



Implementation of Best Practices - Developing and Optimizing Regional Systems of Stroke Care: Design and Methodology

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Matthew E Ehrlich, Brad J Kolls, Mayme Roettig, Lisa Monk, Shreyansh Shah, Ying Xian, James G Jollis, Christopher B Granger, Carmelo Graffagnino; Implementation of best practices - Developing and optimizing regional Systems of Stroke Care: Design and methodology. American Heart Journal (2020), <https://doi.org/10.1016/j.ahj.2020.01.004>.



WHY? THIS IS WHY!

- ▶ 80 year old
- ▶ No significant baseline medical history
- ▶ LKN: 2030
- ▶ Spouse heard patient fall @ 0230 and called EMS
- ▶ Aphasia, complete right-side weakness, and neglect
- ▶ tPA: Out of window
- ▶ LVO
- ▶ D2R: 103 minutes
- ▶ DC' d home no deficits

- ▶ **Rode 52 miles in the MS RACE this year**
- ▶ **Last year rode 80+ miles in the MS RACE**



Objectives

- ▶ Discuss the IMPROVE Stroke Care Project
- ▶ Review the IMPROVE Stroke Design Manuscript



AHA Guidelines Stroke Systems of Care



- ▶ Recommend developing multi-tiered systems for the care of patients with acute stroke.
- ▶ An ideal stroke system of care ensures that all patients receive the most efficient and timely care, regardless of how they first enter the medical system.
- ▶ Coordination among the components of a stroke system is the most challenging but most essential aspect of any system of care.

IMPROVE Goal



- ▶ The purpose is to:
 - ▶ identify the ways in which stroke care systems can be optimized
 - ▶ provide evidence on which process optimization steps result in better patient outcomes.
- ▶ The goal is to develop a regional integrated stroke care system that:
 - ▶ identifies
 - ▶ classifies
 - ▶ treats acute ischemic stroke patients more rapidly and effectively with reperfusion therapy.
- ▶ We aim to improve:
 - ▶ public stroke awareness, stroke symptom recognition and EMS activation, EMS transportation efficiency
 - ▶ The proportion that receive reperfusion therapy and reversal agent for intracerebral hemorrhage associated with anticoagulant use
 - ▶ The speed of delivery of those therapies
- ▶ Our model is based on the hypothesis that optimization of the early chain of care will improve patient outcomes.
- ▶ These improvements in acute stroke care delivery are expected to result in lower mortality, fewer recurrent strokes, and improved long term functional outcomes.
- ▶ The impact of implementation of stroke systems of care on mortality and long-term functional outcomes will be measured.

► SYSTEM IMPLEMENTATION PROCESS

1) Develop leadership, funding, data collection and feedback structure

2) Establish regional referral centers (STEMI, cardiac arrest, stroke)

3a) Hospital by hospital establishment of plan (review, consensus, training)

3b) EMS by EMS establishment of plan (review, consensus, training)

4) Test and refine how to implement/improve

Measure baseline and quarterly key process data



Methods



- ▶ Identify gaps and barriers to implementation of stroke systems of care
- ▶ Leverage existing resources within the regions
- ▶ Aid in designing strategies to improve care processes
- ▶ Bring regional representatives together to agree on and implement best practices, protocols, and plans based on guidelines
- ▶ Establish methods to monitor quality of care

Stats



- ▶ Stroke remains the 5th leading cause of death² and a leading cause of disability in the United States
- ▶ Intravenous tissue plasminogen activator (tPA) was the only approved therapy for treatment of acute ischemic stroke until 2015
- ▶ The benefits of tPA were demonstrated nearly 25 years ago
- ▶ The number of stroke patients treated with thrombolytics remains at 3-8% nationwide, and only 60-70% of eligible patients
- ▶ Many stroke patients are outside the time window for tPA
- ▶ In 2015 supportive data was published for thrombectomy

Barriers

- ▶ Challenges in diagnostics
- ▶ Limited availability of expertise
- ▶ Limited access to new and expensive anticoagulant reversal agents
- ▶ Limited numbers of facilities capable of emergent thrombectomy
- ▶ **Competition and Financial Issues**
- ▶ **Data Collection and Clinical Outcomes**
- ▶ **Lack of Standardized Protocols**



Process Improvement and System Optimization



- ▶ AHA/ASA acute stroke guidelines
- ▶ Proven effective approaches that have been used to develop regional systems of care for trauma, STEMI and of out-of-hospital cardiac arrest.
- ▶ Same strategies and lessons learned from the AHA's "Target: Stroke"
- ▶ Integrate technologies including communication platforms, imaging, and advanced therapeutic interventions
- ▶ Process measure elements that reflect best care will be collected and fed back in near real-time to drive practice improvement.

Creating an Integrated Stroke System of Care



- ▶ A consortium of collaborating stroke centers in the Southeast U.S. were selected to participate in the program
- ▶ Centers were selected based on:
 - ▶ their location
 - ▶ thrombectomy capabilities
 - ▶ Telestroke services
 - ▶ strong administrative support
 - ▶ established relationship with EMS agencies
 - ▶ a balance of urban and rural networks
 - ▶ volume of acute stroke patients
 - ▶ presence of a well-developed vascular neurology program
 - ▶ willingness to commit to work with other centers in the regional plan
 - ▶ the ability to use a common database.



Carolinus Medical Center
Carolinus HealthCare System



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9 Hub, 46 Spoke
++ 911, Fire, & EMS

Standardizing Best Medical Practices Manual of Operations



- ▶ Created to provide a unifying framework of best practices
- ▶ Allowing all providers to focus, and to disseminate evidence-based and best-practice guidelines for implementation of advanced regional stroke care.
- ▶ Is a “living” document
 - ▶ frequently updated with new knowledge and best practice consensus as they are learned within the consortium,
 - ▶ allowing the level of evidence for any recommendation to climb as implementation of these recommendations are instituted and their efficacy evaluated with near real-time data collection and analysis.

Data Collection, Feedback and Clinical Outcomes



- ▶ Data will be collected to enable assessment of performance and opportunities for improvement at each level of care.
- ▶ Initial data collection will also include retrospective baseline data.
- ▶ Prospective data will be collected through manual chart review and abstraction
- ▶ In order to affect change in a meaningful way, participating centers will need to have real-time feedback in terms of their performance metrics.
- ▶ There will be regular review of local teams to review data and refine processes.
- ▶ Feedback will be provided on several levels:
 - ▶ to the team caring for each patient (including EMS and referral ED within 24 hours)
 - ▶ to the regional leadership team including aggregate data once a month
 - ▶ across regions to review aggregate data and trends quarterly.

Community Engagement Through Targeted Education



- ▶ Early stroke symptom recognition and timely activation of EMS services via the 911 call system is a cornerstone of acute stroke care
- ▶ 75% of patients presenting with acute stroke did not correctly interpret the nature of their symptoms
- ▶ 63% did not feel that symptoms were serious
- ▶ Mode of transportation to hospital also has significant impact on time to reperfusion therapy, with patients presenting by EMS having shorter door to treatment times.
- ▶ Sites are asked to report monthly their community events

Summary



- ▶ The IMPROVE Stroke Care program, is an implementation science program with a core goal to improve regional stroke care within the 9 hub-and-spoke systems selected across four states utilizing systemic efficiencies and cooperation to identify and implement best-practices for more rapid reperfusion therapy delivery to improve stroke outcomes.
- ▶ These improvements in acute stroke care delivery are expected to result in lower mortality, fewer recurrent strokes, and improved long term functional outcomes.



HOLY STROKES

