

**A RETROSPECTIVE STUDY OF DOOR TO NEEDLE TIME IN PATIENTS UNDERGOING INTRAVENOUS THROMBOLYSIS FOR ACUTE ISCHEMIC STROKE AT TERTIARY CARE REFERRAL HOSPITAL**

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**ABSTRACT**

Door-to-needle time less than 60 minutes is recommended by many organizations and included in guidelines. This study was conducted to know the effectiveness of initiation of Intravenous thrombolysis (IVT) in preventing morbidity and mortality. This study was conducted over a period of 9 months and data was analysed retrospectively. Totally 6 patients were included in this study and all of them underwent IVT. Majority of the patients we could thrombolysed within one hour and only one patient it was more than one hour. All 6 patients survived with good clinical recovery. This study highlights the importance of having the less DNT to reduce morbidity and mortality.

**KEYWORDS:** Thrombolysis, Ischemic strike, Door-to-needle, Alteplase.

**INTRODUCTION**

The acute ischemic stroke is defined as the sudden loss of blood supply to an area of the brain leading to loss of neurological function of that corresponding area. For acute ischemic stroke intravenous thrombolysis (IVT) is one of the effective treatments described. The IVT should be administered within 4.5 hours of symptoms onset which is considered as golden period. This study was conducted to study the door to needle time in patients undergoing intravenous thrombolysis for acute ischemic stroke at tertiary care referral hospital.

haemorrhagic stroke, bleeding diathesis, active gastric ulcers, very high blood pressure and recent surgery were excluded from the study.

**METHODOLOGY**

This is a retrospective observational study conducted at Apollo hospital Sheshadripuram between October 2021-June 2022 (9 months). Those patients who visits the Emergency room with signs and symptoms of acute ischemic stroke within 4.5 hours of onset of symptoms of stroke with age group of >18 years were included in the study. In our hospital the door time is defined as soon as the patient enters the Emergency room with signs and symptoms of acute ischemic stroke. If the patient admitted in the ward for some other reason and gets stroke then the time when the neurologist receives the first telephone call is considered as door time. Needle time is considered when the patient receives the bolus dose of rt-PA followed by Continuous infusion over 60 minutes. Patients who are <18 years, recent history of

## RESULTS

We conducted this study over a period of 9 months and data was analysed retrospectively. Baseline characters and comorbidities of the patients who underwent intravenous thrombolysis (Alteplase) are shown in Table-1.

BASELINE CHARACTERISTICS	Number of patients.
Males	01
Females	05
Age (Mean)	63.08
Pulse rate (Mean)	76.08
Systolic blood pressure (Mean)	162.91
Diastolic blood pressure (Mean)	73.86
Spo2 (Mean)	94.78
HYPERTENSION:	04
CAD:	02
CKD:	01
DM:	03
ASTHMA:	01
HYPOTHYROIDISM:	01
COPD:	01
NO COMORBIDITIES:	00

Totally 6 patients were included in our study and all of them underwent IVT. Among this patient's majority are females (5 patients) and only one male. Hypertension was the most common comorbid condition seen in about 4 patients. The symptoms of the patients who underwent intravenous thrombolysis (Alteplase) are shown in Table-2.

SYMPTOMS	Number of patients.
Aphasia	04
Dysarthria	02
Right/Left sided weakness	05
Deviation of mouth	04
Giddiness/Imbalance	02

Aphasia, Dysarthria, right or left sided weakness, deviation of mouth and imbalance are some of the symptoms which patient presented with. One half of the body weakness is the most common symptom followed by aphasia. The Time of symptom onset to arrival to Emergency room (Door time) is shown in Table-3.

TIME	Number of patients.
0-1 Hour	02
1-2 Hours	03
2-3 Hours	01
3-4.5 Hours	00

Maximum patients reached emergency room within 2 hours of symptoms onset. Only two patients arrived to emergency within one hour. Diagnosis of the patients who underwent intravenous thrombolysis (Alteplase) is shown in Table-4.

DIAGNOSIS	Number of patients.
Right MCA territory infarct	02
Left MCA territory infarct	01
Right PCA territory infarct	01
Left PCA territory infarct	01
Watershed Infarcts	01

Door to needle time distribution of patients undergoing intravenous thrombolysis (Alteplase) is shown in Table-5.

Door to needle time	Number of patients.
Within 30 minutes	01
30-45 Minutes	03
45 Minutes – 1 Hour	01
More than 1 Hour	01

**Majority of the patients we could thrombolyse within one hour and only one patient it was more than one hour. Outcome of the patient who underwent intravenous thrombolysis is shown in Table-6.**

OUTCOME	Number of patients.
Alive	06
Dead	00

## DISCUSSION

Acute ischemic stroke is one of the common reasons for admission to the hospital in present era. Early identification of these patients and immediate treatment with IVT who come to the hospital within window period (less than 4.5 hours) has shown morbidity and mortality benefits. Even in many experienced centres only 2-7% of patients receive this treatment.<sup>[1-3]</sup> Every minute delay in IVT and failure to establish recirculation can lead to permanent death of neurons that is why it is called "Time is brain".<sup>[4]</sup> The patient can become physically independent or dependent based upon how early we thrombolyse the patient. Totally 06 patients were included in our study and all of them underwent IVT. Among these patient's majority are Females (5 patients) and only one male patient. Hypertension was the most common comorbid condition seen in about 4 patients. Aphasia, Dysarthria, right or left sided weakness, deviation of mouth and imbalance are some of the symptoms which patient presented with. One half of the body weakness is the most common symptom followed by aphasia.

Whenever patient has any signs and symptoms of acute ischemic stroke, he has to reach the hospital early which is called as Symptoms-to-door time. Once patient enters the hospital and how early we initiate the IVT is called as Door-to-needle time. These two times we need to be careful because this will define the outcome of a patient. We don't have control on Symptoms-to-door time (SDT) but at least those patients who reach hospital within window period (less than 4.5 hours) we can reduce Door-to-needle time (DNT). By reducing DNT, we can increase the proportion of patients who are eligible for IVT and also we can reduce morbidity and mortality. Symptoms-to-door time can be effectively reduced through public awareness.<sup>[5]</sup> Some steps to decrease DNT is using early triaging of patients, proper counselling of patients, keeping CT/MRI machine near to emergency room and alert system to activate people involved in the management of these patients.<sup>[6,7]</sup>

Door time is defined in many ways, according to stroke guidelines from American heart association it is the time from diagnosis of stroke after initial triaging of patient. SITS-MOST registry (Safe implementation of thrombolysis in stroke monitoring study calculates the time from which patient enters the hospital. Some studies define the time from when patient gets admitted to stroke unit. In our hospital the door time is defined as soon as the patient enters the Emergency room. If the patient admitted in the ward for some other reason and gets stroke then the time when the neurologist receives the

first telephone call is considered as door time. In our study maximum patients reached emergency room within 2 hours of symptoms onset. Only two patients arrived to emergency within one hour.

Needle time is considered when the patient receives the bolus dose of rt-PA. According to the National institute of neurological disorder and stroke rt-PA stroke study group, rt-PA should be administered at dose of 0.9mg/kg, in that 10% should be given as bolus followed by remaining 90% as infusion over 60 minutes.<sup>[8]</sup> There should not be any delay in administering continuous infusion following bolus dose because after bolus there will be rapid increase in concentration of rt-PA and after 5 minutes this concentration falls since it binds to fibrin which results in short half time of 4-5 minutes. This short half tie makes IVT less efficient,<sup>[9,10]</sup> There are multiple factors which can prolong needle time such as patients unaware of onset of symptoms, high blood pressure at the time of stroke, altered coagulation parameters, delay in consenting for IVT, CT scan delay, equipment issues, rt-PA not available and delayed laboratory testing.

In majority of hospitals the DNT is >60 minutes.<sup>[11,12]</sup> The national guidelines recommend that the DNT should not exceed >60 minutes. American heart association along with other organizations has taken an initiation to achieve DNT less than or equal to 60 minutes for more than or equal to 50% of patients who reaches to hospital within window period.<sup>[13,14]</sup> Some studies have been undertaken even to enhance IVT beyond 4.5 hours in some select subgroup of patients.<sup>[15]</sup> In our study majority of the patients the thrombolysis was done within one hour of arrival to emergency room.

## CONCLUSION

The door to needle time (DNT) signifies the effectiveness and quality of care administered in any institutions. In our tertiary care referral hospital we could able to achieve the DNT less than 60 minutes due to proper triaging the patients who comes to emergency room along with rapid activation of stroke team. This study shows the importance of having the less DNT to reduce morbidity and mortality.

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