

A STUDY ON FUNCTIONAL OUTCOME OF ANTERIOR VERSUS POSTERIOR CIRCULATION STROKE TREATED WITH INTRAVENOUS THROMBOLYSIS

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ABSTRACT

Objective: In this study, the objective was to evaluate the functional outcome of intravenous thrombolysis in anterior versus posterior circulation stroke (PCS) patients.

Methods: A total of 41 patients were enrolled during the study. This study was conducted at the Department of Neurology, Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar. The modified Rankin Scale score was used assessed outcome and at the 3-month follow-up in patients with intracerebral hemorrhage stroke.

Results: In this study, 73% in anterior circulation stroke (ACS) and 81% in PCS. Mean NIHSS score is 10.7 in ACS and 8.6 in PCS with a significant difference ($p < 0.008$) between two groups.

Conclusion: Our study shows that patients with PCS had significantly lower baseline NIHSS scores (8.6%) as compared with those with ACS (10.7%) in the present study which is statistically significant. NIHSS score at 24 h is 5.8% for ACS and 3.8% for PCS.

Keywords: Stroke, Intravenous thrombolysis, Anterior versus posterior circulation, Functional outcome.

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INTRODUCTION

Intravenous thrombolysis (IVT) has been approved as medical treatment of acute ischemic stroke and it has been in clinical use for further than 25 years. Since a long time, the conditions for efficacy and safety of thrombolytic agents have been tested, favoring further exploration into systemic reperfusion curatives for acute ischemic stroke [1].

IVT is a standard treatment of acute ischemic stroke in anterior circulation stroke (ACS) and posterior circulation stroke (PCS) cerebral strokes. Still, PCS differs from ACS in stroke causes and outgrowth because PCS is more frequently due to atherosclerosis [2,3], and the prognosis is assumed to be worse with advanced morbidity and mortality rates [3], ultimately reaching up to 54% after basilar artery occlusion [4].

IVT remains the most common acute stroke treatment. Advances in stroke treatment have increased its efficacy, and advances in imaging have expanded its use. The present study was to assess the functional outcome of IVT in anterior versus PCS cases.

METHODS

Study design

This was a prospective observational cohort study.

Sample size

Total sample size was 41 patients enrolled in this study.

Study setting

This study was conducted by Department of Neurology, Chalmeda Anand Rao Institute of Medical Sciences (CAIMS), Karimnagar, Telangana.

Study duration

The study period was from August 2021 to April 2023.

Inclusion criteria

- Age 18 years and above
- The cases with a diagnosis of ischemic stroke with disabling neurologic deficit
- Patient who came within 4.5 h from stroke onset
- Wake-up stroke with weighted imaging fluid-attenuated inversion recovery mismatch on magnetic resonance imaging.

Exclusion criteria

- Patients with a history of severe head trauma within 3 months
- Patients with ischemic stroke within 3 months
- Patients with previous intracranial hemorrhage
- Patients with suspected subarachnoid hemorrhage, infective endocarditis, and aortic arch dissection
- Patients with intracranial or intraspinal surgery (within 3 months)
- Patients with gastrointestinal (GI) malignancy or GI bleeding within 21 days
- Patients with bleeding diathesis and active internal bleeding.

The modified Rankin Scale score was used assessed outcome and at the 3-month follow-up in patients with intracerebral hemorrhage stroke [5]. After getting approval from the Institute Ethics Committee, CAIMS, Karimnagar (Ref. No. CAIMS/IEC/2021/015).

Statistical analysis

Data were entered into a Microsoft Excel spreadsheet and analyzed by the SPASS software version 24. Data were cleaned, and descriptive statistics were applied.

RESULTS

A total of 41 patients with acute ischemic stroke patients admitted to the Department of Neurology, CAIMS Hospital, Karimnagar.

Table 1 shows that the mean age in ACS is 58.9 and mean age in PCS is 54.18. There is no significant difference in age distribution seen.

Table 2 shows that the mean NIHSS score is 10.7 in ACS and 8.6 in PCS with a significant difference ($p < 0.008$) between two groups.

Table 3 shows that mean NIHSS score after 24 h is 5.8 in ACS and 3.8 in PCS with a significant difference between two groups ($p < 0.012$).

Table 4 shows that the functional outcome of the cases at 90 days was found to be better in PCS compared to ACS, but there is no statistically significant due to the limited sample size.

DISCUSSION

Age distribution was similar in stroke in anterior and posterior circulation in the present study. In this study, mean age for both ACS and PCS is less compared to other studies. It may be due to increasingly prevalent risk factors, most of which are based on lifestyle choices such as low physical activity, excess alcohol consumption, and cigarette smoking.

Mean window period for PCS was more (2.5 h) compared to ACS (2 h); it may be due to the initial symptoms of PCS such as vertigo or diplopia like subtle clinical symptoms that are neglected by patients. Other studies by Taha *et al.* [6] and Dornak *et al.* [8] showed similar mean values. Our study shows that patients with PCS had significantly

lower baseline NIHSS scores as compared with ACS was statistically significant.

In the present study, patients with PCS had significantly lower baseline NIHSS scores as compared with ACS. A similar difference in NIHSS baseline scores was reported in two other studies. Similar results were observed in Taha *et al.* study [6].

In this study, primary outcome which is a decrease in the NIHSS score ≤ 4 points from admission to 24 h was achieved in 86.7% in ACS and 81.8% in PCS. The functional outcome of the cases at 90 days was found to be better in PCS compared with ACS but there is no statistically significant due to the small sample size.

Arterial recanalization can also be achieved later than the accepted 3 h window period as studied in previous studies. These revascularization procedures have demonstrated good outcomes even in comatose patients [8]. PCS group has demonstrated a lower mortality rate than the ACS group with no significant difference as demonstrated in a previous study by Taha *et al.* [6].

CONCLUSION

Our study shows that patients with PCS had significantly lower baseline NIHSS scores (8.6%) as compared with those with ACS (10.7%) in the present study which is statistically significant. NIHSS score at 24 h is 5.8% for ACS and 3.8% for PCS.

AUTHORS CONTRIBUTIONS

Sanjaykumar Kaminwar, Thimmineni Haritha – Analysis or interpretation, literature search, Tejaswi G, Yennam Naresh – Design and data collection, P.Shanmugaraju – Manuscript writing and submission.

CONFLICTS OF INTERESTS

None.

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Table 1: Age distribution

Age	Anterior circulation	Posterior circulation	t-test	p-value
Mean	58.9	54.18	1.083	0.285
SD	12.474	12.007		

p-value-Not significant. SD: Standard deviation

Table 2: NIHSS score at admission

NIHSS at admission	Anterior circulation	Posterior circulation	t-test	p-value
Mean	10.7	8.6364	2.797**	0.008
SD	1.95024	2.4606		(significant)

SD: Standard deviation

Table 3: NIHSS score after 24 h

NIHSS score after 24 h	Anterior circulation	Posterior circulation	t-test	p-value
Mean	5.8	3.8182	2.643	0.012
SD	2.35475	1.25045		(significant)

SD: Standard deviation

Table 4: Modified Rankin score at 3 months

Study	PCS (%)	ACS (%)
Present study	≤ 2	90.9
Taha <i>et al.</i> [6]	≤ 2	93.8
Dornak <i>et al.</i> [11]	≤ 2	≤ 2

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