



## Extreme age and spontaneous intracerebral haemorrhage

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### Abstract

**Background:** Spontaneous intracerebral haemorrhage (ICH) is an intraparenchymal bleeding in the absence of trauma or surgery. Although it occurs lesser in relation to ischemic one but is most disabling and deadly type of stroke. Adult age is more prone than younger age group; regarding incidence in very older group is still ambiguous. This study is done to observe spontaneous haemorrhagic stroke in relation of extreme age group.

**Materials and Methods:** The study design is prospective study. Total 195 patients were diagnosed as spontaneous ICH and they have been first time reported & admitted in Combined Military Hospital (CMH) Dhaka, between Jan 2018 and December 2019. Diagnosis was based on history, clinical examination and confirmed by non-contrast Computed Tomography (CT) scan of brain. Statistical analyses were done with using the Statistical Package for Social Sciences (SPSS) version 26.

**Results:** Total admitted 195 patients in CMH Dhaka from Jan 2018- Dec 2019 are included in our study who full-fill the criteria. Males were 141(72.31%), females were 54(27.69%) and were aged between 18 and 95 years. There is significant relationship of spontaneous ICHs with the age. Rate of spontaneous intracerebral haemorrhage among age group,  $\geq 25 - 74$  years, 182(93.33%) whereas  $< 25$  years only 1(.51%) and  $\geq 75$  years 12(6.15%) patients; so extreme age group affected only 13(6.67%). Regarding aetiology of 195 patients, Hypertensive 127(65.13%), Coagulopathy 16(8.21%), Unknown aetiology 12(6.15%) and most common association is hypertension.

**Conclusion:** Mostly affected intracerebral hemorrhage is middle age group population. Hypertension is also major factor for this incidence. Extreme age is less vulnerable for spontaneous ICH.

**Keywords:** extreme age, CT (Computed Tomography) scan, ICH (Intracerebral haemorrhage)

### Introduction

Intraparenchymal bleeding in the absence of trauma or surgery is spontaneous ICH. Cerebrovascular disease (CVD) is a stroke having two varieties ischemic and haemorrhagic. Overall ischemic stroke is more common than haemorrhagic one. But haemorrhagic stroke occurs mostly in hypertensive patients<sup>[1]</sup>. Usually CVD increases with age and number of stroke cases also increases as life expectancy goes up, with doubling in stroke death<sup>[2]</sup>. This haemorrhage of brain parenchyma may extend to ventricle. Incidence and prevalence of stroke is estimated between 84-262/100,000 in rural and between 334-424/100,000 in urban area<sup>[3]</sup>. Incidence of intracerebral haemorrhage increases with the age advancement<sup>[4]</sup>. Spontaneous ICH is most disabling and life-threatening type of stroke. Regarding risk factors for spontaneous ICH mainly: male sex, old age, smoking cigarette, alcohol, DM and sympathomimetic drugs<sup>[1]</sup>. And aetiology of ICH: Primary- (mostly) HTN, Amyloid angiopathy and Secondary- Vascular malformation (AVM, Aneurysm), Tumour, Thrombolytic drug, Vasculitis<sup>[5]</sup>. Intracerebral haemorrhage is mostly occurring by ruptured degenerated blood vessels due to long-standing hypertension. These prominent degeneration showed in tunica media and smooth muscles & developed tiny lipohyalinotic aneurysms that subsequently rupture<sup>[6]</sup>. Amyloid deposition of the vessels of cerebral cortex may produce micro-aneurysm leads to rupture and resulting in ICH. Usually it affected older age and lobar in nature<sup>[7]</sup>. Vascular malformation is another culprit for haemorrhagic stroke. Regarding young age group; ICHs are mainly result from vascular malformation and lobar in location<sup>[8]</sup>. Regarding pathophysiology of spontaneous ICH, there are different thoughts and phenomenon. In acute phase of ICH, primary brain damage occurs due to mechanical mass effect of the hematoma, leads to raised intracranial pressure (ICP) followed by reduction of cerebral perfusion and possibility of herniation<sup>[9]</sup>. (Figure-1). There is great relation of age with the blood pressure as well as haemorrhagic stroke.

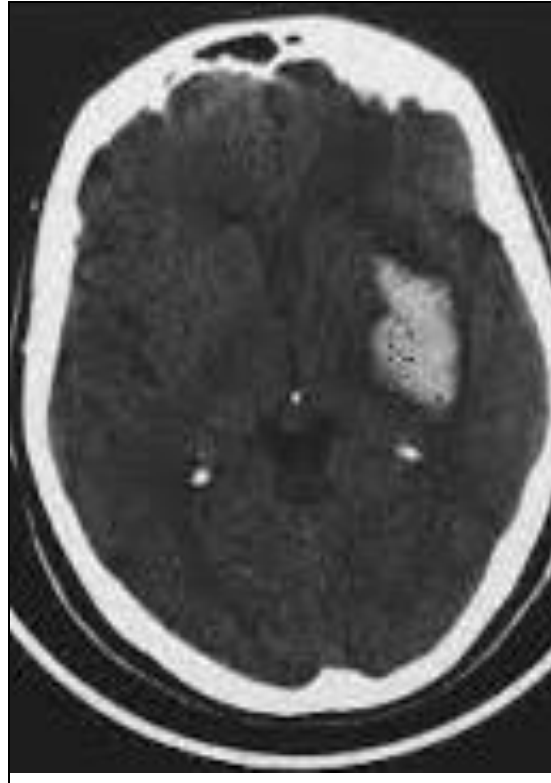
In younger age less possibility of raised blood pressure due to; organ growth with utilization of nutrition, high catabolism with burning of energy producing stuff and increased elasticity of vascular wall with more compliance of blood pressure<sup>[10]</sup>.

According to Lee *et al.*<sup>[11]</sup>, 20% reduction of stroke in moderately active adults and 27% reduction in highly active person. And haemorrhagic stroke in young age group is rare except few like vascular malformation, coagulopathy<sup>[8]</sup>.

In the contrary; very older age group decrease response to beta adrenergic / sympathetic stimulation, elevated parasympathetic vagal tone and blunted baroreflexes; all induce reduction of blood pressure, although hardening of vascular wall have negligible effect <sup>[12]</sup>.

Rate of mortality in ICH is approximately 40% at 1 month & 54% at 1 year. Only average 25.5% patients can lead long-term functional independency <sup>[1]</sup>.

In this background to come into conclusion we tried to find out age relation with haemorrhagic stroke in CMH Dhaka, Bangladesh.



**Fig 1:** Spontaneous ICH in Non-contrast CT scan head

### Materials and Methods

This study is a prospective type of study. All the patients of haemorrhagic stroke who were admitted and confirmed radiologically in the Neurosurgery Centre, CMH, Dhaka, during the period from Jan 2018 to Dec 2019 were enrolled for the study.

Most of patients having history of hypertension, some patients with DM, coagulopathy and mixed co-morbidity. Total 195 cases in either sex and age variables from 18 years to 95 years were randomly selected and details history, meticulous clinical examination and finally CT scan of head was done.

All of our patients were kept analyzed and evaluated by their clinical and radiological data from hospital record, picture archive and communication system.

CT scan finding of spontaneous ICH of any volume were included in this study. Patients of age 18 years and above with irrespective of gender, co-morbidities such as HTN, DM, and coagulopathy were included in this study but consent not given were excluded. Statistical analysis was performed by SPSS version 26.

### Results

Total 195 patients of spontaneous intracerebral haemorrhage were admitted in CMH Dhaka from Jan 2018-Dec 2019. All of them were properly evaluated by details history, meticulous clinical examination and relevant investigation.

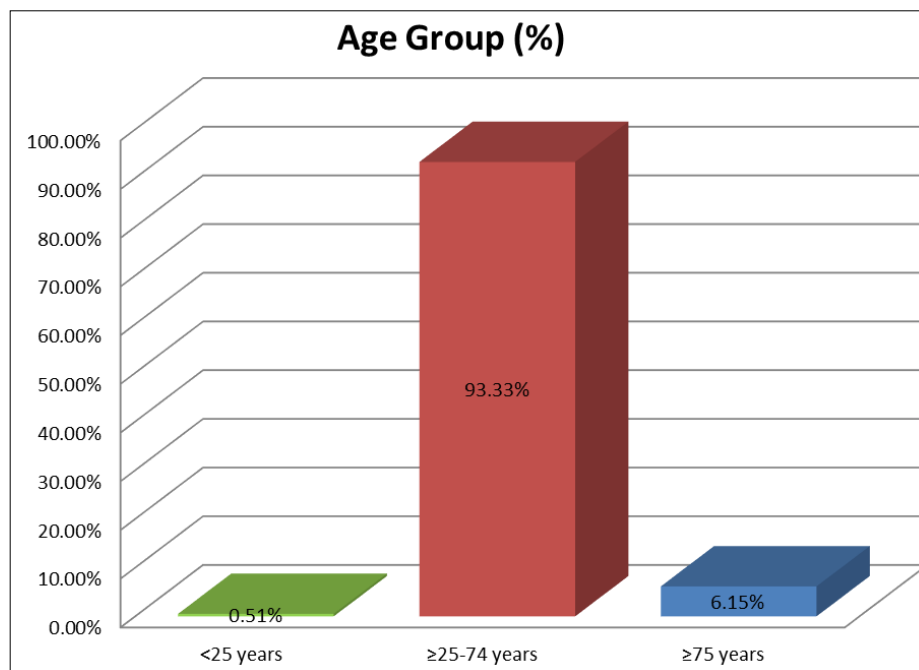
Among 195 spontaneous ICH patients, maximum 141(72.31%) were male and less number of patients female 54(27.69%) only (Table-1).

**Table 1:** Distribution of patients according to Gender (n=195)

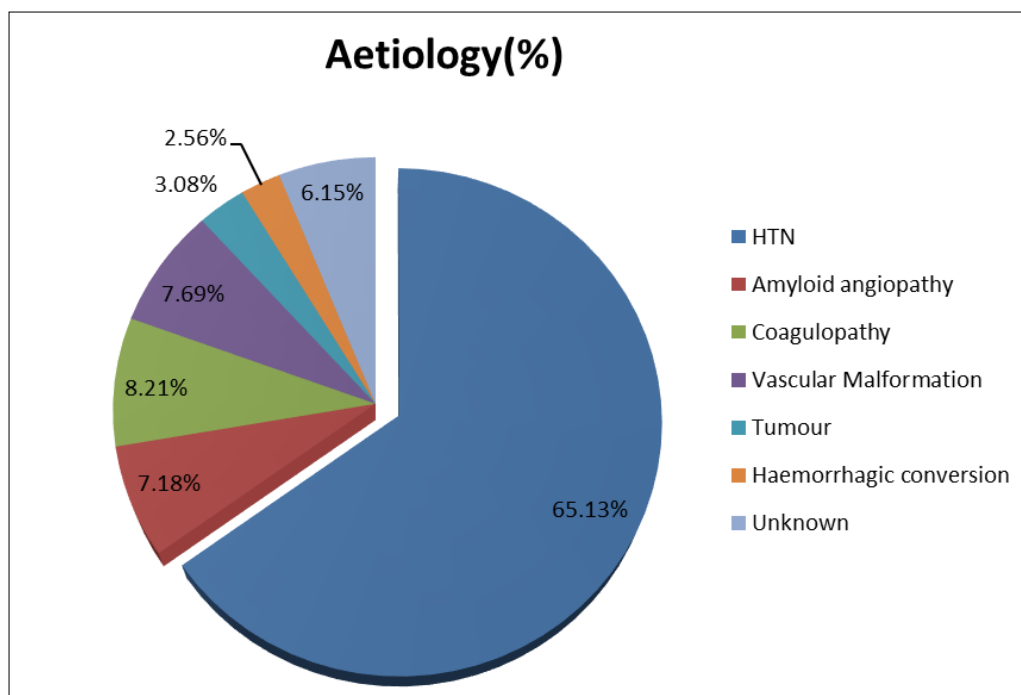
Gender	Number	Percentage (%)
Male	141	72.31
Female	54	27.69

According to age group ICH positive;  $\geq 25$ –74 years, 182(93.33%) whereas  $< 25$  years only 1(.51%) and  $\geq 75$  years 12(6.15%) patients; so extreme age group affected only 13(6.67%) (Figure-2).

Regarding aetiology of spontaneous ICH; HTN, 127(65.13%), Amyloid angiopathy 14(7.18%), Coagulopathy 16(8.21%), vascular Malformation 15(7.69%), Tumour 6(3.08%), Haemorrhagic conversion of ischemic stroke 5(2.56%) and unknown aetiology 12(6.15%) and mostly HTN 65.13% (Figure-3).



**Fig 2:** Distribution of patients according to age group (n=195)



**Fig 3:** Distribution of different Aetiological factors of spontaneous ICH (n=195)

### Discussion

Regarding intracerebral haemorrhage, some studies showed that advancing age is more vulnerable with raised blood pressure as well as spontaneous ICH, but is it consistent raising pressure with age or not still conflicting. In our study we have observed that male were 141(72.31%) and female were 54(27.69%) patients with male predominancy.

Jolink *et al.* [13], in 2015 showed that annual incidence per 100,000 persons was higher in men than women; which correlates with this study.

Macellari *et al.* [5], in 2014 showed that aetiology of ICH: Primary- mainly HTN then Amyloid angiopathy and Secondary- (less number) Vascular Malformation (AVM, Aneurysm), Tumour, Thrombolytic drug, Vacuities.

In our study; HTN 127(65.13%), Amyloid angiopathy 14(7.18%), Coagulopathy 16(8.21%), Vascular Malformation 15(7.69%), Tumour 6(3.08%), Haemorrhagic conversion of ischemic stroke 5(2.56%) and

Unknown aetiology 12(6.15%) cases and mostly with HTN 65.13% which co-relates with the study of Macellari *et al* [5].

Spontaneous hemorrhagic stroke in young people below 35 years is 0.5/100 000 population shown by Roditis *et al.* [14]

In a study of 2012, 80 years and above affected ICH were 34% of patients [15].

After 55 years of age; incidence of ICH increases but relatively lesser risk above 70 years [16].

Our present study demonstrated that  $\geq 25 - 74$  years, 182(93.33%) whereas  $< 25$  years only 1(.51%),  $\geq 75$  years 12(6.15%) patients, so extreme age group ( $< 25$  &  $\geq 75$  years age) is less affected only 13(6.67%) which co-relates to some extent with Skajaa *et al.* [16], study.

These erratic results may conflict in the study design. These problems may arise due to an inappropriate analytic model, insufficient length of time with age wise analysis and small sample.

Pathophysiologically; in younger age group, elasticity of vascular wall is enough to cope up extra increased blood pressure but not in adult due to harden vascular wall specially by deposition of cholesterol and tend to disruption of vessels easily whereas very old age decrease sympathetic stimulation and reduce vascular tone (although some loss of elastin & cholesterol deposition but negligible) followed by reduction of blood pressure as well as bring down haemorrhagic stroke.

Most of the affected population having history of middle age to old aged rather than extreme age group in our study and mainly they are suffering from HTN and next coagulopathy mainly getting anti-platelet drug and anti-coagulant drug.

The limitation our study is, it was done in single center. But the patients we dealt; both serving, retired soldiers and parents of our soldiers live in different parts of the country and reported to CMH Dhaka that reflects to some extent overall scenario at least Bangladesh.

### Conclusion

Regarding spontaneous ICH most affected population is middle aged male. Hypertension is the major factor for this incidence. Extreme age is not much vulnerable for haemorrhagic stroke.

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