



Spontaneous intraparenchymal haemorrhage– A dilemma of afflicted hemisphere

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Abstract

Background: Spontaneous intraparenchymal haemorrhage (IPH) may be defined as bleeding within brain parenchyma in absence of any trauma or surgery. Serious disabling and deadly type of stroke is spontaneous IPH. The most affected hemisphere is still ambiguous. The purpose of our study is to find out the most involved cerebral hemisphere of spontaneous IPH.

Matrilas and Methods: Total 38 numbers patients were diagnosed as spontaneous ICH and they have been first time admitted in Combined Military Hospital (CMH) Dhaka, between July 2021 and 15th December 2021. All patients were randomly allocated and sampling was done as per inclusion and exclusion criteria. Diagnosis was done based upon details history, meticulous clinical examination and investigation. Non-contrast Computed Tomography (CT) scan of head was done to confirm diagnosis as well as site of lesion identification. Analyses of statistics were performed by using the Statistical Package for Social Sciences version 26 for Windows (SPSS).

Results: In our study 38 cases were finally selected as ‘Spontaneous intraparenchymal haemorrhage’ was diagnosed clinically and confirmed by CT scan. It was observed that most of our patients are male 29 (76.32%) and female only 9(23.68%) in number. Regarding age distribution; old age is more affected, ≥ 60 years 23(60.53%) and least are young adult only 1(2.63%). It was noticed that out of 38 patients 19(50%) subjects had sole hypertension (HTN) and next one is mixed pathology 6(15.79%). Regarding site of intraparenchymal hemorrhage, it was noticed that dominant (left) cerebral hemisphere is more common 24(63.16%) than that of opposite right hemisphere (non-dominant).

Conclusion: Dominant cerebral hemisphere (usually left) is highly metabolically active with raised blood flow. The highest rate of intraparenchymal hemorrhage incidence is on that hemisphere.

Keywords: spontaneous intraparenchymal haemorrhage (IPH), combined military hospital (CMH), computed tomography (CT)

Introduction

Regarding cerebrovascular disease (CVD); there are two types- one ischemic and another one is haemorrhagic stroke. Although mainly Ischemic stroke but not less common haemorrhagic one and common in hypertensive patients. CVD increases with age and as life expectancy increases, number of stroke patients goes up & expected doubling in stroke death between year 2000 and 2030^[1].

Intracerebral parenchymal haemorrhage is bleeding within brain parenchyma but may extent to ventricle. Incidence & prevalence of stroke is estimated 84-262/100,000 in rural and 334-424/100,000 in urban area^[2].

Spontaneous IPH is most disabling and deadly of all types of intracranial haemorrhage and stroke.

Risk factors of spontaneous intraparenchymal haemorrhage mainly: advanced age, male sex, and smoking, and alcohol abuse, previous history of stroke, sympathomimetic drugs and cocaine^[3].

Regarding aetiology of IPH: Primary- mainly HTN, cerebral Amyloid angiopathy, Secondary- Vascular malformation (Aneurysm, AVM), Brain tumour, Thrombolytic drug, Coagulopathy and Vaculitis^[4].

Pathogenesis

There are different thoughts and ideas regarding pathophysiology of spontaneous ICH or IPH: Intraparenchymal haemorrhage mostly occurred by ruptured degenerated blood vessels due to long-standing hypertension. Degeneration mostly occurred in tunica media and smooth muscles leads to tiny lipohyalinotic aneurysms and subsequently rupture^[5].

Deposition of amyloid in cerebral vasculature usually produce micro-aneurysm that may rupture and resulting in ICH/IPH. It is usually lobar in nature^[6].

Other mechanisms of IPH including bleeding diatheses, anticoagulation, cocaine abuse^[3,4].

In ICH/IPHs, primarily brain damage occur due to mechanical mass effect of hematoma and also raised intracranial pressure (ICP) followed by reduction of cerebral perfusion and invariably herniation^[7]. (Figure-1).

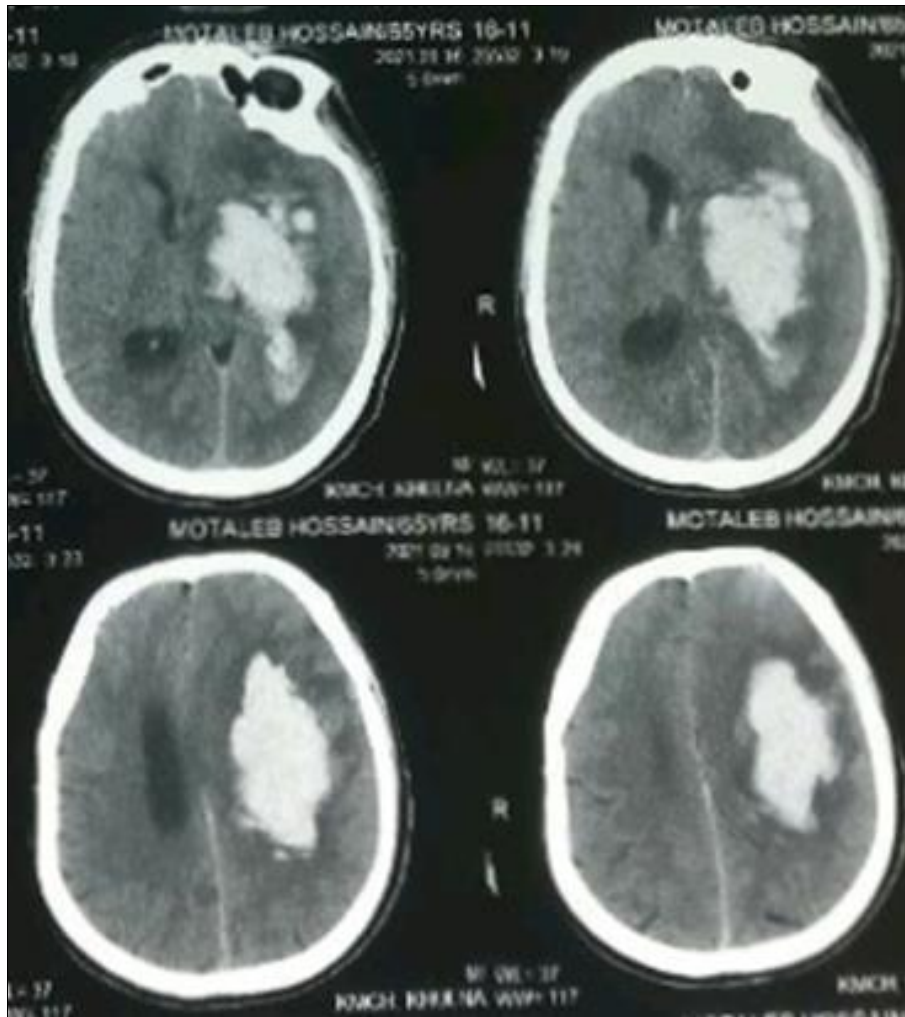


Fig 1: Spontaneous IPH on non-contrast CT scan head

When an area of the brain is in use its metabolic activities increases and blood flow to that region also raised [8]. Hence there is increase blood flow into the thin, right angle end capillary of brain increases risk of rupture. In this background to come into conclusion we tried to find out incidence of haemorrhagic stroke at highly metabolic dominant hemisphere of brain with opposite right non-dominant hemisphere in CMH Dhaka, Bangladesh.

Materials and Methods

The study, in which we worked, is a prospective study. It was carried out in the Department of Neurosurgery, CMH Dhaka, Bangladesh from July 2021 and 15th December 2021. Age of the patients was above 18 years who all were admitted and diagnosed clinically as a case of spontaneous IPH. A total 38 cases in either sex or age variables were randomly selected. Here all patients were right handed means left hemisphere dominant. Patient's sampling was done as per inclusion and exclusion criteria but without CT scan positive none included in our study.

Informed written consent was taken and data collection sheet completed with relevant information from hospital record, communication system & picture archive.

Diagnosis was done by details history, through clinical examinations including neurological examination and confirmed finally by CT scan of head. Statistical analyses were performed by using SPSS Statistical Package, version 26 for Windows.

Results

In this prospective study; total 38 cases were finally selected and diagnosis as spontaneous intraparenchymal haemorrhage. All the patients were evaluated thoroughly by details history, relevant clinical examination including neurological examinations and finally confirmed diagnosis-radiologically. All cases were CT scan positive as IPH.

In this study distribution of patients according to gender male were 29(76.32%) & female were 9(23.68%) in number (Figure 2).

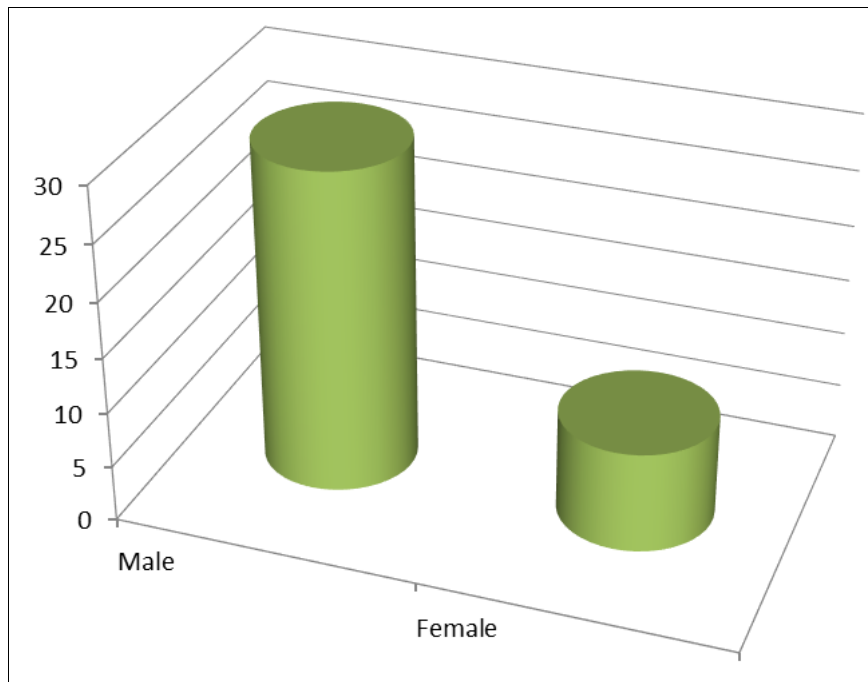


Fig 2: Distribution of patients according to Gender (n=38)

Regarding affected age group; Young adult (18-25 years) is very less only 1 (2.63%) and mostly Old age (≥60 years) is 23 (60.53%) in number; shown in Table I.

In our study, it was noticed that out of all Aetiological factors for spontaneous IPH, HTN alone is 50% (19); others Amyloid Angiopathy 7.89% (3), Vascular Malformation 7.89% (3), Coagulopathy 5.26% (2), Tumour 2.63% (1), Haemorrhagic conversion of Ischemic stroke 2.63% (1), Mixed 15.79% (6) and Idiopathic 7.89% (3) (Figure 3).

Regarding sites of IPH, in this study group, it was observed that most cases had left sided IPH 24(63.16%) and less number of patients only 14 (36.84%) cases right sided IPH (Figure 4).

Table 1: Distribution of patients according to age group (n=38)

Age (years)	(n=50)	(%)
18-25	1	2.63
26-44	2	5.26
45-59	12	31.58
≥60	23	60.53
Range (max, min) 18, 80		

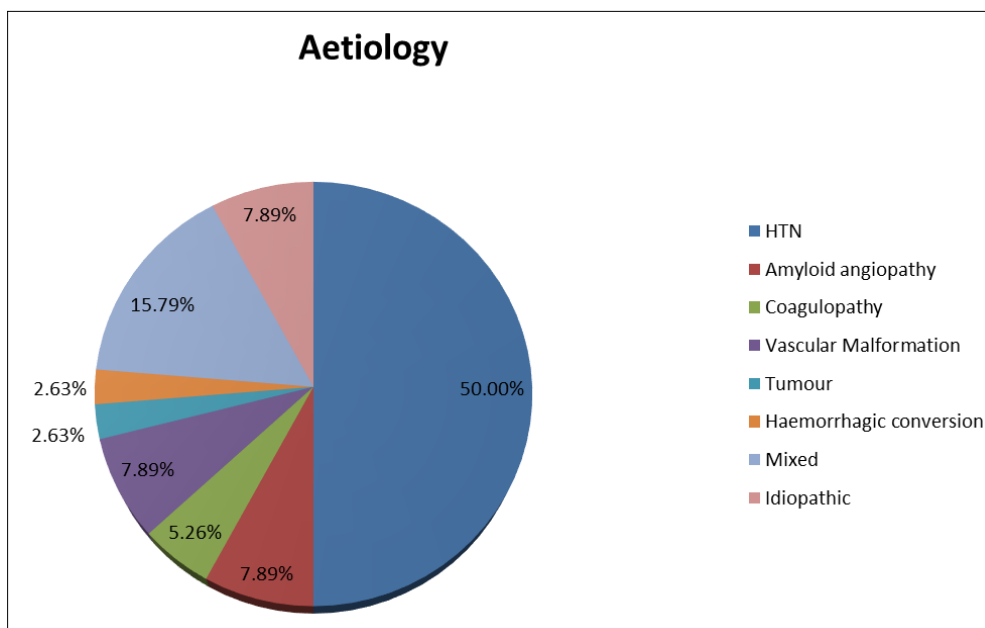


Fig 3: Distribution of patients according to Aetiology (n=38)

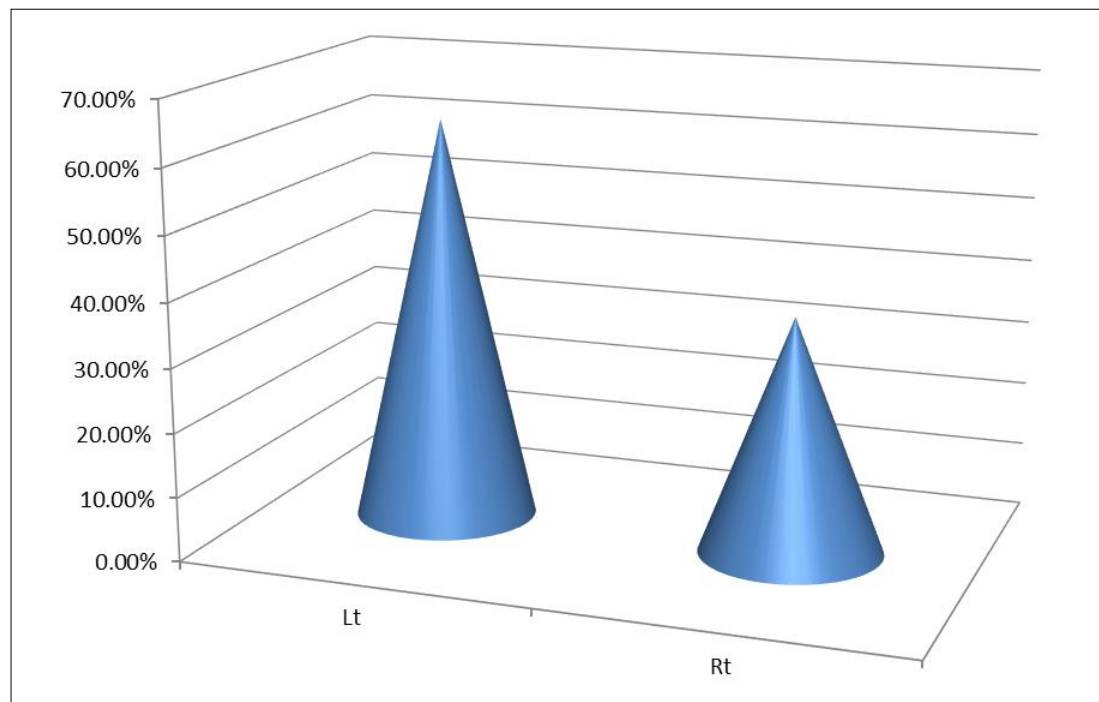


Fig 4: Distribution of patients according to site of Hemisphere involved (n=38)

Discussion

Advancing age is vulnerable for atherosclerosis and HTN. Spontaneous ICHs are more common in old age. But which hemisphere is more involved of that incident is still conflicting.

In this study we have observed that male were 29 (76.32%) and female were 9(23.68%) patients and predominant is male personel.

In 2015, Jolink *et al.* [9], showed that annual incidence per 100,000 persons was higher in men than women; which correlate with our study.

Roditis *et al.* [10], showed that Spontaneous ICH in young people below 35 years is 0.5/100 000 population. And another study in 2021 by Skajaa *et al.* [11], showed that above 55 years of age; incidence of ICH high.

In this study we found that <25 years only 1 (2.63%) and ≥60 years 23 (60.53%) patients affected with spontaneous ICHs, so old age group is much affected which co-relates to some extent with Roditis *et al.*, &Skajaa *et al.*, study [10,11].

Macellari *et al.* [4], in 2014 expressed that aetiology of intracerebral haemorrhage: Primary- HTN mostly then Amyloid angiopathy and Secondary- (very less) Vascular Malformation (AVM, Aneurysm), Tumour, Thrombolytic drug, Vaculitis. In our study, we have seen that HTN 19(50%), Amyloid antipathy 3(7.89%), Coagulopathy 2(5.26%), Vascular Malformation 3(7.89%), Tumor 1(2.63%), Hemorrhagic conversion of Ischemic stroke 5(2.63%), Mixed 6 (15.79%) and Idiopathic 3(7.89%) cases and mostly having singly HTN 50% which co-relates with study of Macellari *et al.* [4], study.

Regarding incidence of IPH in our study; it was observed that left cerebral hemisphere much affected 63.16% and only 36.84% in right one.

Pathophysiologically; brain capillary at basal ganglia (which affected much) is right angle, end capillary and in old age is much narrowed with atherosclerosis. Hypertensive patients are more vulnerable to degenerative change in tunica media and smooth muscles with development of tiny lipohyalinotic aneurysms that subsequently usually rupture [5].

But regarding young age; highly elastic fibre in their vascular wall which is enough to cope up extra increased blood pressure.

Dominant hemisphere usually left one is highly metabolically active. And once metabolic activities increase the blood flow to that hemisphere raised [8].

Raised blood flow to right angle, narrow end capillary much risk of rupture and spontaneous ICH.

Most of our affected population are middle to old age rather than young age group in this study and were suffering from HTN mainly and next mixed variety.

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

Conclusion

Dominant cerebral hemisphere having highly metabolic activity influencing raised blood flow. High volume of blood flow to narrow or diseased right angle end capillary leads to rupture and producing haemorrhagic stroke. And usually left hemisphere is dominant that affected much.

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