

Evaluate the Causes and Risk Factors of Ischemic Strokes in Young Adult Population

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ABSTRACT

Aim: To examine the causes and risk factors of ischemic strokes in patients with ages less than 50 years.

Study Design: Retrospective/Observational

Place & Duration of Study: Department of Medicine, Combined Military Hospital, Lahore from 1st January 2020 to 31st May 2020.

Methodology: Eighty patients of both genders with ages 15 to 50 years presented with ischemic strokes were included. Patient's demographical detail including age, sex and education, residence and socio-economic status were recorded. Patients less than 15 years of age and above 50 years were excluded. Complete diagnostic tests were done. Risk factors were examined. Outcomes were recorded according to Rankin scale score.

Results: Fifty three (66.25%) patients were male while 33.75% patients were females. 6 (7.5%) patients were ages 15 to 25 years, 18 (22.5%) were ages 26 to 35 years, 48 (60%) patients were ages 36 to 45 years and 8 (10%) were ages 46 to 50 years. The most common risk factor was hypertension 28 (35%) followed by diabetes mellitus 23 (28.75%), dyslipidemia 20 (25%), smoking 18 (22.5%) respectively. The most common subtype was undetermined 30 (37.5%). Majority of the patients resulted good functional outcomes 87.5%. 3 (3.75%) patients were died.

Conclusion: The age group 36 to 45 years was the most common risk factor followed by hypertension, DM and smoking. Undetermined subtype was the most common cause of ischemic strokes.

Keywords: Ischemic strokes, Risk factors, Causes, Age

INTRODUCTION

Ischemic strokes in young population are considerably going upwards in young population. The incidence rate is quite high in the developed countries and mostly people with ages 30 to 50 years have a high incidence rate of ischemic strokes, whereas in the older age groups it has declined.¹⁻⁵ There are many causes and risk factors that are directly associated with Ischemic strokes but still there is a lot of undetermined causes found in young patients population. Accumulating evidence suggests that the prevalence of traditional risk factors in this patient age group is much larger than previously understood. These data mainly come from Western European and North American cohorts; however, reports on young patients from Eastern Europe have been lacking. Many of studies reported the increased incidence rate of ischemic strokes in the age group 30 to 45 years with several causes and risk factors.^{6,7} Almost two thirds of the global burden of stroke is borne by those in developing countries.⁸ Young adults account for approximately 10%-30% of all stroke patients in India, as opposed to 3%-8.5% in Western countries.^{9,10} In Pakistan there is also a increased incidence rate demonstrated in young population, it may be due to the economic burden and hypertension is the most frequent risk factors found in these young patients.^{11,12} In young adults, the causes of ischemic strokes are different as compared to those with elderly ages. Furthermore, etiological subtyping also varies according to geographical distribution. It is important to identify the causative factors

in young stroke patients in order to prevent recurrences appropriately.¹³

Recent study was conducted aimed to examine the causes and risk factors of ischemic strokes in young patients population.

MATERIALS AND METHODS

This Retrospective/Observational study was conducted at Department of Medicine, Combined Military Hospital Lahore from 1st January 2020 to 31st May 2020. A total of 80 patients of both genders with ages 15 to 50 years presented with first ever ischemic strokes were included in this study. Patients below 15 years, patients with head trauma, brain injury and above 50 years of age were excluded from this study. Patients detailed demographic including age, gender, residence and socio-economic status were recorded after taking informed written consent. All the patients had received complete blood count test (CBC), ECR, Urine test, Liver function test glycosylated haemoglobin (Hb A1C), lipid profile and renal function tests. Thrombophilia screening and immunologic studies (anti-nuclear and anti-ds DNA antibodies) were performed in patients when indicated. X-ray and CT scan was performed for brain imaging. Complete diagnostic test was done on all the patients. Dyslipidemia was defined as receiving lipid lowering agent, total cholesterol > 240 mg/dL and LDL cholesterol > 160 mg/dL. Diabetes mellitus was defined as receiving oral hypoglycemic agents/insulin treatment with glycosylated haemoglobin level ≥ 6.5%.

Stroke subtyping was recorded according to the TOAST criteria (Trial of Org 10172 in Acute Stroke Treatment). Causes of ischemic stroke were examined. Risk factors were recorded. Outcomes were recorded according to Rankin scale score. Mortality rate was also recorded. All the statistical data was analyzed by computer statistical software SPSS 21. Chi-square test was applied. P-value <0.05 was set as statistically significant.

RESULTS

There were 53 (66.25%) male patients while 33.75% patients were females. Six (7.5%) patients were ages 15 to 25 years, 18 (22.5%) were ages 26 to 35 years, 48 (60%) patients were ages 36 to 45 years and 8 (10%) were ages 46 to 50 years. 45 (56.25%) patients had rural residence while 35 (43.75%) patients had urban residence. 42 (52.5%) patients had low socio-economic status and 38 (47.5%) patients had middle socio-economic status (Table 1).

The most common etiology of ischemic strokes was undetermined 30 (77.5%), followed by cardioembolism 18 (22.5%), small artery disease found in 14 (17.5%) patients, large artery atherosclerosis in 10 (12.5%) patients and 8 (10%) patients had other determined causes (Table 2).

Table 1: Baseline characteristics of all the patients

Variable	No.	%
Gender		
Male	53	66.25
Female	27	33.75
Age (years)		
15 - 25	6	7.5
26 - 35	18	22.5
36 - 45	48	60
> 45	8	10
Residence		
Urban	45	56.25
Rural	35	43.75
Socioeconomic status		
Low	42	52.5
Middle	38	47.5

Table 2: Causes of ischemic stroke among all the patients

Causes	No.	%
Undetermined	30	37.5
Cardioembolism	18	22.5
Small artery Disease	14	17.5
Large artery atherosclerosis	10	12.5
Other Determined	8	10

Table 3: Gender-wise distribution of risk factors among all the patients

Variable	Male	Female	Total	P value
Hypertension	22	6	28 (35%)	<0.05
Diabetes	17	6%	23 (28.75%)	<0.05
Dyslipidemia	15	5	20 (25%)	<0.05
Smoking	15	3	18 (22.5%)	<0.05
Vasculitis	-	5	5 (6.25%)	-
AF	4	2	6 (7.5%)	<0.05
Coronary artery disease	2	2	4 (5%)	<0.05

According to the gender wise distribution of risk factors of ischemic strokes we found that 53 (66.25%)

patients were male and 33.75% patients were females, there was a significant difference found in male and female p-value <0.05. The most common risk factor was hypertension 28 (35%) (22 male, 6 female) followed by diabetes mellitus 23 (28.75%) [17 male, 6 female], dyslipidemia 20 (25%) [15 male, 5 female], smoking 18 (22.5%) [15 male, 3 female], 5 (6.25%) patients had vasculitis and all were females, atrial fibrillation found in 6 (7.5%) [4 male, 2 female] and coronary artery disease found in 4 (5%) [2 male, 2 female] patients respectively (Table 3). According to the risk factors most of the patients had two or more risk factors 60 (75%) except AF cases and two cases of coronary artery syndrome. Outcomes were recorded according to the modified Rankin scale scoring system and we found 70 (87.5%) patients had score 0 to 2, 5 (6.25%) patients had score 3-4 and 5 (6.25%) patients had score 5-6 respectively (Table 4).

Table 4: Treatment Outcomes at the time of Discharge (Rankin Scale Score)

MRS Score	No.	%
0-2	70	87.5
3-4	5	6.25
5-6	5	6.25
Mortality		
Yes	3	3.75
No	77	96.25

DISCUSSION

Worldwide, Ischemic strokes considered as a most prevalent neurological disorder with high rate of morbidity and mortality. Many of studies had been conducted to examine the causes and risk factors that were involved in ischemic strokes in young population.^{14,15} Present study was also conducted aimed to examine that causes and risk factors of strokes in young adult population. In this study total 80 patients of first ever ischemic strokes visited neurology department were included. In our study majority of patients were males 66.25% as compared to females 37.75%. These results showed similarity to some other studies in which male patient's population was high 60 to 70% as compared to females 30%.^{16,17} We found high incidence rate in males it may be due to the economic burden, family problem and financial issues. In Pakistan these issues are very common in low and middle income population.

In our study, we found that 82.5% patients were ages between 26 to 45 years and in which 60% patients had ages 36 to 45 years. These results showed that people with young ages had a high rate of ischemic strokes. Many of studies showed similarity to our study in which most of the patients were ages 30 to 45 years.^{18,19}

In present study, 42 (52.5%) patients had low socio-economic status and 38 (47.5%) patients had middle socio-economic status. These results were comparable to other studies in which mostly young patients had a low socio-economic status.²⁰ In this study, the most common etiology of ischemic strokes was undetermined 30 (77.5%), followed by cardioembolism 18 (22.5%), large artery atherosclerosis in 9 (11.25%) patients, 8 (10%) patients had other determined causes, 5 (6.25%) patients had vasculitis and 10 (12.5%) patients had small artery disease. A study conducted by

Khalid Sher et al²¹ reported cardioembolism was the most frequent cause in young patients and accounted 25.3%. Another study conducted by Deepa et al²² regarding ischemic strokes in young population reported undetermined etiology was the most frequent cause of ischemic strokes 57% followed by other determined etiologies.

In present study we found the most common risk factor was hypertension 28 (35%) (22 male, 6 female) followed by diabetes mellitus 23 (28.75%) [17 male, 6 female], dyslipidemia 20 (25%) [15 male, 5 female], smoking 18 (22.5%) [15 male, 3 female], atrial fibrillation found in 6 (7.5%) [4 male, 2 female] and coronary artery disease found in 4 (5%) [2 male, 2 female] patients respectively. We found that male patients were high in numbers according to the risk factors. A study conducted by Schneider et al²³ study on 741 cases and they reported hypertension was the most common risk factor found in young patients followed by dyslipidemia and smoking 46% and 35%. Many of other studies showed similarity to our findings regarding risk factors of ischemic strokes and demonstrated hypertension, Diabetes, smoking, dyslipidemia were the most frequent risk factors found in young patient's population.^{24,25}

In this study, outcomes were recorded according to the modified Rankin scale scoring system and we found 70 (87.5%) patients had score 0 to 2, 5 (6.25%) patients had score 3-4 and 5 (6.25%) patients had score 5-6 respectively. These results were similar to some other study in which 89% patients had good outcomes with very low rate of mortality.²⁶

CONCLUSION

Ischemic strokes in young adult's population are commonly found in neurological settings. There are many causes and risk factors has been involved in the increased incidence rate. We concluded from this study that patients had ages 36 to 45 years were high rate of incidence. We found hypertension was the most common risk factor followed by diabetes, dyslipidemia and smoking. Undetermined subtype was the most common cause of ischemic strokes followed by cardioembolism and small artery disease. Moreover, we should have to do more work so that morbidity and mortality rate could be decreased in patients of young adult ages.

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