



ORIGINAL ARTICLE

Frequency of elevated systolic blood pressure and early mortality in patients with Intracerebral hemorrhage.

Maida Nazeer¹, Faisal Amin Baig², Tahir Ullah Khan³, Atif Masood⁴, Muhammad Hamid⁵, Sadaf Sarwar⁶

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ABSTRACT... Objective: To determine the frequency of elevated systolic blood pressure and early mortality in patients with Intracerebral hemorrhage. **Study Design:** Descriptive Case Series study. **Setting:** Department of Medicine, Unit IV of Jinnah Hospital Lahore. **Period:** 6th April 2018 to 7th October 2018. **Material & Methods:** Total 335 patients of intracerebral hemorrhage, fulfilling inclusion criteria were recruited for the study. Blood pressure levels was measured by researcher using random-zero sphygmomanometers with the subject lying quietly. Two readings of blood pressure 5 minutes apart were taken and average of the two readings was noted in the proforma. CT scan brain was done and analyzed by consultant radiologist. These study cases were followed till discharge to note outcome (mortality). Data was entered and analyzed in SPSS version 20. Frequency and percentages were used for expressing qualitative variables while quantitative variables were expressed in the form of mean and standard deviation. **Results:** The mean age of the study participants was 64.39 + 8.50 years. Majority of the cases were males with the frequency of 285(85.1%). Early mortality was noted in 132(39%) of cases. Diabetes Mellitus was noted in 144(43%) of cases. There was significant difference noted with p-value<0.05 for early mortality in elevated versus normal blood pressure people. **Conclusion:** Significant proportion of patients with intracerebral hemorrhage patients have elevated blood pressure and suffer from early mortality.

Key words: Cerebral Hemorrhage, Epidemiology, Incidence, Risk Factors, Neurologic Manifestations.

INTRODUCTION

Stroke is a debilitating disease characterized by focal neurological deficit and one of the leading causes of mortality worldwide.¹ While previously termed as cerebrovascular accident (CVA), it is recently termed as cerebrovascular event (CVE) and accounts for roughly 5.5 million deaths per annum around the globe with approximately 44 million reporting serious physical disabilities.² The catastrophic consequences and complications of cerebrovascular event are long lasting with high emotional, social, physical and financial impact on patient health.³ Ischemic cerebrovascular events predominate all types by a margin (80%) followed by hemorrhagic CVA.⁴ The underlying pathophysiology of cerebrovascular event is either ischemic or hemorrhagic in most of the cases with ischemia the leading cause in majority of cases.^{5,6}

Blood pressure levels before and immediately after intracerebral hemorrhage is the primary determinant of disease outcome and complications in terms of hematoma expansion and rebleeding. Intracerebral hemorrhage (ICH) is more debilitating in terms of disease course and complications as compared to ischemic CVA.^{2,3} High blood pressure readings in the immediate period after the stroke is reported in about 90% of patients with acute ICH. Persistently elevated blood pressure in these patients can lead to exacerbation of recurrent bleeding episodes from rupture of small vasculature, resulting in hematoma expansion and worsening clinical status. Perfusion pressure is also increased as a result of persistently elevated blood pressure with consequent worsening of cerebral edema, rise in intracranial pressure and ischemic penumbra,

1. MBBS, FCPS (Medicine), Senior Registrar Medicine, University of Lahore Teaching Hospital, Lahore.
2. MBBS, FCPS (Medicine), Associate Professor Medicine, University of Lahore Teaching Hospital, Lahore.
3. MBBS, FCPS (Medicine), Assistant Professor Medicine, University of Lahore Teaching Hospital, Lahore.
4. MBBS, FCPS (Medicine), MRCP (Medicine), Associate Professor Medicine, University of Lahore Teaching Hospital, Lahore.
5. MBBS, FCPS (Medicine), Senior Registrar Medicine, University of Lahore Teaching Hospital Lahore.
6. MBBS, FCPS (Medicine), Senior Registrar Medicine, University of Lahore Teaching Hospital Lahore.

Correspondence Address:
Dr. Tahir Ullah Khan
Department of Medicine
University of Lahore Teaching Hospital Lahore.
tahirnurar69@gmail.com

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and cerebral hypo perfusion. Increasing cerebral edema is the primary pathophysiological mechanism responsible for neurological deterioration within 24–48 hours of stroke onset. Progressive increase in cerebral edema underlies the late deterioration (week second and third) in these patients.⁷ Despite the convincing evidence that lowering blood pressure in the immediate period after cerebral hemorrhage is beneficial, some concerns have been raised about possible adverse consequences of acute reductions in blood pressure. Among these concerns is a commonly stated hypothesis that area around the cerebral hemorrhage may develop ischemia due to mass effect of existing hematoma with consequent fall in cerebral perfusion and further worsening of ischemia, leading to a vicious cycle.

However, according to a recent prospective study, the evidence for this popular hypothesis is inconclusive.⁸ Elevated systolic blood pressure at admission was found to be a predictor of acute mortality from ICH. In study 32% patients with ICH died during hospital stay, half of whom died during the first 2 days of hospitalization. Patients who died during hospital stay were more likely to have a systolic blood pressure (SBP) greater than or equal to 180 mm Hg on admission.⁹

The results of this study will generate useful database of our local population as there is no study done here. The results of study will help in highlighting the impact of elevated systolic blood pressure on mortality in ICH and determine the role of early antihypertensive therapy in patients with ICH in terms of mortality reduction.

MATERIAL & METHODS

This Descriptive, case series study was conducted in the Department of Medicine (Unit IV), Jinnah Hospital, Lahore over a period of Six months (6th April 2018 to 7th October 2018). Sample size was 335, calculated at 5% level of significance and 5% margin of error using non probability, consecutive sampling method and taking expected percentage of mortality of ICH as 32%. Both male and female patients, age \geq 50 years and \leq 80 years, having conclusive evidence of intracerebral hemorrhage on CT brain, and

patients of ICH with intraventricular extension were our study subjects. Patients having Coagulopathy & bleeding disorders (PT, APTT>4 sec), patients having SBP < 110mmHg at time of presentation, those with history of head trauma or those having CNS tumor, and Patients not giving consent for participation in study were excluded. All the cases of intracerebral hemorrhage, fulfilling inclusion criteria were recruited from inpatient Department of Medicine, Unit IV of Jinnah Hospital Lahore.

Official approval from ethical review board and detailed written inform consent were taken from patients. Blood pressure was measured by researcher using random-zero sphygmomanometers with the subject lying quietly. Two readings of blood pressure 5 minutes apart were taken and average of the two readings was noted in the proforma. CT scan brain was done in Jinnah Hospital Lahore, and analyzed by consultant radiologist. These study cases were followed till discharge to note outcome i.e. Mortality.

SPSS version 20 was used for entry and analysis of the available data. Mean and standard deviation were used for descriptive statistics. Frequencies and percentages were calculated for categorical variables like elevated systolic blood pressure, diabetes, residential status and early mortality. Effect modifiers like age, gender, diabetes (BSR>200mg/dl), and intraventricular extension of ICH were distributed by stratification. Post stratification chi-square test was applied to see their effect on outcome. P-value < 0.05 was considered as significant.

RESULTS

The mean age of the study participants was 64.39 + 8.50 years. Majority of the cases were males (85.1%) while few were female cases 50 (14.9%). Early mortality was noted in 132 (39%) of cases (Table-I). Diabetes Mellitus was noted in 144 (43%) of cases (Table-II). Moreover, intraventricular extension of ICH was present in 59 (17.6%) and absent in 276 (82.4%) (Table-III). There was significant difference (p-value<0.05) for early mortality in elevated versus normal blood pressure people (Table-IV). On stratification

for early mortality, it was noted that there was no significant difference with respect to gender (Table-V) and age (Table-VIII), but a significantly high early mortality was noted in diabetic patients (Table-VI) and those having intraventricular extension of ICH (Table-VII).

Early Mortality	Frequency (%)
Yes	132 (39.4%)
No	203 (60.6%)
Total	335 (100.0%)

Table-I. Distribution of the early mortality in the study participants

Diabetes Mellitus	Frequency (%)
Yes	144 (43.0%)
No	191 (57.0%)
Total	335 (100.0%)

Table-II. Distribution of diabetes mellitus in the study participants

	Frequency (%)
Yes	59 (17.6%)
No	276 (82.4%)
Total	335 (100.0%)

Table-III. Distribution of the intraventricular extension of ICH in the study participants

		Early Mortality		Total
		Yes	No	
Elevated Systolic blood pressure	Yes	49	38	87
		56.3%	43.7%	100.0%
	No	83	165	248
		33.5%	66.5%	100.0%

Table-IV. Comparison of the early mortality in the elevated blood pressure versus normal blood pressure P-value=0.00

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		Early Mortality		Total
		Yes	No	
Gender of patients	Male	115	170	285
		40.4%	59.6%	100.0%
	Female	17	33	50
		34.0%	66.0%	100.0%

Table-V. Stratification of the early mortality with respect to the gender P-value=0.43

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		Early Mortality		Total
		Yes	No	
Diabetes Mellitus	Yes	79	65	144
		54.9%	45.1%	100.0%
	No	53	138	191
		27.7%	72.3%	100.0%

Table-VI. Stratification of the early mortality with respect to the diabetes mellitus P-value=0.00

		Early Mortality		Total
		Yes	No	
Intraventricular Extension of ICH	Yes	28	31	59
		47.5%	52.5%	100.0%
	No	104	172	276
		37.7%	62.3%	100.0%

Table-VII. Stratification of the early mortality with respect to the intraventricular extension of ICH P-value= 0.18

		Early Mortality		Total
		Yes	No	
Group o age	<70 years	98	138	236
		41.5%	58.5%	100.0%
	>70 years	34	65	99
		34.3%	65.7%	100.0%

Table-VIII. Stratification of the early mortality with respect to the age P-value=0.27

DISCUSSION

Hemorrhagic CVA accounts for approximately 10-15% of all 0.7 million strokes reported in the United States every year.¹⁰ Intracerebral hemorrhage is a catastrophic neurological event with worldwide high mortality and morbidity reported in these patients.¹¹ Trials conducted 2000 onwards revealed significant improvement in mortality of intracerebral hemorrhage patients¹², although a meta-analysis (1980-2008) did not reveal such improvement in terms of mortality and prognosis.¹³ As intracerebral hemorrhage goes unnoticed in most of the cases and considering its high mortality, preventive strategies for this debilitating condition is the only way forward.¹⁴

There are certain key stages of ICH: initial hemorrhagic event followed by gradual increase in hematoma size and diffuse cerebral edema

leading to deterioration in clinical condition.¹⁵ Initial hemorrhagic event occurs due to rupture of diseased cerebral vasculature followed by extravasation of blood into the interstitial compartment with consequent cerebral edema.¹⁶ Hematoma expansion leads to increased intracranial pressure resulting in displacement of brain and potential risk of herniation.¹⁷

The current study shows that incidence of ICH increases with growing age, which can be reasonably explained by high prevalence of hypertension in older population. Furthermore, a study on Chinese population showed conclusive evidence of hypertension, smoking and alcohol contributing to the stroke occurrence in young patients. According to our present study results, significant mortality was noted in young patients (16-25), which could logically be explained by high prevalence of structural heart lesions in this age group. Rutten-Jacobs et al. did not find any significant correlation between mortality and patient' age. Therefore, multicenter studies with large sample sizes are needed in to validate the findings of our present study.¹⁸ Only 30-day and not 180-day mortality was significantly increased in ICH patients than those without.¹⁹ Out of total 214 patients, about 70 (32.7%) ICH patients died during the hospital admission, result almost similar to our current study.²⁰ Literature review reveals hypertension as a major risk factor for ICH and its grave prognosis, but the present study failed to establish correlation between hypertension and early mortality due to ICH.^{21,22}

Our study was not without limitations. It was uncentered, and we had only mortality outcome data for the hospitalized cases. No established guidelines were available regarding surgical treatment initiation. Strengths of our current study includes the nature of study (population-based survey) and large sample size.

CONCLUSION

Significant proportion of patients with Intracerebral hemorrhage patients suffer from early mortality and have elevated blood pressure.






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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Maida Nazeer	Data collection.	
2	Faisal Amin Baig	Statistical analysis.	
3	Tahir Ullah Khan	Manuscript writing.	
4	Atif Masood	Literature review.	
5	Muhammad Hamid	Manuscript design.	
6	Sadaf Sarwar	Final proof reading review.	