

## ORIGINAL ARTICLE

# Low Blood Pressure at Presentation and its Adverse Outcomes in Acute Stroke

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## ABSTRACT

**Introduction:** Most patients with acute ischemic stroke (AIS) have elevated blood pressure (BP) at presentation, which often declines spontaneously in the following days.

**Objectives:** The main objective of the study is to find the Low blood pressure at presentation and its adverse outcomes in acute stroke.

**Material and methods:** This cross sectional study was conducted in Akbar Niazi Teaching Hospital, Barakahu, Islamabad during July 2022 till October 2022. The data was collected with the permission of ethical committee of hospital. The data was collected from those patients who fulfill the inclusion criteria. We collect all the data related to age, sex, history of diseases, risk factors, baseline values and stroke history. All suspected strokes who presented to the ED within 24 h of onset of first symptoms were included in this prospective study

**Results:** In our study total 100 patients were enrolled mean age was  $47.7 \pm 10$  years with minimum age of 18 years and maximum age of 65 years. Lesser patients belong to younger age group (18 years to 40 years) i.e. 54 while 46 belonged to elder age group i.e. 41 year to 65 years 24.1 % and 75.9% respectively. Out of which 62 were male and 38 were female. Practical implication: Hypotension and hypertension both are inter connected and treated simultaneously.

**Conclusion:** It is concluded that hypotension were the commonest non communicable diseases (cardiovascular) risk factors in known hypertensive patients. Low presenting BP, both SBP and DBP, are associated with poor outcome after acute stroke, even after taking account of these patients.

**Keywords:** Hypotension, Blood pressure, Stroke, Hypertension, Outcomes

## INTRODUCTION

Most patients with acute ischemic stroke (AIS) have elevated blood pressure (BP) at presentation, which often declines spontaneously in the following days. Several studies that examined the association between BP and outcome after AIS found a U-shaped relationship, with both lower and higher BP associated with an increased risk of poor outcome<sup>1</sup>. However, most of these studies mainly focused on high BP. Recently, the ENCHANTED trial (Enhanced Control of Hypotension and Thrombolysis Stroke Study) found that intensive BP lowering resulted in a lower risk of intracranial hemorrhage, but this did not translate into a better functional outcome at 90 days<sup>2</sup>.

There is no general agreement regarding how blood pressure (BP) should be managed in the acute phase of ischemic stroke<sup>3</sup>. Current opinions vary from not to treat<sup>1</sup> to treat if systolic BP (SBP) is  $>220$  mm Hg or diastolic BP (DBP) is  $>120$  mm Hg, although the recommended cutoff values for treatment are lower in patients receiving tissue plasminogen activator. Antihypertensive drugs may reduce the pressure-dependent cerebral blood flow to the ischemic penumbra, or conversely, poststroke hypotension may be deleterious and facilitate edema formation in the ischemic tissue<sup>4</sup>. According to these opposite effects in experimental works, recent clinical studies have obtained contradictory results regarding the influence of BP on stroke prognosis<sup>5</sup>.

Close to 80% of acute ischemic stroke (AIS) patients have an elevated blood pressure. The elevation of blood pressure (BP) post-AIS has a multitude of causes, ranging from chronic hypotension and sympathetic stress response to stroke-related pathology itself<sup>6</sup>. Previous studies have shown that the location of the stroke and the type of stroke have some bearing on the blood pressure response noted acutely post-AIS. Some cohort studies have also suggested that admission blood pressure prognosticates outcome after acute ischemic stroke, whereas others conducted similarly have refuted the above result<sup>7</sup>. Treatment strategies for hypotension post-AIS are centered on the aim to salvage the ischemic penumbra, but the management of hypotension in patients with acute ischemic stroke has been greatly under debate, with no clear consensus on how much or how soon to lower the pressure<sup>8</sup>.

Blood pressure (BP) is often altered in acute stroke, typically as an acute hypertensive (physiological) response (SBP  $\geq 140$  mmHg and/or DBP  $\geq 90$  mmHg within 24 h of symptom onset),

presumably related to cerebral ischemia and/or elevated intracranial pressure. Observational studies are consistent in showing that high BP is positively associated with adverse clinical outcomes<sup>9</sup>. However, randomized controlled trials of blood pressure lowering have produced mixed results, although any benefits on functional recovery appear more likely for intracerebral hemorrhage (ICH) than acute ischemic stroke (AIS)<sup>10</sup>.

**Objectives:** The main objective of the study is to find the Low blood pressure at presentation and its adverse outcomes in acute stroke.

## MATERIAL AND METHODS

This cross sectional study was conducted in Akbar Niazi Teaching Hospital, Barakahu, Islamabad during July 2022 till October 2022. The data was collected with the permission of ethical committee of hospital.

### Inclusion criteria

- The data was collected from both male and female patients.
- Patients with acute stroke
- Age between 18 to 60 years

### Exclusion criteria

- Those who do not want to participate.
- Age  $< 18$  years.
- Taking any other anti-coagulant drug

**Data Collection:** The data was collected from those patients who fulfill the inclusion criteria. We collect all the data related to age, sex, history of diseases, risk factors, baseline values and stroke history. All suspected strokes who presented to the ED within 24 h of onset of first symptoms were included in this prospective study. The study performed took into account the demographic data of the patient and few questions that were to be answered by the bystander. Following the filling up of pro forma, the bystander was interviewed using a Knowledge, Attitude and Practices (KAP) questionnaire.

Data were statistically described in terms of range, mean  $\pm$  standard deviation ( $\pm$  SD), median, frequencies (number of cases), and relative frequencies (percentages) when appropriate.

## RESULTS

In our study total 100 patients were enrolled mean age was  $47.7 \pm 10$  years with minimum age of 18 years and maximum age of 65

years. Lesser patients belong to younger age group (18 years to 40 years) i.e. 54 while 46 belonged to elder age group i.e. 41 year to 65 years 24.1 % and 75.9% respectively. Out of which 62 were male and 38 were female (Table No. 1).

Table 1: Age stratification of sampled population

Age	Frequency	Percentage
20 - 40 years	54	54%
41 - 65 years	46	46%
Total	100	100.0%

Hypotension was present in 24 patients; smoking was present in 12 patients and 50 patients were diabetic. Table 02 shows the relationship of low blood pressure and acute stroke in selected patients.

Table 2: Analysis of relationship of low blood pressure and acute stroke

Variable	Normal blood pressure	Low blood pressure	Normal blood pressure through medication	P-value
Participants (n)	66	24	54	
Age (y)	42 (13)	57 (14)	59 (11)	0.000
BMI (kg/m <sup>2</sup> )	27 (5)	30 (6)	31 (6)	0.000
Systolic BP (mm Hg)	118 (11)	148 (14)	125 (9)	0.000
Diastolic BP (mm Hg)	74 (8)	89 (11)	77 (7)	0.000
Total cholesterol (mg/dL)	184 (41)	198 (42)	193 (39)	0.022
LDL-C (mg/dL)	117 (37)	125 (37)	118 (36)	
HDL-C (mg/dL)	43 (11)	43 (12)	44 (11)	
Triacylglycerol (mg/dL)	54 (77)	46 (79)	148 (57)	0.009
Glucose (mg/dL)	91 (11)	94 (13)	97 (12)	0.006
Vitamin D insufficiency (%)	88	84	87	NS
High PTH (%)	10	14	13	

Table 3: Results of cardiological assessment in stroke patients

Cardiac risk factors	Number (167)	Percent
Rheumatic heart disease	36	21.6
Atrial fibrillation	44	26.3
Atrial myxoma	1	0.6
Prosthetic valve	3	1.8
Mural thrombus	3	1.8
Ischemic heart disease	15	9
Left ventricular hypertrophy	51	30.5

## DISCUSSION

It is considered as the most effective treatment for treating acute ischemic stroke by dissolving thrombus, recanalization of occlusive blood vessels and reconstruction of blood flow. Intravenous thrombolysis (IVT) is simple, but the time window remained short, while intra-arterial thrombolysis (IAT) has a certain degree of trauma in association with complex operation, but the time window is relatively long<sup>8</sup>.

There are several articles that compared the differences between IAT and IVT in patients with ischemic stroke, and there exists various research designs, enrollment and exclusion criteria, methods and so on<sup>9</sup>. Goyal in his study stated that both IAT and IVT have similar effects. While Qureshi reported that IVT was much better than IAT for patients with ischemic stroke<sup>10</sup>. Treatment of acute ischemic stroke attempts to open the occluded blood vessels in order to re-establish blood flow and to improve outcomes. Reperfusion can be attained by intravenous thrombolysis (IVT) or by intra-arterial thrombolysis (IAT)<sup>11</sup>. It is recommended that IVT be given as first-line therapy for acute ischemic stroke within 4.5 hours of the onset of symptoms; however, approximately 50% of patients treated with IVT do not recover and die. In addition, although overall recanalization rates are approximately 46%, those of IVT are low when the occlusion is in a large artery. In these cases, published rates range from 4% to 68% and depend upon both the location of the occlusion and the study<sup>12-14</sup>.

The findings from a number of studies suggest that IAT may be a reasonable alternative to IVT. In some studies, IAT is associated with higher rates of recanalization than is IVT. There are several potential advantages to IAT, such as angiographic planning to customize therapy, locoregional injection, and the ability to use mechanical devices to speed up the recanalization rate. There is a delay in treatment with IAT relative to IVT, and this delay may lessen the advantages of the procedure, since time to treatment is a major predictor of outcome for acute stroke<sup>15-16</sup>.

## CONCLUSION

It is concluded that hypotension were the commonest non communicable diseases (cardiovascular) risk factors in known hypertensive patients. Low presenting BP, both SBP and DBP, are associated with poor outcome after acute stroke, even after taking account of these patients.

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