Original Article

Risk Factors of Systolic Hypertension among Patients Admitted with Intracerebral Hemorrhage

Muhammad Roh ul Amin, Sabir Hussain, Kashif Ali, Mujahid Iqbal, Irfan Ahmed and Sajid Hussain

ABSTRACT

Objective: To determine the risk factors of systolic hypertension among patients admitted with intracerebral hemorrhage.

Study Design: Cross-sectional analytical study

Place and Duration of Study: This study was conducted at the Hospital Dera Ghazi Khan from December 2018 to June 2019.

Materials and Methods: After taking approval from institutional ethical review committee. Calculated sample size was 139 at 95% level of confidence, 5% precision required and 90% anticipated population proportion.[10] Both male and female patients, between 40-70 years of age which presented with sudden onset of neurological deficit were included in study through non probability consecutive sampling method. Informed consent was taken from each patient. Systolic hypertension was labeled at blood pressure >140 mmHg. BMI of each patient was calculated and >27 taken as obese. SPSS version 22.0 was used for data entry and analysis. Chi-square test was applied and p-value <0.05 was considered as significant.

Results: Mean age of study participants was 55± 9.5 years. Out of total 139 cases; 79 (56.8%) had age between 51-70 years, 80 (57.6%) patients were obese, 94 (67.6%) were smoker and 75 (54%) patients were male (Table I). Total 115 (82.7%) patients with intracerebral hemorrhage had systolic hypertension (Fig. I). Obesity (p=0.006) and smoking history (p<0.001) was found to be significantly associated with systolic hypertension among patients with intracerebral hemorrhage.

Conclusion: Obesity and history of smoking was found to be significantly associated with systolic hypertension among patients with intracerebral hemorrhage.

Key Words: Systolic blood pressure, Hematoma expansion, Systolic hypertension, Intracerebral hemorrhage, Stroke

Citation of article: Roh ul Amin M, Hussain S, Ali K, Iqbal M, Ahmed I, Hussain S. Risk Factors of Systolic Hypertension among Patients Admitted with Intracerebral Hemorrhage. Med Forum 2021;32(9):96-99.

INTRODUCTION

Intracerebral hemorrhage (ICH) is responsible for 10% of all strokes, with 35-45% of patients dying within a month. It's yet uncertain whether reducing blood pressure slows the growth of hematomas or not.[1,2] Approximately 85% of strokes are caused by inadequacy of blood flow to all or some part of brain. The remaining strokes are divided between hemorrhage into brain tissue and hemorrhage into the surrounding brain spaces, most frequently the subarachnoid space. In addition to availability of well-established prophylactic and acute therapies, the diagnostic tools have also been improved.[1] The interact 2 experiment is the only large scale phase 3 clinical trial that looks at the impact of acute blood pressure lowering on ICH functional outcomes. In the lower blood pressure group, there was a significant change toward better outcomes, while mortality was similar in both groups.[3]

Only 20% of those who survive from ICH are independent after six months.[4-7] Hatcher et al, found that 90% cases of intracerebral hemorrhage showed an elevated SBP of ≥140 mm Hg.15 while Hevesi M et al. found hypertension in 75% cases of ICH.[1,6] This initial blood pressure (BP) after Intracerebral hemorrhage is higher as compared with ischemic stroke. The BP after a hemorrhagic stroke may remain high for a greater time duration than following ischemic stroke.[8,9]

In addition to socioeconomic costs there are various complications associated with intracerebral hemorrhage include motor deficits, dementia and high

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Received: April, 2021
Accepted: July, 2021
Printed: September, 2021

risk of early rehospitalization. The most common risk factor of intracerebral hemorrhage is hypertension followed by diabetes mellitus and smoking. There is scarcity of data in Pakistan on this topic; where hypertension in intracerebral hemorrhage is usually uncontrolled. But such cases are frequently seen in our daily clinical rounds. Keeping these facts in my mind, this study was planned to be conducted in our local population of Southern Punjab to ascertain burden of problem in local population. The results will provide useful baseline data of our local population which would help clinicians to manage such patients more effectively and would form the basis to formulate guidelines for optimal control of blood pressure among targeted population.

MATERIALS AND METHODS

This cross sectional analytical study was conducted in Medicine department of teaching hospital Dera Ghazi Khan after approval of ethical review committee from December 2018 to June 2019. The sample size calculated for study at 95% level of confidence, 5% precision required and 90% anticipated population proportion (frequency of systolic hypertension in ICH) was 139.[10] Both male and female patients, from age of 40 to 70 years admitted in medical ward which presented with sudden onset neurological deficit and CT scan brain plain showing hyper dense area inside brain parenchyma were included in the study through non probability consecutive sampling method. Patients with history of head injury and space occupying lesion (SOL) on CT brain were excluded from study. Informed consent was taken from each patient before data collection. Individual patient data regarding age and gender and history of head injury was taken. Blood pressure levels were measured by using standard sphygmomanometers with the subject lying quietly. Two readings of blood pressure 5 minutes apart were taken and average of the two readings were noted in the proforma. Systolic hypertension was labeled at blood pressure >140 mmHg. Weight and height of each was measured BMI was calculated and >27 taken as obese. Data was entered and analyzed by computer program SPSS version 22.0. Mean and standard deviation was calculated for the age, BMI and systolic blood pressure. Frequencies and percentages were calculated for categorical variables like Age groups, systolic hypertension, BMI groups, smoking history and gender. Stratification was done to control effect modifiers like age groups, gender, smoking and body mass index (BMI). Chi-square test was used after stratification and p-value less than 0.05 was taken as significant.

RESULTS

Total 139 cases with intracerebral hemorrhage were included in the study. Mean age of the study participants was 55 ± 9.5 years. Out of total 139 cases; 79 (56.8%) cases had age between 51-70 years, 80 (57.6%) patients were obese, 94 (67.6%) were smoker and 75 (54%) patients were male (Table I). Out of total 139 cases; 115 (82.7%) cases had systolic hypertension (Fig. I).

Out of 115 cases that had systolic hypertension; 68 (59.1%) cases had age 51-70 years and 13 (54.2%) cases with no hypertension were in the age group of forty to fifty years. Difference in systolic hypertension frequency was not significant (p=0.33) among various age strata. Gender distribution of the patients with intracerebral hemorrhage showed that 62 (53.9%) patients having systolic hypertension were male, 53 (46.1%) cases were female and difference in both genders was not significant (p=0.98). In 88 (76.5%) cases with systolic hypertension history of smoking was present and obesity was present in 70 (61%) cases with systolic hypertension. Out of 24 cases that had no systolic hypertension; 13 (54.2%) cases had age between 40-50, 13 (54.2%) cases were male, 14 (58.3%) cases have no history of smoking, 14 (58.3%) cases were obese while 10 (41.7%) cases with no systolic hypertension were non obese. The factors significantly associated with systolic hypertension among patients admitted with intracerebral hemorrhage were obesity (p=0.006) and history of smoking (p<0.001) as shown in Table II.

Table No.1: Age, gender, obesity and smoking history among respondents

Variable	Frequency	Percentage
Age		
40-50 years	60	43.2%
51-70 years	79	56.8%
Gender		
Male	75	54%
Female	64	46%
Obesity		
Yes	80	57.6%
No	59	42.2%
Smoking history		
Yes	94	67.6%
No	45	32.4%

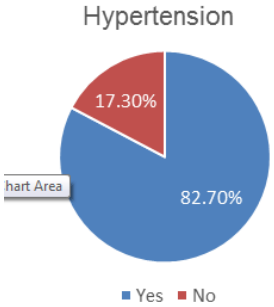

Figure No.1: Frequency of Hypertension among study participants

Table No.2: Association of Age, gender, obesity and smoking history with systolic hypertension

Variable	Systolic Hypertension Yes	No	P value
Age			
40-50 years	47(40.9%)	13(54.2%)	0.33
51-70 years	68(59.1%)	11(45.8%)	
Gender			
Male	62 (53.9%)	13 (54.2%)	0.98
Female	53 (46.1%)	11 (45.8%)	
Obesity			
Yes	45 (39.1%)	14 (58.3%)	0.006
No	70 (60.9%)	10 (41.7%)	
Smoking history			
Yes	88 (76.5%)	06 (25.0%)	<0.001
No	27 (23.5%)	18 (75.0%)	

DISCUSSION

Intracerebral hemorrhage (ICH) is a life-threatening condition and most common risk factor of intracerebral hemorrhage is hypertension followed by smoking. The exact underlying mechanism for this high mortality is unclear but there is theoretical risk that acutely raised blood pressure on expansion of hematoma is the basis of consideration for clinical trials for acute lowering of blood pressure,[10] but it still not clear that whether reduction of blood pressure decreases the growth of hematoma. Recently conducted clinical trials revealed that systolic blood pressure (SBP) can be safely reduced rapidly to less than 140 mmHg among patients with spontaneous ICH whose initial SBP was between 150-220 mmHg.[11,12] Intraventricular extension of hemorrhage (IVH) is particularly a poor prognostic sign, with expected mortality between 50% and 80%.[13,14]

Mean age of the patients admitted with intracerebral hemorrhage was 55 ± 9.5 years. More than three fourth of the patients (82.70%) had systolic hypertension and these results are in line with findings of study conducted by Hatcher S et al. in which 90% of patients with intracerebral hemorrhage has systolic hypertension,[15] and in the study of Hevesi M systolic hypertension was present in 75% of cases.[16]

About two third of the cases who had systolic hypertension were between the age of fifty-one to seventy years. Systolic hypertension was more frequent among male patients admitted with intracerebral hemorrhage as compared to females. History of smoking was present in about 75% of the patients in which systolic hypertension was diagnosed. The obesity was noted in about two third cases of intracerebral hemorrhage in which systolic hypertension is present.

Stratification of systolic hypertension in ICH with age groups, gender, smoking history and obesity revealed that obesity (p=0.006) and smoking history (p<0.001) was found to be significantly associated with systolic hypertension among patients with intracerebral hemorrhage while gender and age were not significantly associated with the systolic hypertension in this study. These findings are similar to the data of Framingham heart study in which it was revealed that there is linear correlation between BMI and systolic blood pressure.[17] The findings of Praso S et al. study also showed that systolic hypertension is more common in obese people as compared to non-obese and obesity is a risk factor of systolic hypertension.[18] Virdis A et al. revealed that there is relationship between cigarrete smoking and hypertension. Smoking stimulates the sympathetic nervous system which in turn increase the blood pressure. Arterial stiffness Persons who are already hypertensive and smoker there are chances of developing severe hypertension among them.[19] Prevention and control of hypertension can be simply achieved by adapting and maintaining healthy lifestyle. Healthy life style means eating healthy diet, regular exercise, maintaining healthy wait, avoidance or quitting the smoking and learning stress management skills.[20, 21]

The main limitations of study were that it was a cross sectional study with small sample size and there was no follow-up for long duration to identify that either this hypertension existed after recovery of the patients or controlled. Other important limitation of the study is that it cannot be ascertained that it was preexisting hypertension which lead to intracerebral hemorrhage or it was intracerebral hemorrhage which caused the systolic hypertension.

Based upon the findings of our study it is recommended that healthy diet with low salt content and fat along with regular exercise to maintain healthy weight, avoidance of smoking and good stress management skills can prevent hypertension. People who are already suffering from high blood pressure, it is important to prevent it from getting worse or causing complications like stroke. Awareness regarding healthy life style, regular medical care and compliance of antihypertensive medications are beneficial to prevent complications in known hypertensive patients.

CONCLUSION

Frequency of Systolic hypertension was high in study population. Obesity and history of smoking was found to be significantly associated with systolic hypertension among patients with intracerebral hemorrhage.

Author's Contribution:

Concept & Design of Study:	Muhammad Roh ul Amin
Drafting:	Sabir Hussain, Kashif

	Ali
Data Analysis:	Mujahid Iqbal, Irfan Ahmed, Sajid Hussain
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Final Approval of version:	Muhammad Roh ul Amin

Conflict of Interest: The study has no conflict of interest to declare by any author.

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