was the most common risk factor (50.7%). Altered sensorium (42.4%) and headache (37.6%) were the most frequent presenting symptoms. The basal ganglia was the most common site of hemorrhage (41.6%). Radiological findings included hematoma volume ≥30 cm^3 (77.6%), intraventricular hemorrhage (45.6%), midline shift (36%), and hydrocephalus (24%). Mortality was associated with lower GCS and higher ICH scores, with an overall mortality of 29.6%. Conclusion: Intracranial hemorrhage carries significant mortality. Hypertension was the most common risk factor and basal ganglia the predominant site. GCS score, ICH score, and radiological findings are important prognostic indicators for predicting outcomes.

KEYWORDS : Intracranial haemorrhage; Stroke; Hypertension; Glasgow Coma Scale (GCS); ICH score

INTRODUCTION

Stroke is one of the most common causes of morbidity and mortality worldwide and represents a major public health challenge. Among all neurological diseases of adult life, cerebrovascular diseases rank first in frequency and importance and remain among the leading causes of death and long-term disability globally.[1] In 2016, stroke accounted for approximately 10.1% of global deaths, with an estimated 13.7 million new cases annually and a significant burden in terms of disability-adjusted life years.[2]

Intracranial hemorrhage, particularly intracerebral hemorrhage (ICH), is the second most common type of stroke after ischemic stroke and accounts for about 7.5–30% of all strokes.[3],[4] Despite advances in medical care, ICH continues to be associated with high morbidity and mortality. The 30-day mortality rate ranges from 25% to 50%, and mortality is highest in the initial weeks following the hemorrhage due to hematoma expansion and early complications.[5,6]

Several modifiable and non-modifiable risk factors contribute to the occurrence of intracranial hemorrhage. Hypertension, smoking, alcohol consumption, diabetes mellitus, and dyslipidemia are among the major modifiable risk factors associated with increased incidence of stroke.[7] In Asian populations, hypertension is reported as the leading cause of ICH in young adults, whereas Western studies frequently report vascular malformations along with hypertension as important etiological factors.[8]

Clinically, intracerebral hemorrhage typically presents with progressive onset of focal neurological deficits over minutes to hours, often accompanied by headache, nausea, vomiting, decreased level of consciousness, and elevated blood pressure. The diagnosis relies on urgent neuroimaging such as computed tomography (CT) or magnetic resonance imaging (MRI), while outcomes are influenced by factors including hematoma volume, location, and severity of neurological impairment.[10]

Understanding the clinical profile, associated risk factors, and outcomes of patients with intracranial hemorrhage is essential for early diagnosis, appropriate management, and prognostication. Therefore, this prospective observational study was undertaken to evaluate the clinical profile of patients presenting with intracranial hemorrhage in a tertiary care setting.

METHODOLOGY

The study was an observational descriptive study conducted in the Intensive Care Unit (ICU) and general wards under the Department of General Medicine in a tertiary care hospital. The study was carried out over a period of 18 months, from 1st November 2023 to 30th April 2025, after obtaining approval from the Institutional Ethics Committee.

A total of 125 patients aged more than 18 years who were admitted to the ICU and general wards under the Department of General Medicine and diagnosed with intracranial hemorrhage were included in the study.

All patients aged above 18 years with a confirmed diagnosis of intracranial hemorrhage were included in the study. Patients with a history of trauma and those diagnosed with subdural or epidural hematoma were excluded from the study. Relevant data were collected by the investigator from the daily case records of patients admitted to the ICU and general wards. When required, additional clarification was obtained from the treating physicians. Demographic details such as MRD number, age, and gender were recorded. Disease-related information including detailed clinical history, clinical examination findings, and laboratory investigations such as complete blood count, lipid profile, 12-lead ECG, CT scan, and MRI scan were documented. Data related to treatment were also collected. General and neurological examinations were recorded at admission along with relevant investigation reports. The Intracranial Hemorrhage (ICH) score was assessed on admission to evaluate 30-day mortality, and functional outcomes were assessed using the Modified Rankin Scale (mRS). Confidentiality of patient data was maintained throughout the study.

Operational definition:

Intracranial hemorrhage (ICH) was defined as a subtype of stroke characterized by hematoma formation within the brain parenchyma with or without extension into the ventricles.

The collected data were entered into Microsoft Excel and analyzed using SPSS version 16 software. Descriptive statistics and percentages were used for analysis.

RESULT

A total of 125 patients with intracranial hemorrhage were included in the study, of whom 75 (60%) were males and 50 (40%) were females. The majority of patients belonged to the 40–49 years age group (24.8%), followed by 50–59 years (22.4%) and 60–69 years (17.6%). Hypertension was the most common risk factor, present in 73 (50.7%) patients, followed by type 2 diabetes mellitus in 33 (22.9%), alcohol abuse and smoking in 24 (16.7%) each, and previous stroke in 14 (9.7%) patients. Altered sensorium was the most common presenting symptom observed in 53 (42.4%) patients, followed by headache (37.6%), seizures (30.4%), and vomiting (20%). The mean systolic and diastolic blood pressure among the study participants were 170.2 ± 10.1 mmHg and 101.7 ± 5.8 mmHg, respectively. (Table 1)

Table 1: Sociodemographic and Clinical Profile of Study Participants (N = 125)

Sr. No.	Variable	Category	Number of Patients (n=125)	Percentage (100%)
1	Gender	Male	75	60%
		Female	50	40%
2	Age Group (years)	20–29	3	2.4%
		30–39	18	14.4%
		40–49	31	24.8%
		50–59	28	22.4%
		60–69	22	17.6%
		70–79	15	12%
		80–89	8	6.4%
3	Risk Factors	Hypertension	73	50.7%
		Type 2 Diabetes Mellitus	33	22.9%
		Alcohol Abuse	24	16.7%
		Smoking	24	16.7%
		Previous Stroke	14	9.7%
4	Clinical Presentation	Altered Sensorium	53	42.4%
		Headache	47	37.6%
		Seizures	38	30.4%
		Vomiting	25	20%
		Hemiparesis	15	12%
		Focal Neurological Deficit	15	12%
		Nausea	12	9.6%
		Slurred Speech & Aphasia	3	2.4%
		Quadriparesis	3	2.4%
5	Mean Blood Pressure	Systolic BP	170.2 ± 10.1 mmHg	
		Diastolic BP	101.7 ± 5.8 mmHg	

Radiological investigations revealed that volume of hematoma was ≥ 30 cm^3 in 97 (77.6 %) cases, midline shift was seen in 45 (36 %) cases, hydrocephalus in 30 (24 %) cases, Intraventricular hemorrhage was seen in 57 (45.6 %) cases and infratentorial origin of ICH was seen in 21 (16.8 %) cases.(Table 2)

Table-2: Radiological features of intracranial hemorrhage among study participants.

Sr. No.	Radiological features	No. of cases (%) [N=125]
1	ICH volume ≥ 30 cm3	97 (77.6%)
2	Hydrocephalus	30 (24%)
3	Midline shift	45 (36%)
4	Intraventricular hemorrhage extension	57 (45.6%)
5	Infratentorial origin	21 (16.8%)

The most common site of ICH was basal ganglia [52 cases (41.6 %)] followed by thalamus [29 cases (23.2 %)], lobar [23 cases (18.4 %)], cerebellum [12 cases (9.6 %)], and brainstem [9 cases (7.2 %)] (Fig-1)

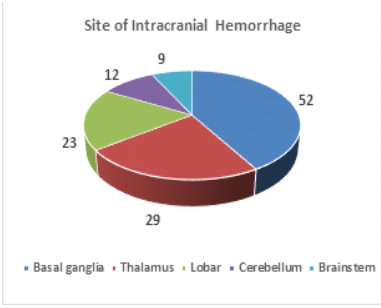

Figure-1: Location of ICH among study participants.

The association between Glasgow Coma Scale (GCS) score and mortality was assessed among the study participants. The highest mortality rate was observed in patients with a GCS score of 3–4, where 12 patients died and 2 survived, resulting in a mortality rate of 85.7%. In patients with a GCS score of 5–8, 16 deaths and 27 survivals were recorded, with a mortality rate of 48.5%. Lower mortality rates were observed in patients with higher GCS scores, with 14.3% mortality in the GCS 9–12 group (5 deaths, 30 survivals) and 9.3% mortality in those with GCS ≥13 (4 deaths, 39 survivals). The association between GCS score and mortality was found to be statistically significant (Chi-square = 18.59, p = 0.0003).(Table 3)

Table-3: Correlation between GCS score on admission and mortality rate among study participants.

GCS Score	No. of Cases Survived (n=88)	No. of Cases Dead (n=37)	Mortality Rate	Chi-square Value	P Value
3–4	2	12	85.7%	18.5992	0.0003
5–8	27	16	48.5%		
9–12	30	5	14.3%		
≥13	39	4	9.3%		

The distribution of cases according to ICH score on admission and outcome showed that among the 88 survivors, most had an ICH score of 1 (57.9%), followed by score 2 (33%), while smaller proportions had scores of 0 (4.5%), 3 (3.4%), and 4 (1.1%), with none having scores of 5 or 6. Among the 37 deaths, the highest proportion occurred in patients with an ICH score of 2 (40.5%), followed by score 3 (27%) and score 1 (24.3%), while scores 4, 5, and 6 each accounted for 2.7% of deaths and no deaths occurred with score 0. The mortality rate increased with higher ICH scores, being 0% for score 0, 7.2% for score 1, 12% for score 2, 8% for score 3, and 0.8% each for scores 4, 5, and 6, and the association between ICH score and mortality was statistically significant (Chi-square = 110.9, p = 0.01). (Table 4)

Table-4: Correlation between ICH scores on admission and mortality rates among study participants.

ICH Score on Admission	No. of Cases Survived (%) (n=88)	No. of Cases Dead (%) (n=37)	Mortality Rate (%) (N=125)	Chi-Square Value	P Value
0	4 (4.5%)	0	0	110.9	0.01
1	51 (57.9%)	9 (24.3%)	9(7.2%)		
2	29 (33%)	15 (40.5%)	15(12%)		

3	3 (3.4%)	10 (27%)	10(8%)		
4	1 (1.1%)	1 (2.7%)	1(0.8%)		
5	0	1 (2.7%)	1(0.8%)		
6	0	1 (2.7%)	1(0.8%)		

DISCUSSION

The present prospective observational study evaluated the clinical profile, radiological characteristics, and prognostic indicators in patients presenting with intracranial hemorrhage (ICH). A total of 125 patients were included, and the findings were compared with previously published studies to understand similarities and differences in clinical patterns and outcomes.

In the present study, males constituted 60% of the cases, indicating a male predominance. Similar findings were reported by Hegde et al.[3], where males accounted for 638 out of 905 patients, and by Togha et al.[5], who also observed a higher proportion of male patients with ICH. This male predominance may be attributed to a higher prevalence of risk factors such as hypertension, smoking, and alcohol consumption among males.

The majority of patients in the present study were in the 40–49 years age group, followed by 50–59 years and 60–69 years. In contrast, Modi et al.[9] and Radu et al.[2] reported a higher incidence in older age groups, with mean ages of 62.04 years and 69.1 years respectively. These differences may reflect demographic variations and the earlier onset of cardiovascular risk factors in developing countries.

Hypertension was identified as the most common risk factor in the present study, present in 50.7% of patients. This observation is consistent with several previous studies. Togha et al.[5] reported hypertension in 67.2% of patients, while Smajlović et al.[1] observed hypertension in 84% of cases. Similarly, Hegde et al.[3] reported that 57.8% of their patients had a history of hypertension. These findings reinforce the well-established role of hypertension as the most important modifiable risk factor for intracerebral hemorrhage.

Regarding clinical presentation, altered sensorium (42.4%) and headache (37.6%) were the most common symptoms observed in the present study. Comparable findings were reported by Modi et al.[9], who noted weakness and altered sensorium as common presenting complaints. Goswami et al.[7] also found that symptoms such as convulsions, vomiting, hemiparesis, headache, and altered sensorium were associated with poor outcomes.

Radiologically, the basal ganglia were the most frequent site of hemorrhage (41.6%) in the present study, followed by thalamus and lobar regions. Similar observations were reported by Hegde et al.[3], Namani et al.[4], and Dave et al.[10], who also found basal ganglia or putamen to be the most common site of intracerebral hemorrhage. This predominance of deep cerebral hemorrhage is often related to chronic hypertension causing lipohyalinosis of small penetrating arteries.

In the present study, a large hematoma volume (≥30 cm^3) was observed in 77.6% of patients, and intraventricular hemorrhage was present in 45.6% of cases. Previous studies have demonstrated that larger hematoma volumes and ventricular extension are associated with worse outcomes. Hegde et al.[3] reported that hematoma volume greater than 30 ml was an independent predictor of mortality, while Smajlović et al.[1] found intraventricular hemorrhage to be significantly associated with increased mortality.

The association between Glasgow Coma Scale (GCS) score and mortality was statistically significant in the present study. Patients with lower GCS scores had markedly higher mortality, with an 85.7% mortality rate in patients with GCS 3–4. Similar findings were reported by Goswami et al.[7] and Hegde et al.[3], who demonstrated that lower admission GCS scores were strongly associated with poor outcomes and increased mortality.

The Intracerebral Hemorrhage (ICH) score was also found to be a significant predictor of mortality in the present study. Mortality increased with higher ICH scores, and the association was statistically significant. Comparable findings were reported by Khatri et al.[8], who observed significantly higher mortality among patients with higher ICH scores, hematoma volumes greater than 30 ml, and ventricular extension.

The overall mortality rate in the present study was 29.6%. This is comparable to the mortality reported by Hegde et al.[3] (30.1%) and Dave et al.[10] (33%). However, some studies have reported higher mortality rates, such as Togha et al.[5] (46.7%) and Smajlović et al.[1] (42%). These variations may be attributed to differences in study populations, severity of hemorrhage, availability of early intervention, and healthcare facilities.

CONCLUSION

The present study on the clinical profile of patients with intracranial hemorrhage showed that the condition was associated with significant mortality (29.6%). Hypertension was the most common cause and the basal ganglia was the most frequent site of hemorrhage. Factors associated with increased mortality included smoking, altered sensorium at presentation, low Glasgow Coma Scale (GCS) score, high ICH score, and radiological features such as large hematoma size, midline shift, and infratentorial extension. The ICH score was found to be a simple and reliable tool for predicting 30-day mortality and assessing prognosis. Early identification and control of risk factors, particularly hypertension, may help reduce morbidity and mortality in patients with intracranial hemorrhage.

LIMITATIONS

It was conducted at a single tertiary care centre, which may limit the generalizability of the findings to the broader population. The study duration was limited and long-term outcomes beyond 30 days were not assessed. Additionally, as it was an observational study, causal relationships between risk factors and outcomes could not be definitively established.

REFERENCES

1. Smajlović D, Salihović D, Ibrahimagić OĆ, Sinanović O, Vidović M. Analysis of risk factors, localization and 30-day prognosis of intracerebral hemorrhage. Bosn J Basic Med Sci. 2008;8(2):121-5.
2. Radu RA, Terecoasa EO, Tiu C, Ghita C, Purcaru LI, Marinescu AN, et al. Clinical characteristics and outcomes of patients with intracerebral hemorrhage – A feasibility study on Romanian patients. J Med Life. 2020;13(2):125-31.
3. Hegde A, Menon G, Kumar V, Lakshmi Prasad G, Kongwad LI, Nair R, et al. Clinical profile and predictors of outcome in spontaneous intracerebral hemorrhage from a tertiary care centre in South India. Stroke Res Treat. 2020;2020:2192709.
4. Namani G, Rampure DM, Murali M. Clinical profile and mortality in patients presenting with intracerebral hemorrhage in a tertiary care centre. Sch J Appl Med Sci. 2014;2(6C):3005-10.
5. Togha M, Bakhtavar K. Factors associated with in-hospital mortality following intracerebral hemorrhage: a three-year study in Tehran, Iran. BMC Neurol. 2004;4:9.
6. Saqqur M, Salam A, Ayyad A, Akhtar N, Ali M, Khan A, et al. The prevalence, mortality rate and functional outcome of intracerebral hemorrhage according to age, sex and ethnic group in the state of Qatar. Clin Neurol Neurosurg. 2020;199:106255.
7. Goswami D, Sharma T, Das CK, Choudhury B, Bharadwaj R. Prognostic factors in intracerebral hemorrhage: a hospital based prospective study. Int J Med Res Prof. 2016;2(5):32-9.
8. Khatri IA, Almosa M, Alkahtani A, Alanazi K, Masud N. Clinical characteristics, etiology, radiological features, and outcomes of intracerebral hemorrhage in young adults at King Abdulaziz Medical City, Riyadh. Stroke Res Treat. 2025;2025:5550380.
9. Modi TN, Santosh SA, Dhoreeyanee FK, Patil PS. Clinico-epidemiological profile of intracerebral hemorrhage. Natl J Community Med. 2017;8(8):512-6.
10. Dave N, Vora A, Jani P, Vora A. Clinical profiles and predictors of mortality in intracerebral hemorrhage: A prospective cohort study from Western India.

Cureus. 2025;17(9)
11. Peta B, Mallela SR. Evaluation of Risk Factors and Prognostic Outcomes in Patients With Intracerebral Hemorrhage: A Clinical Study From a Tertiary Care Hospital in South India. Cureus. 2025 Aug 24;17(8).
12. Bhatia R, Singh H, Singh S, Padma MV, Prasad K, Tripathi M, Kumar G, Singh MB. A prospective study of in-hospital mortality and discharge outcome in spontaneous intracerebral hemorrhage. Neurology India. 2013 May 1;61(3):244-8.