Background

New Hanover Regional Medical Center (NHRMC) is a DNV Primary Stroke Center with a service area encompassing the seven-county region of Southeastern North Carolina. Sitting in the buckle of the stroke belt, where stroke ranks third as the cause of death in the county, the organization recognized the need to create a highly functional stroke center to provide optimal care to our community. Current research emphasizes the importance of early, timely treatment with alteplase with the goal of treatment less than 60 minutes “door-to-needle”. Despite the proven benefits, recommendations, and goals for timely administration there was evidence of variation prompting our organization and Stroke Team to evaluate the “door-to-needle” time and utilization of alteplase in ischemic stroke care.

Utilizing Lean methodology, the team evaluated the current state of stroke treatment at NHRMC. During 2010 to 2014 the team identified that NHRMC admitted nearly 1000 stroke patients annually. Additionally, during the same timeframe, alteplase was rarely given (8-30 patients per year) and patients were usually treated beyond the recommended guidelines of 60 minutes.

Objectives

The focus of the team was to examine the stroke care process from the initial activation throughout the continuum. The team mapped out the flow of stroke patients and completed a value-stream analysis by examining each step in the process. The Stroke Team care goals were to:

- increase the percentage of eligible stroke patients who received treatment with alteplase
- decrease the median time to treatment below the national standard of 60 minutes from hospital arrival, ideally below 45 minutes

Methods

- Use of Lean problem solving and PDSA methodology to identify opportunities for improvement and implement countermeasures
- Development of a multidisciplinary Stroke Team
- A “Code Stroke” process was developed and refined with specific activation criteria
- Key strategies implemented to reduce treatment times included:
  - Pre-hospital activation of “Code Stroke” by EMS promoting a streamlined process for assembling the stroke team prior to the patient’s arrival
  - Establishment of IV access and collection of labs in the field prior to hospital arrival
  - Creation and implementation of rapid “pit stop” assessment and evaluation immediately upon ED arrival
  - The stroke patient is left on the EMS stretcher and evaluated by a dedicated “Code Stroke” response team to include: Stroke RNs, Pharmacists, ED physicians, and Neurologists, then transported to CT for imaging
  - Pharmacists prepare IV alteplase to be administered in the CT suite
- Weekly “Stroke Huddle” was implemented to review cases, celebrate successes, and identify opportunities for improvement This “real-time” assessment of clinical care allows for follow-up on current issues, loop closure, and process review creating a rapid PDSA mechanism
- Presentation and review of cumulative data monthly by the Stroke Steering Committee to identify trends

Results

- Patients treated with alteplase increased 500%, from 30 patients per year (2014) to 147 patients (2017)
- Median alteplase treatment times were reduced by 45%, from 63 minutes (2014) to 35 minutes (2017)
- Percentage of patients who received alteplase in less than 45 minutes at NHRMC was 73.4% (2016 – Feb 2018), compared to 38% nationally and 37.8% in NC hospitals participating
- Risk adjusted mortality was 1.5% for NHRMC, 2.6% for all hospitals and 3.5% for NC hospitals
- Bleeding complications from alteplase were 3% for NHRMC, 3.9% nationally and 3.8% in NC

* AHA/ASA Get With the Guidelines Stroke registry

Conclusion

Utilizing Lean process improvement methodology and rapid cycle PDSA, the NHRMC Stroke Team advanced stroke care and patient outcomes without compromising patient safety. Integrating strategies that engage the interdisciplinary team, support collaboration, and clearly defined roles and responsibilities are critical to the success of the program. Incorporation of data collection and analysis with evidence-based recommendations allowed the team to translate guidelines into clinical practice.

Increasing treatment rates while decreasing treatment times improved patient outcomes and eliminated the fragmentation previously observed in the system of care. The continued goal of the NHRMC Stroke Team is to decrease stroke mortality, while improving outcomes and stroke care in our region.

Reference

2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

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