



## Original Research Article

## Outcome of thrombolysis with recombinant tissue plasminogen activator (rtPA) in a rural tertiary care center

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## ABSTRACT

**Introduction:** Stroke is a leading cause of morbidity and mortality worldwide and there is a significant gap in the availability of standard of care in different regions especially in the rural areas.

**Aims:** To assess the clinical profile and outcome of patients treated with iv rtPA at a rural tertiary care center.

**Materials and Methods:** A prospective observational study of consecutive window period stroke patients treated with iv rtPA. Clinical, epidemiological, imaging parameters, outcome measures including baseline NIHSS, NIHSS at 1 hour, 24 hours, discharge and mRS [modified Rankin Score] at 1 and 3 months were entered in structured proforma.

**Results:** A total of 28 patients were thrombolysed with iv rtPA during the study period. Diabetes, Hypertension and smoking were the most common comorbidities. The mean arrival time in hospital was 151 minutes. The door to needle time was 68 minute. 22 had anterior circulation stroke and 6 with posterior circulation stroke. Mean NIHSS at arrival was 10.4. Mean NIHSS score at 24 hours was 10.1 and NIHSS at 7 days was 9.8. Major improvement as measured as a drop in NIHSS of 8 points was seen in 7 patients [25%]. The mean mRS at 1 month was 2.89 and at 3 months was 1.74. At 3 months follow up 10 out of 28 patients [35.7%] had major improvement characterized by mRS improvement of 3 from time of discharge or final mRS of 0 or 1.

**Conclusion:** Thrombolysis with rtPA is safe and effective in rural setting.

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### 1. Introduction

The management and outcome of acute ischemic stroke has seen major changes in the last two decades ever since the publication of NINDS trial in 1995 which confirmed the benefits of thrombolysis in the first 3 hours after stroke onset.<sup>1</sup> Later the window period was extended to 4.5 hours after the publication of ECASS 3 trial in 2008.<sup>2</sup> Stroke is one of the major causes of morbidity and mortality in India. The incidence of stroke is about 119-145/ 100000 population.<sup>3</sup> A study conducted from Trivandrum district of Kerala had shown a crude incidence rate of 117 per 100000 population with incidence of 116 for urban population and 119 for rural population.<sup>4</sup> Though thrombolysis is a very

effective treatment its availability and usage worldwide is much less in rural and backward areas.<sup>5</sup> Ours is a tertiary care center located in rural area in Malabar with comprehensive stroke care facility including mechanical thrombectomy available. We wanted to study the clinic-epidemiological profile of patients treated with intravenous rtPA [recombinant tissue Plasminogen Activator] and assess their treatment outcome.

### 2. Materials and Methods

This is a prospective observational study approved by the institutional ethics committee and written informed consent was obtained from all study participants.

Consecutive ischemic stroke patients above 18 years of age arriving at the emergency department of MES

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**Table 1:** Baseline features of 28 patients thrombolysed with rtPA

	Number	Minimum	Maximum	Mean	Std. Deviation
AGE	28	42.00	85.00	63.4286	9.39042
Onset to doortime	28	30.00	240.00	151.4286	50.96944
Door to imaging	28	5.00	50.00	21.6071	12.09940
Door to perfusiontime	28	20.00	160.00	68.7857	32.56146
Nihss	28	4.00	27.00	10.4286	5.63999
Nihss at discharge	28	1.00	42.00	9.8214	9.89595
Mrs at 1 months	28	.00	6.00	2.8929	1.59488
Mrs at 3 months	28	.00	6.00	2.1786	1.74385

**Table 2:** Improvement based on NIHSS at discharge

NIHSS outcome		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No improvement	9	32.1	32.1	32.1
	Mild improvement	9	32.1	32.1	64.3
	Moderate improvement	3	10.7	10.7	75.0
	Major improvement	7	25.0	25.0	100.0
	Total	28	100.0	100.0	

**Table 3:** Improvement based on mRS at 3 months.

mRS outcome at 3 months		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No improvement	7	25.0	25.0	25.0
	Mild improvement	5	17.9	17.9	42.9
	Moderate improvement	6	21.4	21.4	64.3
	Major improvement	10	35.7	35.7	100.0
	Total	28	100.0	100.0	

Medical College in window period of 4.5 hours and treated with iv rtPA was included in the study. Baseline NIHSS score was calculated, and plain CT brain was taken immediately. Patient was thrombolysed with rtPA after taking informed consent if CT didn't show any bleed and there were no contraindications for thrombolysis. MR angiogram of brain was done after thrombolysis and if there was large vessel occlusion patient was taken up for mechanical thrombectomy. Patients taken up for mechanical thrombectomy was excluded from the study. Repeat CT brain was done at 24 hours after thrombolysis or earlier if there was clinical deterioration. Clinical, epidemiological, imaging parameters, outcome measures including baseline NIHSS, NIHSS at 1 hour, 24 hours, discharge and mRS [modified Rankin Score] at 1 and 3 months were entered in structured proforma. The primary outcome measured was NIHSS at discharge and secondary outcome was mRS at 3 months. A drop of NIHSS score by 8 was considered as major improvement and drop of 4 and 2 as moderate and mild improvement. A 3 point drop in mRS or mRS of 0 or 1 at 3 months was considered as major improvement. 2 and 1 point drop of mRS was considered as moderate and mild improvement respectively. Analysis was done using SPSS software.

### 3. Results

28 patients were thrombolysed with alteplase of which 16 were males. Mean age was 63 years with youngest was 42 years and oldest patient was 85 years. Hypertension [46.4%] and Diabetes mellitus [39.3%] were the most common risk factors. 17.9% of patients were smokers. Being in a rural area the mean time of arrival in hospital was on the higher side of 151 minutes. The door to imaging time was 21 minutes [Table 1]. However, the door to needle time was 68 minutes which was on the higher side mostly due to the delay in decision making as most of the patients belonged to lower economic strata. Mean NIHSS at arrival was 10.4. Out of 28 patients 22 had anterior circulation stroke and 6 with posterior circulation stroke. Mean NIHSS score at 24 hours was 10.1 and NIHSS at 7 days was 9.8. Major improvement as measured as a drop in NIHSS of 8 points was seen in 7 patients [25%] and moderate and mild improvement was seen in 3 [10.7%] and 9 [32.1%] patients respectively [Table 2]. The mean MRS at 1 month was 2.89 and at 3 months was 1.74. At 3 months follow up 10 out of 28 patients [35.7%] had major improvement characterized by mRS improvement of 3 from time of discharge or final mRS of 0 or 1. At 3 months follow up 7 patients [25%] had no improvement. 6 [21.4 %] and 5 [17.9%] had moderate

and mild improvement respectively [Table 3]. There was no bleeding either clinically or in the 24 hours repeat CT in any of the patients.

#### 4. Discussion

Acute stroke management has seen significant changes in the last 3 decades. The benefits of these treatment have been slow to reach the rural population.<sup>6</sup> The causes include lack of awareness among people regarding stroke symptoms, lack of access to health care, high prevalence of untreated comorbidities like diabetes and hypertension<sup>7</sup> and delay in referral.<sup>8</sup> We wanted to study how effective is thrombolysis done in a rural center compared to that in urban centers and with other centers in developing countries.<sup>8–10</sup> Mean age of 63 years and the percentage of comorbidities were similar to other studies.<sup>11</sup> The onset to symptoms to time of arrival in hospital of 151 minutes was also comparable. The door to needle time of 68 minutes was high compared to urban studies. Our door to imaging time was 21 minutes which was very satisfactory. The delay in door to needle time was mostly due to delay in decision making from the patient side as most of them belonged to low socioeconomic status and many could not afford the costly medicine. The arrival of government health schemes which provide free thrombolytic drugs could change that in the future. Majority of cases were anterior circulation stroke. The primary and secondary outcomes were comparable to other studies.<sup>1</sup> None of the patient had any significant adverse effects. There was no clinical or asymptomatic bleeding in any of the patients reiterating the safety of the procedure. Intra venous thrombolysis with rtPA is a very safe and effective treatment and the benefits are reproducible in a rural setting as well.

#### 5. Source of Funding

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#### 6. Conflicts of Interest

There are no conflicts of interest.

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