

# Analysis of Door-to-Needle Time for Acute Stroke, and Factors Contributing for Delay in a County Hospital in Ireland

Sir,

Time is the most important factor in management of acute stroke. Reperfusion therapy is the current standard of care for patients presenting with acute stroke within the thrombolytic window.<sup>1</sup> Swift initiation of thrombolytic therapy is associated with a better outcome.<sup>2</sup> Maximum benefit from thrombolysis is achieved within a period of 4.5 hours; and beyond this, risks outweigh the benefits.<sup>3</sup>

Due to this narrow therapeutic window and certain other contraindications like coagulopathy, recent surgery, or stroke or head injury within the past three months, makes only 10 percent of people presenting with acute stroke eligible for thrombolytic therapy.<sup>4</sup> Current guidelines recommend door-to-needle time of less than 60 minutes for patients presenting with acute stroke.<sup>5</sup>

This was retrospective study conducted in a county hospital in Ireland. The aim of our study was to look at the current protocol for thrombolysis for patients presenting with acute stroke within the window period, to know about the door-to-needle time and to try to identify problems/issues in the current system, in order to improve the efficiency and productivity of the system—leading to safer and better patient outcomes. Retrospective data was collected from electronic case records of 19 patients, who were thrombolysed for acute stroke between March 2018 to March 2019. A number of parameters including time of onset of clinical symptoms, arrival into emergency department, assessment by stroke team or medical registrar on call, brain imaging time (CTB and CTA), reporting by the radiologist, decision regarding thrombolysis, and the time for initiation of thrombolysis were taken into consideration.

The average door-to-needle time was 97 minutes and average time for onset of symptoms to ED arrival was 108 minutes. The average time taken by medical registrar or stroke team to see a patient was 30 minutes and the average time taken a radiologist to report the CT scan was 30 minutes.

Cavan General Hospital receives many patients with acute stroke. They undergo a set protocols of events from arrival at the hospital to the time a decision is being made regarding thrombolysis. We noted in this study that there is significant intra-hospital delay in thrombolysis of acute stroke. The average time taken by the stroke team or medical registrar on call to see the patient was 30 minutes, and the average CT scan booking to reporting time was 31 minutes. These figures show that there is quite significant time delay. One study shows that a

20-minute delay in treatment reduces the odds ratio of a favourable outcome by approximately 20%, or about 1% per minute.<sup>5</sup> We suggest that a dedicated stroke nurse along with pre-hospital notification for stroke can have an effect on reducing the door-to-needle time.

This study shows that we are currently falling short of achieving national/international guidelines for door-to-needle time for thrombolysis of acute stroke patients. We recommend that a thrombolysis review group should be developed which looks into each and every thrombolysis patient's case in detail to see what and where we went wrong in saving time for thrombolysis, from the time of arrival of the patient at the ED. We also recommend involvement of radiologists, medical consultants, hospital managers and the medical registrars to come up with a better acute stroke management pathway (e.g. improved CT booking and filming pathway).

There should be a standardised training programme/course for acute stroke management for medical registrars, that should be mandatory and needing regular updates within 2 years (like ACLS).

We plan to do a re-audit in 6-month time after making changes to the current acute stroke management pathway, to see if the changes have translated into better patient care outcomes.

## CONFLICT OF INTEREST:

The authors declared no conflict of interest.

## AUTHORS' CONTRIBUTION:

MMS: Conception and design, data acquisition and analysis, interpretation, critical revision, drafting, final approval.

JC: Interpretation, critical revision, final approval.

## REFERENCES

1. Wardlaw JM, Murray V, Berge E, Del Zoppo G, Sandercock P, Lindley RL, et al. Recombinant tissue plasminogen activator for acute ischaemic stroke: An updated systematic review and meta-analysis. *Lancet* 2012; **379(9834)**:2364-72. doi: 10.1016/S0140-6736(12)60738-7.
2. Emberson J, Lees KR, Lyden P, Blackwell L, Albers G, Bluhmki E, et al. Effect of treatment delay, age, and stroke severity on the effects of intravenous thrombolysis with alteplase for acute ischaemic stroke: A meta-analysis of individual patient data from randomised trials. *Lancet* 2014; **384(9958)**:1929-35. doi: 10.1016/S0140-6736(14)60584-5.
3. Lees KR, Bluhmki E, Von Kummer R, Brodt TG, Toni D, Grotta JC, et al. Time to treatment with intravenous alteplase and outcome in stroke: An updated pooled analysis of ECASS, ATLANTIS, NINDS, and EPITHET trials. *Lancet* 2010; **375(9727)**:1695-703. doi: 10.1016/S0140-6736(10)60491-6.
4. de los Ríos la Rosa F, Khoury J, Kissela BM, Flaherty ML, Alwell K, Moomaw CJ, et al. Eligibility for intravenous recombinant tissue-type plasminogen activator within a

population: The effect of the European Cooperative Acute Stroke Study (ECASS) III Trial. *Stroke* 2012; **43**(6):1591-5. doi: 10.1161/STROKEAHA.111.645986

5. Powers WJ, Rabinstein AA, Ackerson T, Adeoye OM, Bambakidis NC, Becker K, et al. 2018 guidelines for the early management of patients with acute ischemic stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke* 2018; **49**(3):e46-99. doi: 10.1161/STR.0000000000000158.

---

Muhammad Mohsin Sajjad and John Corrigan

.....  
*Department of Stroke Neurology, Cavan General Hospital,  
Royal College of Physicians, Ireland*  
.....

*Correspondence to: Dr. Muhammad Mohsin Sajjad, Department of Stroke Neurology, Cavan General Hospital, Royal College of Physicians, Ireland  
E-mail: drmohsin34567@gmail.com*  
.....

*Received: May 18, 2020; Revised: July 09, 2020;  
Accepted: July 15, 2020*

*DOI: <https://doi.org/10.29271/jcpsp.2021.04.487>*

.....