International Journal of Biomedical Research
ISSN: 0976-9633 (Online); 2455-0566 (Print)
Journal DOI: 10.7439/ijbr
CODEN: IJBRFA

Original Research Article

Acute ischemic stroke in young adults-a hospital based study in North India

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Abstract

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

Methods: This study was conducted among 50 acute ischemic stroke patients (clinically and radiologically confirmed) irrespective of sex within the age group of 15-45 years admitted to Department of Medicine (Emergency Unit) after getting clearance from Institutional Ethical Committee (IEC). A proforma for each of the acute ischemic stroke patients was maintained where all clinical information in brief including particulars of the subject, chief complaints, past history, proper general physical examination and systemic examinations etc were recorded. The patients had been undergone plain CT (computed tomography) scan/MRI (Magnetic Resonance Imaging) brain on admission for radiological confirmation and to localize the site of lesion in brain.

Results: Hypertension (56%) was the most common risk factor among acute ischemic stroke in young adults, followed by heart disease (54%). Majority of the acute ischemic stroke patients presented with hemiplegia (84%). Beside, imaging findings confirmed left sided brain lesion in majority of the patients (52%) and anterior circulation as the most common territory involved in the brain.

Conclusions: Hypertension is very common among the young acute ischemic stroke patients. Most common clinical presentation is hemiplegia. Thus, the knowledge of the risk factors, clinical presentation and radiological findings of acute ischemic stroke in young adults can help in prevention, better understanding and therapeutic decision making in the disease management.

Keywords: Ischemic, CT scan, Hemiplegia

1.Introduction

Stroke is defined by the sudden onset of a neurological deficit due to a focal vascular cause. Acute ischemic stroke, a major subtype of acute stroke, occurs due to loss of blood supply to a part of the brain which initiates ischemic cascade due to free radical production and damage to endothelial lining. The high variability of the clinical presentation of stroke is because of the complex anatomy of the brain and its vasculature.[1] Ischemic stroke in young adults can affect the individuals, their families, and societies in general, as the patients are affected in the economically productive period of their lives. Almost two thirds of the global burden of acute ischemic stroke is in developing countries.[2] Nearly 10%-30% of all stroke patients in India are within the young adult age group.[3]-[5] The risk factors of acute ischemic stroke in young adults are more diverse compared to those in the elderly. Proper knowledge of the risk factors of acute ischemic stroke in young patients can prevent the burden of the

disease and its recurrences appropriately.[6] To the best of our knowledge, literature concerning acute ischemic stroke in young adults in North India is limited to a few studies inspite of significant impact of the disease in the society. Hence, the study was conducted to see the risk factors, clinical presentation and radiological profile of the acute ischemic stroke in young patients in the tertiary care hospital of 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 December 2014. A total of 50 acute ischemic stroke patients (clinically and radiologically confirmed) within the age group of 15-45 years admitted to 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 ischemic stroke patients was maintained where in a brief clinical information including particulars of the patient, 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 ischemic stroke patients were subjected to plain CT scan brain or MRI on admission to confirm the diagnosis and also to localize the site of lesion. This study was conducted only after getting approval from Institutional Ethical Committee. Informed consent from the participating individual was also obtained.

3. 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 percentage was used wherever appropriate.

4. Results

The present study is based on the primary data of 50 acute ischemic stroke patients irrespective of sex within the age group of 15-45 years. Majority of the acute ischemic stroke patients were male (60%) and were married (70%). Hypertension(56%) was the most common risk factor among acute ischemic stroke in young adults, followed by heart disease (54%), non-veg diet (40%) and tobacco use **(Table 1).** Majority of the acute ischemic stroke patients presented with hemiplegia (84%) followed by altered consciousness (28%) and aphasia (24%)(**Table 2).** Most of the patients (48%) presented with Glasgow coma scale range (13-15) as the level of consciousness **(Table 3)**. Beside, imaging findings showed that majority of the patients (52%) had left side lesion in brain and anterior circulation was the most common territory involved in the brain **(Table 4).**

Table 1: Risk factors of acute ischemic stroke in young adults

Risk factors of acute ischemic stroke in young adults	No. of patients	Percentages
K/c/o Hypertension	28	56 %
Current Smoking	07	14%
Non-veg diet	20	40%
K/c/o Diabetes	08	16%
K/c/o-Heart diseases	27	54%
H/o- stroke	02	4%
H/o-TIA (transient ischemic attack)	03	6%
Current Alcoholism	08	16%
Tobacco	12	24%
H/o head injury	02	4%
Illicit drug abuse	04	8%
H/o OCP(female) and Steroids	06	12%

Table 2: Clinical presentations of acute ischemic stroke in young adults

Clinical presentation of acute ischemic stroke	No. of patients	Percentages
Hemiparesis/ hemiplegia	42	84 %
Altered consciousness	14	28 %
Headache	04	08%
Vomiting	06	12%
Aphasia	12	24 %
Facial palsy	06	12%
Visual loss	04	08%
Altered behaviour	08	16%

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

Level of consciousness	No. of patients	Percentages
GCS-3	02	04%
GCS 4-8	10	20%
GCS 9-12	14	28%
GCS 13-15	24	48%

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

Side of lesion	No. of patients	%	Site of lesion	No. of patients	%
Left side	26	52 %	Anterior circulation	18	69.23 %
			Posterior circulation	06	23.07 %
			Both territories	02	7.7%
Right side	24	48 %	Anterior circulation	17	70.83 %
			Posterior circulation	04	16.66 %
			Both territories	03	12.51 %

5. Discussion

By 2050, it can be expected that 80% of stroke patients will be from the developing regions of the world.[7] There is growing evidence for an increase in the incidence of stroke in young adults.[8] In the present study, higher male predominance among the acute ischemic stroke in young adults was observed. Similar findings had been reported from studies conducted in western world and in India.[9]-[11] As our institute is a tertiary-care centre, patients are referred from all over the North India. The male predominance noted in the present study may be due to a socio-cultural bias in India that males are more likely to seek attention and treatment at referral centers than females. In this study, hypertension was the most common risk factor of acute ischemic stroke in young adults. Similar finding had been reported in a study by a group of Indian authors.[12],[13] According to several studies, hypertension is the single common risk factor which is significantly associated with acute ischemic stroke.[10],[11][14] In this study, 14% of the acute ischemic stroke patients were smokers. Donnan *et al* found smoking as a strong risk factor for subarachnoid haemorrhage and cerebral infarction.[15] Cole *et al* demonstrated that cigarette smoking may modulate stroke risk through a gene-environment interaction.[16] Bhat *et al* and Md Jalal Uddin *et al* also suggested a strong relationship between cigarette smoking and causation of acute ischemic stroke.[17],[18] In this study, 40% of the young acute ischemic stroke patients gave a history of non-vegetarian diet. Joshipura *et al* in their study reported that consumption of fruits and green leafy vegetables can protect against acute ischemic stroke.[19] Josephson *et al* also suggested that intake of fruits can reduce the risk of acute ischemic stroke.[20] However, Preis *et al* in their study did not find any statistically significant association between total animal or vegetable protein and risk of stroke.[21] In this present study, 16% of the patients were known case of diabetes. Dash *et al* in their study also reported similar results in young acute ischemic stroke patients.[12] Diabetes mellitus is a long recognized risk factor for vascular disease and it doubles the risk of acute stroke compared to non-diabetics.[22] Majority (54%) of the young acute ischemic stroke were known case of heart disease such as valvular heart disease, atrial fibrillation, coronary artery disease etc. Dash *et al* also in their study reported valvular heart disease, atrial fibrillation, coronary heart disease, cardiomyopathy etc. as a risk factor of acute ischemic stroke in young adults.[12] Previous studies from India have reported rheumatic heart disease and prosthetic valves contributing to almost two thirds of all acute ischemic strokes due to cardio-embolism in young adults.[10],[11] In this study, some number of patients had a history of prior stroke and TIA (transient ischemic attack). This observation shows the importance of aggressive primary and secondary prevention targeting the traditional modifiable risk factors for young Indian subjects. In this study, 16% of the patients had a history of current alcoholism. Dash *et al* in their study also reported alcoholism as a risk factor of acute ischemic stroke in young adults.[12] Alcohol may contribute to stroke by several mechanisms such as induction of cardiac arrhythmias and cardiac wall abnormalities (which may predispose to cerebral embolism), hypertension, stimulation of platelet aggregation, clotting cascade activation, reduction of cerebral blood flow and alteration of cerebral metabolism.[23] A Finnish study also reported alcohol as an important contributing factor in the development of acute ischemic stroke.[24] Sridharan *et al* reported hypertension, heart diseases of any type, diabetes, smoking and alcohol as the risk factors of acute ischemic stroke in the patients of all age groups in their study.[25] Several female subjects in this study had a history of current intake of oral contraceptive pills and some were on steroid therapy. The use of oral contraceptives is associated with a nine fold increased risk of cerebral infarction in women.[26] The Collaborative Group for the Study of Stroke in Young Women suggested that the risk of stroke with the use of oral contraceptives increases sharply in women with hypertension and heavy smoking.[26],[27] Oral contraceptives increase platelet aggregation and anti-thrombin III activity, decrease serum anti-thrombin levels, and increase the levels of factor VII.[28] It must be noted that pregnancy increases the risk of ischemic events by approximately 13 times.[29] In our study 24% of the subjects were smokeless tobacco chewer in oral form. Hergens *et al* in their study reported that oral tobacco increases the risk of fatal ischemic stroke but not of hemorrhagic stroke.[30] In this study, 8% of the patients had history of illicit drug abuse, which is supported by Dash *et al*.[12] Majority of the subjects (84%) in this study presented with hemiplegia which is supported by HNH Kumar *et al*.[13] In the present study, anterior circulation is the most common territory involved in brain of the young acute ischemic stroke patients as confirmed by CT scan/MRI. Similar findings have been reported by Dash *et al* in their study.[12]

6. Conclusion

Incidence of acute ischemic stroke is on rise in young adults and the risk factors are more diverse compared to elder ones. Hypertension is the commonest risk factor for young acute ischemic stroke patients. Most common clinical presentation is hemiplegia. Beside, anterior circulation is the most common territory involved in brain. Thus, the knowledge of the risk factors, clinical presentation and radiological profile of acute ischemic stroke in young patients can help in prevention, better understanding and taking therapeutic decision in management of the disease in this age group. However, the study is limited by small sample size as it is conducted over 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 for the study. We are also grateful to all the patients and their relatives who have given their consent to take part under the study.

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