Time is Brain:
Improving efficiency of tPA administration time

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Background

The advantages of using intravenous tissue plasminogen activator (tPA) for patients experiencing acute ischemic stroke (AIS) rely on time sensitivity. In multiple studies, the effect of tPA on long term outcomes (90 days) was found to be dependent on the time between the onset of symptoms and tPA administration or onset-to-treatment (OTT). Guidelines advocate for a door-to-needle (DTN) time of 60 minutes or less. Yet, research indicates that fewer than 30% of patients in the US receive treatment within this critical timeframe.

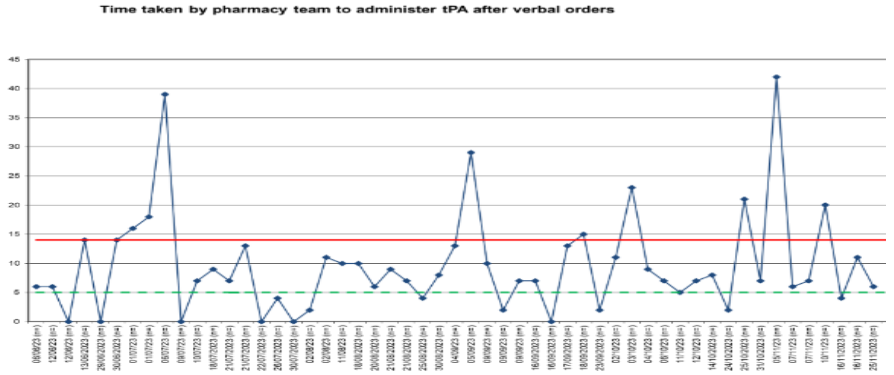
Objectives/Aims

As a comprehensive stroke care center, we at the University of Kentucky aim to deliver tPA to 100% of our eligible patients within 60mins, more than 75% of eligible patients within 45mins and to more than 50% of eligible patients within 30mins. The aim of this QI project is to decrease the number of patients experiencing DTN time exceeding 60 minutes by 20%. Ultimately, our goal is to achieve 100% of patients receiving TPA within the recommended 60-minute timeframe.

Methods

A retrograde chart review was performed for all the stroke patients over past 6 months (June 2023- Nov 2023) who have received tPA at UKY hospital. 53 patients were identified who received TPA in ED who presented with stroke-like symptoms. The average time for Door to Needle (DTN) was noted to be 48.8 mins. Upon further in-depth chart review, it was seen that the average duration between the verbal orders after attending approval to TPA dispensation by pharmacy team ("Pharmacy Time"), exceeded our initial expectations. The expected timeframe for mixing and administering tPA was initially estimated to be under 5 minutes. But on chart review, the average time seen for the above 53 patients was 10.5 mins.

To investigate the temporal factors impacting "Pharmacy Time" (from attending approval to TPA dispensation), a survey was conducted among neurology residents to identify key causes of delays within this period. Based on their feedback, a Plan-Do-Study-Act (PDSA) cycle was initiated, targeting the reduction of delays by implementing an intervention aimed at proactively notifying the pharmacy team prior to attending physician approval. This intervention involved pre-alerting the pharmacy team upon initial patient evaluation by residents, contingent on meeting TPA eligibility criteria. By doing so, pharmacy staff could commence TPA preparation, including blood pressure management and drug mixing, in advance, thereby expediting the administration process once attending approval was obtained. The effectiveness of this intervention was evaluated on a cohort of 10 patients treated between January and May 2024.



Results/Outcomes

The intervention involving proactive pharmacy notification prior to attending physician approval was assessed in a PDSA cycle conducted from January to May 2024 with 10 patients. Results indicated a significant reduction in door-to-needle (DTN) time, decreasing from an average of 48.8 minutes to 28.8 minutes. Additionally, the specific "Pharmacy Time" was also reduced, improving from 10.5 minutes to 3.8 minutes.

Conclusion

The preliminary results demonstrate the potential for integrating this change into the stroke workflow. However, to fully assess its applicability and efficacy, further data collection is warranted. Our efforts for additional PDSA cycles were halted due to the announcement of a shift in thrombolytic use from TPA to TNK at UK, but similar measures can be explored with TNK once data is gathered from a substantial patient cohort.