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## Acute hemorrhagic stroke in young adults-a study in a tertiary-care hospital of North India

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### Abstract

**Objectives:** To see the risk factors, clinical presentations and radiological profile of acute hemorrhagic stroke in young subjects in a tertiary-care hospital of North India.

**Methods:** This study was carried out among 50 acute hemorrhagic stroke patients (clinically and radiologically confirmed) irrespective of sex within the age group of 15-45 years admitted to Department of Medicine after getting clearance from Institutional Ethical Committee (IEC). A proforma for each of the acute hemorrhagic stroke patients was maintained where all clinical information in brief including particulars of the subject, chief complaints, past history, general physical examination and systemic examinations etc were recorded in a systematic way. Plain CT (computed tomography) scan brain was done for all the subjects on admission for radiological confirmation and to localize the site and side of lesion in brain.

**Results:** Hypertension (74%) was common among acute hemorrhagic stroke in young adults. Majority of the acute hemorrhagic stroke patients presented with hemiplegia (66%). Beside, imaging findings confirmed left sided brain lesion in majority of the patients (56%) and lobe as the most common site involved in the brain.

**Conclusions:** Hypertension is very common among the young acute hemorrhagic stroke patients. Most common clinical presentation is hemiplegia. Thus, the proper knowledge of the risk factors, clinical presentation and radiological profile of acute hemorrhagic stroke in young adults can help in prevention, understanding the patho-physiology and the disease management.

**Keywords:** Hemorrhagic stroke, CT scan, Hemiplegia

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### 1. Introduction

Stroke is defined by the sudden onset of a neurological deficit due to a focal vascular cause.[1] Hypertension or any other causes which weakens the endothelial lining of the vessel leads to the rupture of the blood vessel of a focal region of brain and collection of blood in brain parenchyma leading to acute hemorrhagic stroke. In hemorrhagic stroke, the injury of neuronal tissue is caused by the compression of the tissue from expanding hematomas. In addition, pressure may lead to loss of blood supply causing infarction.[2] Collected hematoma or haemorrhage can cause mass effect on

the surrounding neurons, adjacent structures and increase the intracranial pressure and may even leads to death by brain herniation.[2] The mortality of hemorrhagic stroke is 40% to 50%.[3] Thus, prevention of hemorrhagic stroke remains the most important means of reducing its morbidity and mortality. For effective prevention and treatment of the disease it requires better knowledge of all the possible risk factors underlying the occurrence of hemorrhagic stroke.[4] The incidence of ICH (Intracerebral Hemorrhage) in young adults varies from 0.7% to 40%.[5,6] The risk factors of ICH in

young adult subjects are more diverse compared to elder individuals.[7,8] However only few literature of ICH in young subjects have been reported.[7,9–15] To the best of my knowledge, literature regarding the risk factors and epidemiology of acute hemorrhagic stroke in young adults in India are limited to only few studies. Hence, the present study had been conducted to see the risk factors, clinical presentation and radiological profile of acute hemorrhagic stroke in young adults in the tertiary-care hospital in North India.

## 2. Material and Methods

This study had been carried out in collaboration with the Department of Physiology and the Department of Medicine from November 2013 to January 2015. A total of 50 acute hemorrhagic stroke patients (clinically and radiologically confirmed) within the age group of 15-45 years admitted in OPD/Ward/Emergency of Department of Medicine were included irrespective of sex in this study. Exclusion criteria were those patients who refused to take part in the study. A pre designed semi-structural proforma, designed for the purpose was used as a study tool. A proforma for each of the acute hemorrhagic stroke patients was maintained where in a brief clinical information including particulars of the subject, chief complaints, family, personal, dietary history, past history etc were taken. Proper general physical examination and systemic examination were also done and recorded in the proforma. The acute hemorrhagic stroke patients were subjected to plain CT scan brain on admission to confirm the diagnosis and also to localize the site and the side of lesion in brain. Ethical clearance from institutional ethical committee was obtained before conducting the study. Informed consent from the participating individual was also taken.

### 2.1. Statistical Methods

Data so collected were checked for consistency and were analyzed using the Statistical Package for Social Sciences (SPSS), version 16(SPSS Inc, Chicago, IL, USA). Descriptive statistics like percentages were used wherever found appropriate.

## 3. Results

The present study is based on the primary data of 50 acute hemorrhagic stroke patients irrespective of sex within the age group of 15-45 years. Majority of the acute hemorrhagic stroke patients were male (70%). Hypertension (74%) was the most common risk factor among acute hemorrhagic stroke in young adults (Table 1). Majority of the acute hemorrhagic stroke patients presented with hemiplegia (66%) followed by altered consciousness (58%)(Table-2). Most of the patients (50%) presented with Glasgow coma scale range (9-12) as the level of consciousness (Table 3). Beside, imaging findings showed that majority of the patients (56%) had left side lesion in brain and lobe was the most common site involved in the brain (Table 4).

**Table 1: Risk factors of acute hemorrhagic stroke in young adults**

Risk factors of acute hemorrhagic stroke in young adults	No. of patients	Percentages
Known case of hypertension	37	74%
Current Smoking	17	34%
Known case of diabetes	07	14%
Known case of heart diseases	03	06%
Current Alcoholism	21	42%
Tobacco use	19	38%
history of head injury	01	02%
Illicit drug abuse	04	08%
History of Oral contraceptive Pills (in female patients) and Steroids use	06	12%

**Table 2: Clinical presentations of acute hemorrhagic stroke in young adults**

Clinical presentation of acute hemorrhagic stroke	Number of patients	Percentages
Hemiparesis/ hemiplegia	33	66%
Altered consciousness	29	58 %
Headache	20	40%
Vomiting	25	50%
Aphasia	04	08%
Facial palsy	01	02%
Altered behaviour	02	04%

**Table 3: Level of consciousness in acute hemorrhagic stroke patients in young adults**

Level of consciousness	Number of patients	Percentages
GCS-3	02	04%
GCS 4-8	18	36%
GCS 9-12	25	50%
GCS 13-15	05	10%

**Table 4: Distribution of acute hemorrhagic stroke in young patients based on the site and the side of lesion**

Side of lesion	No. of patients	Percentage	Site of lesion	No. of patients	Percentage
Left side	28	56%	Lobar	19	67.85%
			Basal ganglia	04	14.29%
			Cerebellum	03	10.72%
			Pons	01	03.57%
			Thalamus	01	03.57%
Right side	22	44%	Lobar	14	63.63%
			Basal ganglia	04	18.18%
			Pons	01	04.55%
			Thalamus	02	09.09%
			cerebellum	01	04.55%

#### 4. Discussion

Literature regarding the acute hemorrhagic stroke in young adults is limited only to several studies.[7] The present study shows male predominance among the acute hemorrhagic stroke in young adults. Similar findings were reported by some studies.[16,17] Because our institute is a tertiary referral center, patients are referred from all over the North India. The male predominance noted in this study may be due to the socio-cultural bias in India as males are more likely to get attention and treatment at referral centers compared to females. Hypertension (74%) is the most common risk factor of acute hemorrhagic stroke in young adults in present study. In a study Wang *et al* showed that the hypertension is an independent risk factor for hemorrhagic stroke.[18] Daniel *et al* in their study reported untreated hypertension as an important risk factor for hemorrhagic stroke and suggested that approximately one fourth of hemorrhagic strokes would be prevented if all hypertensive subjects received treatment.[19] Mark Willmot *et al* also focused in their study that high blood pressure in acute ischemic stroke or intracerebral hemorrhage is associated with subsequent death, dependency, deterioration and moderate lowering of BP might improve the outcome.[20] In another study, Donnell *et al* showed hypertension, smoking, waist-to-hip ratio, diet, and alcohol intake as significant risk factors for hemorrhagic stroke.[21] Roditis *et al* also suggested the role of hypertension as a leading cause of hemorrhagic stroke in young population.[22] Beside several other studies also reported hypertension as a frequent risk factor of acute hemorrhagic stroke in young subjects.[16,17,23] However, in our present study, the patients with history of hypertension had not been classified based on treatment status, duration of treatment and mode of treatment and no suggestion can be given based on these parameters. In the present study, 34% of the patients had a history of current smoking. According to a group of authors, smoking is a frequent risk factor of acute hemorrhagic stroke.[17,23] Kurth *et al* suggested that

there is significant correlation between the risk of acute hemorrhagic stroke and the smoking.[24] In another study Kurth *et al* confirmed that smoking increases the relative risk of hemorrhagic stroke, intra-cerebral hemorrhage (ICH) and subarachnoid hemorrhage in men.[25] Some other studies also reported the association between the smoking and risk of hemorrhagic stroke.[26,27] In the present study, 14% of the patients were known case of diabetes. Diabetes Mellitus is a recognized risk factor for cerebrovascular disease. It increases the risk of stroke compared to non-diabetics.[28] Edward Feldmann *et al* also reported diabetes as an independent risk factor of intracerebral hemorrhage in young subjects.[23] In this study, 42% of the young subjects had a history of current alcoholism. Jose *et al* in their study, reported alcohol use as a frequent risk factor of intracerebral hemorrhage in young patients.[16] Edward Feldmann *et al* in their study also reported alcoholic drinks as one of the modifiable and independent risk factor of intracerebral hemorrhage in young subjects.[23] According to an author, there exists a complex relationship between alcohol consumption and stroke as it includes both benefits and risks. Current (but not previous) heavy alcohol consumption may increase the risk for both acute hemorrhagic and acute ischemic strokes. Young adults are more predispose to acute hemorrhagic strokes compared to women or older subjects as they are more often current heavy drinkers. Regular heavy consumption of alcohol may keep the blood pressure on higher side leading to cerebral arterial degeneration which increases the risk of acute hemorrhagic stroke. Acute rise in systolic blood pressure and/or changes in cerebral arterial tone due to regular heavy alcoholism could be the underlying mechanisms which cause hemorrhagic stroke during alcohol intoxication.[29] In this study, 38% of the subjects were regular tobacco user. Jose *et al* in their study, tobacco use as the most frequent risk factor for acute intra-cerebral hemorrhage in young subjects.[16] However, according to a group of authors, current and recent smokeless tobacco

increases the risk of fatal ischemic stroke but not hemorrhagic stroke.[30] In this study, the most common site of lesion involved in brain in the young acute hemorrhagic stroke patients was lobe. Similar findings had been reported by the some studies in the young hemorrhagic stroke patients. [16,17]

## 5. Conclusion

Incidence of acute hemorrhagic stroke is not so common among young adults. The risk factors which predispose to acute hemorrhagic stroke in young subjects are more diverse compared to older subjects. Hypertension is the common among young acute hemorrhagic stroke patients. Most common clinical presentation is hemiplegia. Beside, Lobe is the most common site of lesion in brain. Thus, the good knowledge of the risk factors, clinical presentation and radiological profile of acute hemorrhagic stroke in young patients can be of upmost importance in prevention, understanding the underlying patho-physiology and management of the disease in this age group. However, the limitation of the study is small sample size as it is done within limited period of time; hence further studies on large sample size can be encouraged.

## Acknowledgements

We are grateful to Institutional ethical committee for giving ethical approval to the study. We are also grateful to all the patients and their relatives who have given their consent to take part under the study. Our gratitude also goes to ICMR fellowship and contingency grants funds which have given financial support to the study.

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