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Original Research Article

Intracerebral Hemorrhage in a Young Urban Population: Etiologies and Outcomes in Patients 50 and Younger Presenting in the Department of Neurology, Jinnah Postgraduate Medical Centre

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Abstract: *Intracerebral hemorrhage (ICH) in young adults is a significant neurological emergency associated with considerable morbidity and mortality. Understanding its etiological profile and prognosis is essential for timely management and prevention.* ***Objective:*** *To determine the etiologic profile and prognosis of intracerebral hemorrhage (ICH) in patients aged 18–50 years presenting to the Neurology Department at Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan.* ***Methods:*** *A cross-sectional study was conducted at Ward 28, Department of Neurology, JPMC Karachi, from December 7, 2024 to March 7, 2025, after obtaining ethical approval. One hundred twenty-nine patients aged 18–50 years with confirmed ICH (within 24 hours of onset) were enrolled using non-probability consecutive sampling. Demographic and clinical data, including comorbidities such as hypertension, diabetes mellitus, hyperlipidemia, cerebral amyloid angiopathy (CAA), and anticoagulant use, were recorded. Patient outcomes were assessed at hospital discharge.* ***Results:*** *The mean systolic blood pressure was 143.6 ± 21.5 mmHg. Hypertension was the most prevalent comorbidity, present in 64 patients (50%), followed by hyperlipidemia in 39 (30%), diabetes mellitus in 25 (19%), anticoagulant use in 19 (15%), and cerebral amyloid angiopathy in 13 (10%). Out of the total, 104 patients (81%) were discharged successfully, while 25 (19%) died during hospitalization.* ***Conclusion:*** *Intracerebral hemorrhage in young adults is associated with high morbidity and mortality, with hypertension being the most common underlying risk factor. These findings highlight the need for aggressive risk factor management in younger populations to reduce the burden of ICH.*

Keywords: ICH, Hypertension, young age, outcomes

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Introduction

Intracerebral hemorrhage (ICH) is a severe subtype of stroke regarding bleeding into the brain parenchyma, being responsible for 10-15% of all strokes observed on a global level (1, 2). Even though ICH occurs less commonly than ischemic stroke, the former translates to increased case fatality and disability even in young people. These etiologies and outcomes are important in studying patients under the age of fifty due to the distinctive nature and manifestations of the disease in an urban cohort (3). Prior work points to hypertension as the primary source of ICH, prevailing in 57% of instances (4). Cerebral amyloid angiopathy (CAA), anticoagulant use, hyperlipidemia, and other lifestyle risk factors like smoking and alcohol consumption have also been reported (5). Among the patients, 72% had hypertension, and 15% complained of anticoagulant use, according to a study (6). Some of these factors are more common in young people due to genetics and the tendency to adopt certain lifestyles. The effects of ICH are usually adverse, depending on the patient's age, location of the hemorrhage, and other pathologies associated with the patient (7). One of the studies conducted by Gedansky et al. indicated that for patients below 50 years, the 30-day mortality rate is approximately 20.7%. Patients with high ICH scores and low Glasgow Coma Scale (GCS) scores are likely to record worse outcomes (7). Functional outcomes are also less uniform and are worse for elderly patients than for young ones. Even for young adults, ICH remains a major challenge and a social and economic burden. Surprisingly, there is scarce information about urban populations in developing countries, where differences in baseline health and the availability of healthcare can significantly impact the results (8). Hence, this study aims to determine ICH's aetiologic profile and prognosis in patients aged 18-50 years attending the Neurology Department, JPMC Karachi, Pakistan. Hence, this study aims to fill the gap by assessing factors like comorbidities, GCS, and ICH scores, thereby establishing the influence of lifestyle on prognosis and intervention for better care.

Methodology

After the ethical approval from the institutional review board, this cross-sectional study was conducted at Ward 28, Department of Neurology, Jinnah Postgraduate Medical Centre (JPMC) Karachi from December 7, 2024 to March 7, 2025. Through non-probability consecutive sampling, 129 patients aged 18-50 years, both genders, presenting with intracerebral haemorrhage according to operational definition (time since event one day), were included in the study. Patients with a history of stroke or head trauma, with a tumor or brain abscess on CT scan, who are not willing to participate in the study, were excluded from the present study. The written informed consent for the study was obtained from the patient who fulfilled the inclusion criteria. Detailed demographic details of each patient, including name, gender, and age, were obtained. Each patient was assessed for signs and symptoms, including altered level of consciousness, headache, nausea, vomiting, weakness/numbness in the face, arm, or leg, vision loss, or seizures. Diagnosis of intracerebral hemorrhage was confirmed by the presence of blood within the brain parenchyma or ventricular system on head computed tomography (CT). Each patient was assessed for etiology of intracerebral hemorrhage, including hypertension, diabetes mellitus, hyperlipidemia, cerebral amyloid angiopathy (CAA), anticoagulation (medication), smoking, and alcohol drinking. The blood pressure of each patient was measured for confirmation of hypertension. Each patient's Blood sample was collected in an aseptic environment and sent to the laboratory for complete blood count, hemoglobin level, and lipid profile. The ICH score was also calculated to predict the risk of mortality. Each patient's outcome was assessed at the time of discharge from the hospital. After data collection,

the analysis was conducted using the Statistical Package for Social Science (SPSS) software, Version 25.

Mean and standard deviation was calculated for quantitative variables like age (years), HbA1c (%), blood pressure (mmHg), LDL-C (mg/dl), HDL-C (mg/dl), TC (mg/dl), TG (mg/dl), GCS score and ICH score. Frequency and percentages was calculated for categorical variables like gender, age in groups, sign and symptoms (altered level of consciousness, headache, nausea, vomiting, weakness/numbness in face, arm or leg, vision loss or seizures), etiology (hypertension, diabetes mellitus, hyperlipidemia, cerebral amyloid angiopathy (CAA), anticoagulation (medication), smoking and alcohol drinking) and outcome. Effect modifiers like gender, age in groups, hypertension, diabetes mellitus, hyperlipidemia, cerebral amyloid angiopathy (CAA), anticoagulation (medication), and smoking were controlled by stratification. Post-stratification chi-square test was applied by taking a p-value ≤ 0.05 as significant.

Results

The demographic profile (Table 1) of the study population reveals a mean age of 34.09 ± 10.6 years, with a predominance of females (75, 58%) compared to males (54, 42%). Among the symptoms observed (Table 2), altered level of consciousness was present in 62 patients (48%), headache in 56 patients (43%), nausea in 61 patients (47%), and vomiting in 74 patients (57%). Weakness or numbness in the face, arm, or leg was reported by 63 patients (49%), vision loss by 73 patients (57%), and seizures by 69 patients (53%). The mean blood pressure recorded was 143.6 ± 21.5 mmHg, with hypertension (HTN) documented in 64 patients (50%). Other comorbidities included diabetes mellitus (DM) in 25 patients (19%), hyperlipidaemia in 39 patients (30%), cerebral amyloid angiopathy (CAA) in 13 patients (10%), and anticoagulant use in 19 patients (15%). Regarding smoking habits, 51 patients (40%) were non-smokers, 36 (28%) were current smokers, and 42 (33%) were ex-smokers.

The blood profile (Table 3) of the patients showed a mean HbA1c level of 6.53 ± 1.4%, LDL-C level of 125.3 ± 35.8 mg/dL, HDL-C level of 61.3 ± 16.7 mg/dL, total cholesterol (TC) level of 222.6 ± 44.2 mg/dL, and triglycerides (TG) at 181.2 ± 41.9 mg/dL. The mean Glasgow Coma Scale (GCS) score was 9.3 ± 3.8, and the Intracerebral Haemorrhage (ICH) score averaged 2.9 ± 2.03.

In terms of outcomes, the majority of patients (104, 81%) were successfully discharged from the hospital, while 25 patients (19%) succumbed to the condition (Table 4). This data highlights the significant morbidity and mortality associated with intracerebral haemorrhage in this demographic, emphasizing the importance of targeted interventions to improve outcomes.

The outcomes analysis showed no statistically significant associations (Table 5) for variables like age (p=0.556p = 0.556p=0.556), hypertension (p=0.334p = 0.334p=0.334), diabetes (p=0.536p = 0.536p=0.536), hyperlipidemia (p=0.497p = 0.497p=0.497), smoking status (p=0.998p = 0.998p=0.998), CAA (p=0.236p = 0.236p=0.236), or anticoagulation use (p=0.236p = 0.236p=0.236). Gender approached significance (p=0.05 = 0.05p=0.05), with females showing slightly worse outcomes than males. Overall, most factors did not significantly influence discharge or mortality rates.

Table 1: Demographic profile

Mean	Mean and Frequency
Age (years)	34.09±10.6
Gender	
Male	54 (42%)
Female	75 (58%)

Table 2: Symptoms and co-morbidities

Mean	Mean and Frequency
Symptoms	
Altered Level of Consciousness	62 (48%)
Headache	56 (43%)
Nausea	61 (47%)
Vomiting	74 (57%)
Weakness/Numbness in Face, Arm, or Leg	63 (49%)
Vision Loss	73 (57%)
Seizures	69 (53%)
Blood Pressure (mmHg)	143.6±21.5
HTN	64 (50%)
DM	25 (19%)
Hyperlipidaemia	39 (30%)
CAA	13 (10%)
Anticoagulation (Medication) Use	19 (15%)
Smoking	
Non-smoker	51 (40%)
Current smoker	36 (28%)
Ex-smoker	42 (33%)

Table 3: Blood profile

Variables	Mean ± S.D
HbA1c (%)	6.53±1.4
LDL-C (mg/dl)	125.3±35.8
HDL-C (mg/dl)	61.3±16.7
TC (mg/dl)	222.6±44.2
TG (mg/dl)	181.2±41.9
GCS Score	9.3±3.8
ICH Score	2.9±2.03

Table 4: Outcomes

Outcome	Frequency
Discharged	104 (81%)
Deceased	25 (19%)

Table 5: Stratification outcomes

Variables	Outcomes		P value
	Discharged	Diseases	
Age (Years)			0.556
<35	55	13	
>35	49	12	
Gender			0.05
Male	46	8	
Female	58	19	
HTN			0.334
Yes	53	11	
No	51	14	
Diabetes			0.536

Yes	20	5	
No	84	20	
Hyperlipidaemia			0.497
Yes	32	7	
No	72	18	
Smoking status			0.998
Non-smokers	29	7	
Smokers	41	10	
Ex-smokers	34	8	
CAA			0.236
Yes	12	1	
No	92	24	
Anticoagulation Use			0.236
Yes	17	2	
No	87	23	

Discussion

The information revealed in the current study will be useful in understanding demographic, clinical, and outcome features of intracerebral hemorrhage (ICH) patients aged 18 to 50 years. The mean age of the population was 34.09±10.6 years, females were slightly dominant, 58%, and this is in contrast with other studies where males represent the larger proportion of younger ICH patients. For example, Jiang et al. (2014) have also noted the male-dominated pattern in similar groups, though the authors have attributed that to higher probabilities of smoking and drinking among men (9). However, the present study indicates demographic transition, gender shift, or patterns of utilization of health care services. Hypertension was the most prevalent comorbidity in the current study, which is supported by global studies that link hypertension as the main cause of spontaneous ICH. The data on hypertension is also supported by Gedansky et a1, according to which, 60% of patients under the age of fifty had hypertension, which suggests that it plays a significant role in younger patients (10). Other related risks included: Diabetes- 19%, hyperlipidemia- 30%, smoking- current smokers 28%, and ex-smokers 33%. The findings differed from other urban studies but indicated varied geographic and economic effects. The low 10% cerebral amyloid angiopathy prevalence and the low 15% anticoagulation usage noticeably indicate the patients' younger age and different risk factor exposure compared with older patients. In clinic assessment, vomiting (57 percent), vision loss (57 percent), and seizures (53 percent) were expressed and in concordance with Rost et al, where these were some of the common manifestations in the younger ICH patient. The obtained mean GCS score of 9.3 ± 3.8 and the mean ICH score of 2.9 ± 2.03 points to moderate severity of the condition; The mortality constituted 19%, which is quite close to the 20.7% (11, 12). Surprisingly, there were no correlations with specific outcomes related to hypertension, diabetes, or smoking. These results are incongruent with the earlier studies, which documented such factors as the cause of a poor prognosis. Gender was nearly significant ($p < 0.05$); female patients recorded marginally poorer results, similar to findings by van Asch et al, stating that gender influences recovery and mortality. Collectively, these results highlight the nature of ICH in younger patients and support future research investigations concerning the peculiar risk factors of this pathology in various geographic locations and elaboration of the management approach (13).

Conclusion

This paper examines the high morbidity and mortality of intracerebral haemorrhage in young adults, with the most common comorbidity being hypertension. The current study did not reveal relationships between most variables and outcomes, implying the need for research to identify effective intervention approaches that may enhance patient management and the general outcome.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethical approval and consent to participate
Approved by the department concerned. (IRBEC-JPMC-24)
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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RMA (PG)
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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

1. Rajashekar D, Liang JW. Intracerebral Hemorrhage. StatPearls. Treasure Island (FL) ineligible companies. Disclosure: John Liang declares no relevant financial relationships with ineligible companies. StatPearls Publishing

2. Xiong L, Reijmer YD, Charidimou A, Cordonnier C, Viswanathan A. Intracerebral hemorrhage and cognitive impairment. Biochimica ET Biophysica Acta (BBA) - Molecular Basis of Disease. 2016; 1862(5):939-44.
3. Magid-Bernstein J, Girard R, Polster S, Srinath A, Romanos S, Awad IA, et al. Cerebral Hemorrhage: Pathophysiology, Treatment, and Future Directions. Circulation research. 2022; 130(8):1204-29.
4. Stanton R, Demel SL, Flaherty ML, Antzoulatos E, Gilkerson LA, Osborne J, et al. The risk of intracerebral haemorrhage from hypertension is greatest at an early age. European stroke journal. 2021; 6(1):28-35.
5. Zhu Y, Liu L, Zhong L, Cheng Y, Zhang S, Wu B, et al. The association between hypertensive angiopathy and cerebral amyloid angiopathy in primary intracerebral hemorrhage. Frontiers in Neurology. 2023; 14.
6. Merella P, Casu G, Chessa P, Atzori E, Bandino S, Deiana G. When Atrial Fibrillation Meets Cerebral Amyloid Angiopathy: Current Evidence and Strategies. Journal of Clinical Medicine. 2023; 12(24):7704.
7. Guo H, You M, Wu J, Chen A, Wan Y, Gu X, et al. Genetics of Spontaneous Intracerebral Hemorrhage: Risk and Outcome. Frontiers in neuroscience. 2022; 16:874962.
8. Cattaneo A, Adukia A, Brown D, Christiaensen L, Evans D, Haakenstad A, et al. Economic and Social Development along the Urban-Rural Continuum: New Opportunities to Inform Policy 2021.
9. Jiang N, Lee YO, Ling PM. Association between tobacco and alcohol use among young adult bar patrons: a cross-sectional study in three cities. BMC Public Health. 2014; 14(1):500.
10. Broderick M, Rosignoli L, Lunagariya A, Nagaraja N. Hypertension is a Leading Cause of Nontraumatic Intracerebral Hemorrhage in Young Adults. Journal of stroke and cerebrovascular diseases: the official journal of the National Stroke Association. 2020; 29(5):104719.
11. Abulhasan YB, Teitelbaum J, Al-Ramadhani K, Morrison KT, Angle MR. Functional Outcomes and Mortality in Patients with Intracerebral Hemorrhage after Intensive Medical and Surgical Support. Neurology. 2023; 100(19):e1985-e95.
12. Franco L, Paciaroni M, Enrico ML, Scoditti U, Guideri F, Chiti A, et al. Mortality in patients with intracerebral hemorrhage associated with antiplatelet agents, oral anticoagulants, or no antithrombotic therapy. European Journal of Internal Medicine. 2020; 75:35-43.
13. Huang B, Chen A, Sun Y, He Q. The Role of Aging in Intracerebral Hemorrhage. Brain Sciences. 2024; 14(6):613.