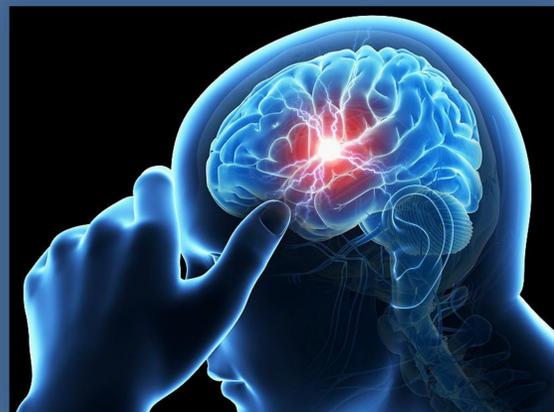


Improving Door to CT Times for Stroke Patients using EMS Pre-Notification

Historical Summary

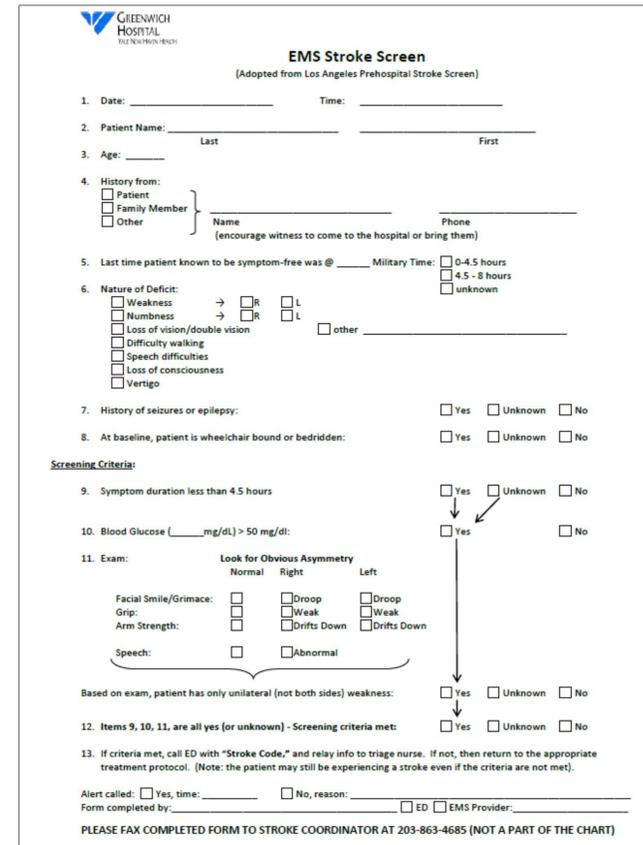
Approximately 795,000 strokes occur in the United States each year. On average, every 40 seconds, someone in the United States has a stroke, and every 4 minutes, someone dies of a stroke. The enormous morbidity of ischemic stroke is the result of interplay between the resulting neurological impairment, the emotional and social consequences of that impairment, and the high risk for recurrence.

- Emphasis on pre-hospital stroke care can improve the likelihood of positive outcomes in patients presenting to the Emergency Department.
- With early notification, Emergency Department staff can be prepared to expedite care of the stroke patient.
- The American Heart Association/American Stroke Association's Target Stroke initiative from 2014 recommends an expedited process for the transport of stroke patients by EMS directly to CT.
- The ultimate goal is to achieve a Door to Needle (thrombolytic therapy) time of less than 60 minutes.



Project Description

The objective of this project was to optimize our pre-notification process and decrease the Door to CT time for stroke patients arriving by EMS to the Emergency Department as part of an initiative to decrease Door to Needle Time. The PDCA methodology was employed. The Emergency Department (ED) team in collaboration with local EMS agencies, redesigned and implemented the EMS Stroke Screen¹, a pre-notification tool that is used to communicate potential stroke cases en route to the ED. Education of ED and EMS staff occurred in August 2016 followed by a September implementation. Upon dispatch, the paramedic now speaks directly to the ED physician on duty, conveying the information captured by the tool, and a pre-hospital stroke code is initiated. By consistently using this tool and method of pre-notification, patients are received immediately upon arrival, quickly assessed by the ED physician, and expedited to the CT scanner.



EMS Stroke Screen
(Adopted from Los Angeles Prehospital Stroke Screen)

- Date: _____ Time: _____
- Patient Name: _____
Last First
- Age: _____
- History from:
 Patient
 Family Member
 Other
Name: _____ Phone: _____
(encourage witness to come to the hospital or bring them)
- Last time patient known to be symptom-free was @ _____ Military Time: 0-4.5 hours
 4.5 - 8 hours
 unknown
- Nature of Deficit:
 Weakness → R L
 Numbness → R L
 Loss of vision/double vision
 Difficulty walking
 Speech difficulties
 Loss of consciousness
 Vertigo
 other _____
- History of seizures or epilepsy: Yes Unknown No
- At baseline, patient is wheelchair bound or bedridden: Yes Unknown No

Screening Criteria:

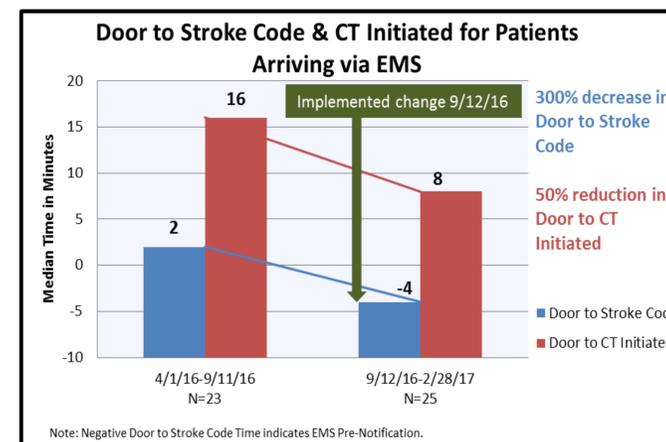
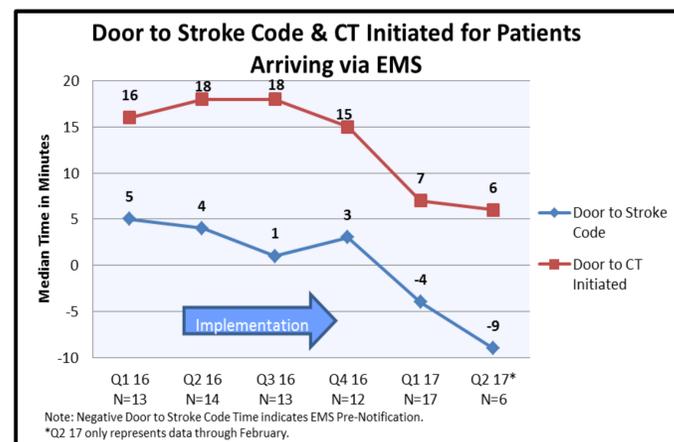
- Symptom duration less than 4.5 hours Yes Unknown No
- Blood Glucose (____ mg/dl) > 50 mg/dl: Yes No
- Exam:
Look for Obvious Asymmetry
Normal Right Left
Facial Smile/Grimace: Droop Droop
Grip: Weak Weak
Arm Strength: Drifts Down Drifts Down
Speech: Abnormal
Based on exam, patient has only unilateral (not both sides) weakness: Yes Unknown No
- Items 9, 10, 11, are all yes (or unknown) - Screening criteria met: Yes Unknown No
- If criteria met, call ED with "Stroke Code," and relay info to triage nurse. If not, then return to the appropriate treatment protocol. (Note: the patient may still be experiencing a stroke even if the criteria are not met).

Alert called: Yes, time: _____ No, reason: _____
Form completed by: _____ ED: EMS Provider: _____

PLEASE FAX COMPLETED FORM TO STROKE COORDINATOR AT 203-863-4685 (NOT A PART OF THE CHART)

Results

Baseline data from Q1 16 to Q3 16 reflect a median quarterly door to stroke code time ranging between 1 and 5 minutes and a median door to CT initiated time ranging from 16-18 minutes. Q4 16 was a transitional quarter, where we educated and began implementing the redesigned processes. Q1 and Q2 17² represent post-intervention results, with Door to Stroke Code time -4 and -9 minutes respectively, and door to CT initiated 7 and 6 minutes respectively. With continued evaluation of the revised process, by the end of Q4 17, the median door to stroke code was -3 minutes and median door to CT initiated was 7 minutes, thus demonstrating consistency and sustained improvement in the new process.



Lessons Learned

By implementing a pre-notification tool with local EMS agencies, increasing awareness of stroke metrics, and introducing a direct to CT process, we were able to significantly reduce both Stroke Code and CT Initiation times. Additionally, EMS pre-notification calls have increased from between two to five per quarter prior to the initiative, to ten in Q1 2017 demonstrating their engagement, collaboration and commitment, both to the revised process and providing high-quality and timely stroke care. Expediting the care of potential stroke patients arriving to the ED and rapid transport to imaging are critical steps in providing stroke care, when minutes matter.



Impact on the Patient Experience

Timely evaluation and treatment are key in ensuring positive outcomes for patients presenting to the ED with signs and symptoms of a stroke. Utilizing this process, eligible patients may receive time sensitive treatments earlier and have a better chance of survival and improved functional outcomes.

¹We would like to acknowledge Dr. Evie Marcolini and the YNH ED for the adaption of their EMS Stroke Screen.