## **Reducing Stroke Door to Needle Times through Stroke Alert** Facilitators and Administering Alteplase Bolus in CT

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### INTRODUCTION

- The American Stroke Association's National Target Stroke Phase II sets a Door to Needle (DTN) goal of  $\leq 45$  minutes.
- Eliminating treatment delays to meet this goal continues to present a challenge for many healthcare facilities.
- Stroke Alert process can suffer delays from lack of communication and facilitation/leadership to ensure rapid patient assessment and treatment.
- The American Stroke Association released several strategies as part of the Target Stroke Phase II including starting intravenous tissue plasminogen activator (Alteplase) in the CT room.
- Sentara Norfolk General Hospital (SNGH) and Sentara Martha Jefferson (SMJH), two primary stroke centers, did not meet this goal of  $\leq$ 45 minutes in 2015 and 2016 (Table 1).
- The objectives of this project were to:
  - Understand current delays in the Stroke Alert Process
  - Eliminate Stroke Alert delays related to communication and lack of continuous leadership/facilitation
  - Redesign the Stroke Alert Process with intravenous tissue plasminogen activator (Alteplase) successfully started in the CT room

### METHODS

- Lack of communication the most common barrier to starting alteplase in the CT room (A Pareto analysis on DTN delays).
- The role of a Stroke Alert Facilitator (SF) was created as a strategy to overcome that barriers.
- The SF and other roles in the stroke alert are outlined in a "swim lane" inspired process (Figure 1).
- The SF launched in March 2016 at SMJH and November 2016 at SNGH.
- The administration of Alteplase in CT began 6-8 months later.

		ER Nursing/			Stroke	CT Tech / INR
		tPA Administrator	ER Physician	Neurologist	Facilitator	Team
0	Arrives	BEFAST assessment:	Ouick eval (LKW,			
×	in the	complete set of vital	any AC, and			
	ED	signs. Gets patient's	deficits),			
10		weight. Notify MD	Estimates NIHSS.			
		Call CT to inform	Calls Stroke Alert.			
		and notify ED MD of	Enters order set.			
		what CT room #.	_	_		
	Stroke	Takes patient directly	Speaks with	Calls via phone	Reports to	Clears CT
	Alert	to CT; Checks	Neuro MD-	into the ED.	main CT,	room to
15	Called	bedside glucose (if	provide stroke	Speaks with ED	brings	prepare for
		not done by EMS)	phone number.	Physician (LKW,	telestroke cart,	patient's arrival
			Establish family	any AC, deficits)	ensures cart is	
			I KW determines	and provides call	Gets	
			contraindications	back number	neurologist	
			informs		phone number.	
			neurologist.		· · · · · · · · · · · · · · · · · · ·	
			, Č			
20	Detient	Parasta VS and	Porriour about in	Logainto	Assist	Mouranationt
	in CT	Glucose to neurology	FPIC for	Telestroke Cart	Neurology with	to scheduling
		or facilitator	additional patient		evaluation	and checks in
			info and PMH	Obtain additional		N. 45
		Gets Stroke Box and		history and	Facilitate/lead	INOTIFIES
25		sets up pump and	Notify neurologist	consent if possible	stroke alert	radiologist when head CT
30		Alteralase (tPA)	or facilitator of	Reads head CT	(CTA, tPA,	completed
		dosage for natient	radiology CT	and evaluate	reversal)	
		dosage for patient	Head read results	patient (NIHSS)	Second check	Notifies INR
		Administer BP meds	if needed	Request team to	tPA with	physician when
		if needed.	If blood identified	mix tPA as early	administrator	completed
		Once ordered by	consult N/S if	as possible		compresed
		neurologist- mix tPA	needed, control	Entry (DA	Ensures CTA is	**INR
		with second check.	BP, order reversal	concent if needed	completed	physician to
		Vital signs and Neuro	if appropriate	CONSCIECT IN INCOUCH	immediately	nouyy want y nationt is a
		check prior to		Request team to	(or before if	candidate for
		starting tPA.	Arranges for	start tPA infusion	tPA is not	intervention
45		tPA bolus started	admission	Ensure CTA	ready for	and place note
		(if aborted return to		completed if	infusion)	in chart**
		pharmacy)		needed.		
	Return	Patient to IR suite if	Facilitates	Enters Acute	Patient to IR	INR team
60	to ED	indicated	admission or	Stroke Note.	suite if	preparation of
	7 or to IR	Post tPA monitoring	transfer as needed		indicated	room and staff
$\bigvee$	Suite	and documentation			Enters stroke	if needed
Ŧ					alert note.	

Figure 1. Redesigned SNGH and SMJH ED Stroke Alert Process

# sentara nurse

- parametric test was utilized.



- There was statistically significant improvement in DTN from the preintervention group with a mean of 70 minutes (M=70.3; SD=29.0) to the SF only group with a mean of 56 minutes [M=56.0.3; SD=17.9; F(1) = 14.3, p=.006]. See trajectory of change in Figure 3.
- There was also statistically significant improvement in DTN from the pre-intervention to the SF and tPA in CT group with a mean of 39 minutes [M=38.5; SD=17.9; F(1) = 14.3, p=.006]; and from SF only group to the SF and tPA in CT group [F(1) = 17.6, p=.001].

• Each hospital's individual results are displayed separately below in Figures 4 and 5. All pairwise comparisons were statistically significant.

Alteplase	2015	2016	2017
Average	66	68	39
Median	55	66	34

Table 1. Alteplase start time summary for calendar year 2015 and 2016.



2015 and October 2017; SNGH and SMJH.



## CONCLUSIONS

- outcomes or process improvements.
- - $\leq$ 45 minutes
  - Potentially better patient outcomes







• Successful communication and facilitation is crucial to achieve positive

• Implementing a SF to overcome these barriers could prove to be a successful strategy to improving DTN times for acute stroke patients.

• The redesigned SNGH and SMJH ED Stroke Alert Process was

successful in significantly decreasing DTN for both sites thus resulting in:

• Compliance with The American Stroke Association's DTN goal of

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