

# Time Is Brain: Improving Door To IV tPA Time in Emergency Department

Habiba Khan, MD, MPH<sup>1</sup>, Dallin Ollerton, MD<sup>1</sup>, George Matus, MD, MBA<sup>1</sup>, Ramesh Komaragiri, MD<sup>1</sup>

<sup>1</sup>Department of Internal Medicine, Las Palmas del Sol Healthcare, El Paso, TX, 79925

## Background

- Timely administration of tPA has been well established.
- Standard door-to-needle time for tPA should be within 60 minutes of arrival to hospital<sup>3</sup>.
- Even reduction of 15 minutes has shown to increase odds of walking on discharge, decrease odds being discharged to an institution rather than home or death at discharge<sup>1</sup>.
- Shorter door to needle times have shown to reduce all-cause mortality at one year follow ups, with reduced risk of readmission<sup>2</sup>.
- At Del Sol Medical Center, door-to-needle time are not infrequently >60 minutes.
- Possible reasons for delays include: delay in code stroke activation, delay in contacting teleneurology, patient's being hypertensive, difficulty in ordering/obtaining tPA
- In 2020, **37% of patients received tPA beyond the recommended 60 minute window**, thus prompting a project to improve door to needle time in our Emergency Department.

## Objective

- To analyze causes of tPA delay, train nursing, faculty, and other emergency department staff in order to achieve a minimum 10% reduction in door-to-needle times >60 minutes.

## Methods

Repeated cycles of data collection, planning and implementing changes were performed from 02/04/21-06/07/21

### Implementation 1

Addition of labetalol and nicardipine to tPA kits and removal of consent requirement

### Implementation 2

Provided Education to Staff to reduce teleneurology dependance

### Implementation 3

Established a "pit-stop" at ED door. Allowing for swift physician assessment and door to needle progression

- Data points included: Door-to-needle times, related subdivided times, and reasons for delays
- Upon termination of data collection, data points underwent statistical analysis via control limits and the development of run plots, with summarization of the descriptive statistics.

## Results

### Data Summary of Door to Needle (DTN) times Collected Pre and Post Intervention in 2020 and 2021

	2020	2021
DTN time >60 minutes (%)	10 (37.03)	14 (23.72)
DTN time <40 minutes (%)	8 (29.62)	35 (59.32)
Total # of Patients	27	59

Table 1: Summary of the data collected in year 2020 and 2021 pre and post intervention with number and percentage of door to needle times at >60 minutes and < 40 minutes.

### Statistical Analyses of Door to Needle (DTN) times Collected Pre and Post Intervention in 2020 and 2021

	2020	2021
Standard Deviation	0:53	0:22
Average	1:10	0:43
UCL	3:09	1:49
LCL	-0:49	-0:23

Table 2: Statistical data on standard deviation, average, upper controlled limit and lower controlled limit were obtained from analyses in year 2020 and 2021 pre and post intervention.

## Run Plot of Door To Needle Time

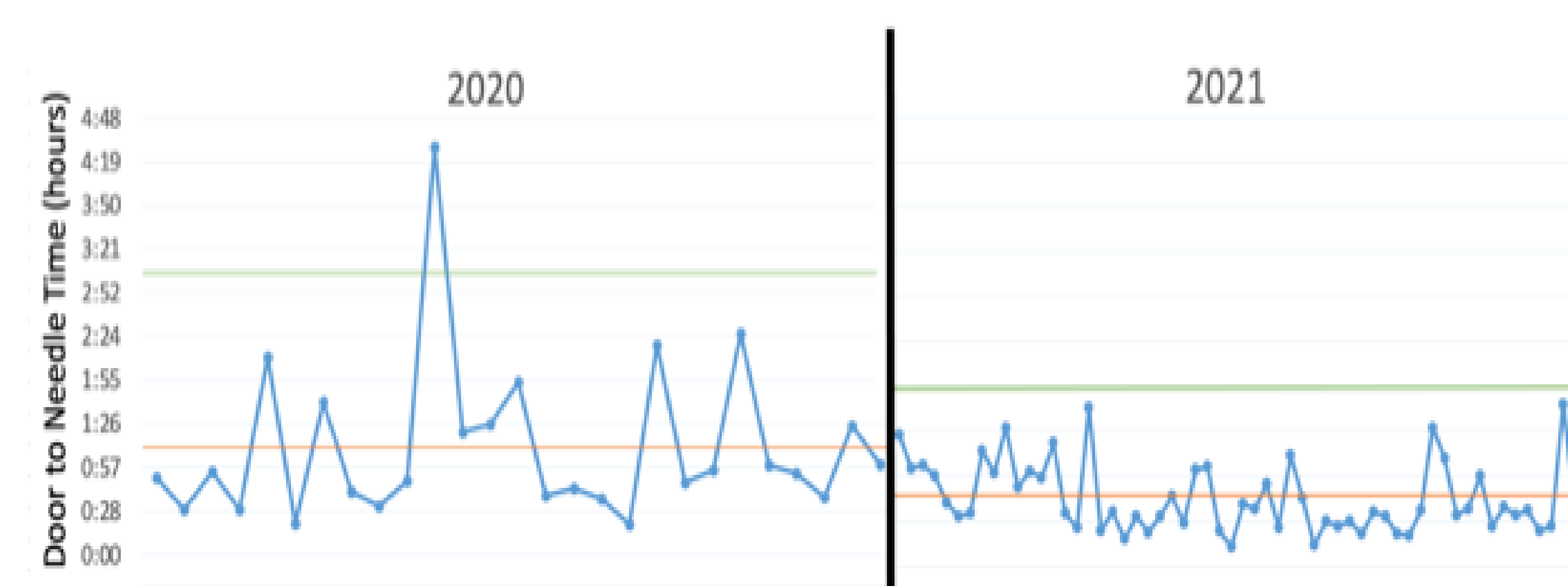


Figure 1: Run plot of door to needle times pre and post intervention in year 2020 and 2021, with green lines representing the UCL and LCL and red line representing the average.

## Discussion

- Our results showed that after implementation of our intervention, time to tPA administration decreased and more patients received the medication in the recommended under 60 minutes. (Table 1 and 2).
- No outliers were seen after intervention and statistical calculation of the control limits show that the intervention has a controlled variation in the year 2021, which we conclude may be reliably replicated for future projects (Figure 1).
- Other quality improvement projects have shown similar improvements with staff education and improvement in transfer time to imaging, which shows the importance of addressing center specific problems hindering time to tPA.<sup>4</sup>
- Limitations to the study were that the 2021 data did not have reasons for tPA delay, so for future research, it will be difficult to address specific areas of improvement. There was also no data gathered about patient demographics, which could have introduced bias in treatment.
- Data will continue to be collected with ongoing analysis to monitor for changes in tPA administration times. If trends head in the negative direction, then a new intervention will need to be implemented to avoid patient delay to care.

## Conclusion

- Our quality improvement project was **successful in reducing the number of patients with door to needle time greater than 60 minutes from 37% in 2020 to 23.72% in 2021**. Due to its success, we recommend implementing these changes in other facilities and to continue monitoring for opportunities of improvement specific to the roadblocks encountered in tPA administration.

## References

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