Workflow of Stroke Patients Arriving by Personal Vehicle
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Background

- 90 seconds someone in the United States sustains a stroke, and every four minutes an individual dies from this stroke (New et al., 2017).
- For each minute that a large-vessel occlusion, or ischemic stroke, goes untreated 1.9 billion neurons and 13.6 billion synapses are lost which in one hour is equivalent to the same loss that would occur in 2.6 years of the natural aging process (Sprig & Mitchell, 2015).
- The door-to-needle time (DTN) is the time that lapses between the time a patient arrives in the emergency department (ED) and the time that intravenous recombinant tissue plasminogen activator (rt-PA), otherwise known as the pharmaceutical drug Alteplase is administered.

Setting

The emergency department at this small Pennsylvania rural hospital contains 11 beds and 4 triage suites contained in an area known as the pit. The layout of the ED is thoughtfully done with the radiology department directly outside the doors to the unit which allows for easy access and transport of critical patients, namely those suspected of having a stroke.

Literature Synthesis

Stroke is identified as the third leading cause of death by Bilder et al. (2017), however Elder et al. (2016) and Sprig & Mitchell (2015) identify stroke as the fourth leading cause of death in the United States. The implication of this inconsistency is that through the years, stroke prevalence has increased such that it has moved up from the fourth leading cause in 2013 to the third leading cause in 2017, meaning that these are areas of focus in more education about stroke and prevention measures.

Recombinant tissue plasminogen activator (rt-PA), otherwise known as the Food and Drug Administration (FDA) approved, pharmaceutical intervention, Alteplase, was maximized stated to be the primary standard treatment for acute ischemic stroke (Emerson et al., 2014; Lang et al., 2014; Elder et al., 2015; Sprig & Mitchell, 2012; Jove et al., 2014; Zerna et al., 2010; Campbell et al., 2019; Tennyson et al., 2019; Tran et al., 2019; Jaffe et al., 2019; Kimmel et al., 2019; Zerna et al., 2018). Zerna et al. (2018) identified that approximately 25% of all ischemic strokes are eligible for thrombolytics, however Bilder et al. (2017) states that fewer than 5% of patients who are eligible for acute treatment actually receive intravenous thrombolytic drugs. Zerna et al. (2018) states that they have found no average benefit of Alteplase administration over 2.70 minutes, or 6 hours, from stroke symptom onset and feel that to be the time at which the medication approaches a neutral effect, as where Emerson et al. (2014) estimated the time at which Alteplase has no effect to be 6.3 hours. Risk versus benefit of Alteplase administration was not as heavily discussed throughout the literature as one would assume given that it carries severe and potentially life-threatening side effects such as bleeding and subsequent intracranial hemorrhage (Genentech USA, 2019). Campbell et al. revealed that “the number of patients with symptomatic intracranial hemorrhage was significantly higher in the alteplase group than the placebo group... however, no significant differences were identified in mortality” (2019, p. 113).

Methods

(Plan) The cycle begins with observing the current process and creating a new workflow for approval by the stroke committee and emergency department management.
(Do) Once this is approved, education can be dispersed, and the implementation can be brought about.
(Very) After a short period of implementation, the new workflow should be observed again and feedback from staff as well as metrics should be collected and assessed.
(Act) Finally utilizing this data and staff feedback, the workflow should be modified as needed, if applicable, and new education provided throughout.

The projection as shown in the run chart is that the current door to Alteplase time frame, while currently acceptable, continues to trend shorter to ensure the best possible patient outcomes to a goal of 15 minutes or under by 2021.

Hypothesis Statement

In patients with acute ischemic stroke symptoms arriving via personal vehicle to the emergency department, does the use of an improved stroke workflow and a standardized order set as opposed to the use of the workflow to the emergency department, does the use of an improved stroke workflow and a standardized order set as opposed to the use of the door to Alteplase time as measured in minutes?

Objectives

- The overall aim of my capstone project is to decrease the time from door to Alteplase (tPA) administration in applicable patients arriving to the emergency department via personal vehicle in a community hospital.
- This overarching goal was to be met through the following objectives:
  - Identify the areas of delay throughout the previous stroke process
  - Find solutions to overcome these delays to insert logically into the workflow
  - Reorganize the workflow to prioritize obtaining the head CT before any other ancillary tasks
  - Improve interdisciplinary communication throughout the department about stroke patient arrivals and treatment.

Results & Outcomes

The new workflow was developed, but in further discussion with the hospital stroke committee it was suggested that we look into a nurse driven approach which would allow the triage nurse to initiate the stroke alert process and take the patient to CT.

Delays in Acute Stroke Care.

Significance

A single walk-through of the new workflow was completed by the primary stroke coordinator with the unit educator on a single patient and had successful outcomes. As shown in the comparison chart below, the revised workflow significantly reduced the times from door to intervention as compared to the previous quarter’s average times.

Discussion

The implementation of this project was not abandoned; we developed written and virtual education in the form of a pocket card for staff with the streamlined new workflow and a more in-depth powerpoint presentation explaining the reason for the change and the semantics of the workflow.

References

- Zerna, C., Thomalla, G., Campbell, B. C. V., Joung Min, Y., Iwatsubo, T., et al. (2018). Target: Stroke Initiative Results in Improved Door to Needle Time (DTN) and Improved Outcome in Predetermined Subgroups of Patients with Acute Ischemic Stroke. JAMA Neurology, 75(8), 1076-1083.