

Quality Improvement: Responding to In-house Stroke STAT Calls

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Purpose and Rationale:

Responding to acute out-of-hospital stroke (OHS) is a frequent and common occurrence for most Emergency Department nurses. Responding to acute in-house stroke (IHS) is infrequent and unfamiliar for most floor nurses on non-neurological services. In our 867-bed Comprehensive Stroke Center tertiary care hospital, IHS accounts for 12 – 15% of the annual stroke team calls. Key to stroke management is timely and efficient care, but stroke recognition, assessment and treatment is often delayed for IHS. The typical IHS is in the hospital for surgical procedures or cardiac disorders.¹⁻³ Staff unfamiliar with the onset of stroke may not immediately recognize stroke symptoms or attribute them to other causes. Further delays can occur due to a lack of knowledge of stroke code procedures by staff from different services.

Quality Improvement Initiative:

Staff from the Stroke Unit's step down recognized the need for expert stroke nurses to respond to stroke STATs to assist the bedside nurse and Neurology responder for optimal patient outcomes. To this end, staff developed and implemented a protocol in which the expert stroke nurses from the Stroke Unit's SD respond to stroke STAT calls throughout the hospital.

Review of the Literature:

Of utmost importance in acute stroke is avoidance and reduction of delays in decision making and treatment. For every minute a stroke goes untreated, 1.9 million neurons, 14 billion synapses and 12 km (7.5 miles) of myelinated fibers are destroyed. In other terms, the brain ages 3.1 weeks per minute or 3.6 years per hour when treatment is delayed.⁴ Compared with OHS, patients with IHS generally wait longer for stroke recognition and assessment (2 hrs vs 1.2 hrs), imaging (4.5 hrs vs 1.2 hrs) and are treated less often with thrombolysis (12% vs 19%).^{3,5} While stroke onset may be witnessed in a majority of IHSs, delays are attributed to initial contact with Neurology¹ and time to CT scan⁶.

Patients with IHS tend to have more severe strokes with worse outcomes.^{5,7-8} Moradiya and Levine found that even after multivariate analysis, inpatient mortality and favorable discharge outcome remained significantly worse in IHS.⁷ IHS patients tend to be older and have multiple medical conditions. Many authors reinforce that reduced delays and improved treatment rates will subsequently improve outcomes.

Methods/Procedures:

The Stroke Unit SD staff created objectives, specified roles and developed resources. Prior to this, the only responders to Stroke STATs were Neurology residents and the patient's nurse. Staff created educational packets which included objectives for Stroke STAT response, review material and a structure to record data.

In the new protocol, the Resource Nurse in SD carries a stroke beeper 24/7. The SD nurse responds immediately to the IHS Stroke STAT. Protocols, the NIH-Stroke Scale and necessary documentation can be brought with the responding nurse as reference. SD nurses guide and support the bedside nurse, and educate the patient and family on what is happening. They assist in getting to CT scan quickly and promote transfer to a higher level of care if needed. To evaluate the effect of the change in protocol, times from onset to beeper call and call to CT were compared for the pre and post groups using Wilcoxon Ranked Sum tests; with only 10 patients receiving IV tPA treatment, times for call to treatment are presented descriptively only.

Results:

The Stroke STAT Response protocol went live on July 22, 2015. Times for the essential tasks required for decision making were compared pre- and post-intervention - August 1, 2014 - March 31, 2015 and August

1, 2015 – March 31, 2016. There were 85 IHS calls pre-intervention and 80 calls post. Four IHS patients were treated with tPA in the pre-intervention group and 6 post. The median (interquartile range) times per task, percentage of change and p values are below. While no statistical significance was found, decreases in time to treatment are clinically relevant.

	N	Pre	N	Post	% reduction	p
Onset to call	68	21 (5,50)	74	11 (3.75,30)	47.6%	0.151
Call to CT	64	42 (24,62.75)	65	32 (21.5,51)	23.8%	0.096
Call to IV tPA	4	82.5 (50.75,138.25)	6	68.5 (60.75,93.5)	17%	N too small

It was also observed that documentation of onset improved from 87.5% to 96.3%.

Discussion/Application to Practice:

Small reductions in time to treatment have the potential to result in significant and robust health benefits over patients' lifetimes. Using stroke experts to care for patients as a team in a timely fashion provides comprehensive quality care and utilizes internal resources to their full potential.

Outcomes of this project have been positive. Anecdotally, nurses feel more supported with SD staff responding to Stroke STATs. Time from onset to call, CT and treatment decreased as physicians were able to make treatment decisions sooner with nurses working in tandem with the physician. It gives the SD nurses a feeling of autonomy as they are able to share their expertise hospital-wide. And it gives patients and families the highest quality care they deserve.

References:

1. Vera, R, et al. (2011). In-hospital stroke: a multi-centre prospective registry. *Eur J Neurol*, 18(1):170-6.
2. Cumbler, E, Murphy, P, Jones, WJ, Wald, HL, Kutner, JS, and Smith, DB. (2011). Quality of care for in-hospital stroke: Analysis of a statewide registry. *Stroke*, 42:207-10.
3. Masjuan, J, et al. (2008). In-hospital stroke treated with intravenous tissue plasminogen activator. *Stroke*, 39:2614-16.
4. Saver, JL. (2006). Time is brain – Quantified. *Stroke*, 37:263-66.
5. Saltman, AP, Silver, FL, Fang, J, Stamplecoski, M, and Kapral, MK. (2015). Care and outcomes of patients with in-hospital stroke. *JAMA Neurol*, 72(7):749-755.
6. Garcia-Santibanez, R, Liang, J, Walker, A, Matos-Diaz, I, Kahkeshani, K and Boniece, I. (2015). Comparison of stroke codes in the emergency room and inpatient setting. *Journal of Stroke and Cerebrovascular Diseases*, 24(8):1948-1950
7. Moradiya, Y, and Levine, SR. (2013). Comparison of short-term outcomes of thrombolysis for in-hospital stroke and out-of-hospital stroke in United States. *Stroke*, 44:1903-08.
8. Cumbler, E, et al. (2014). Quality of care and outcomes for in-hospital ischemic stroke. *Stroke*, 45:231-38.