

Stroke Alert Study: A Retrospective Evaluation of Stroke Alert Activations and Outcomes at the University of Colorado Hospital

Background: Stroke Alert (SA) protocols are being implemented across the country in order to establish an expedited means of evaluation for patients presenting with possible acute ischemic stroke (AIS). These protocols have been successful in improving time to diagnosis, and therefore have improved access to thrombolytic therapies within the necessary window of treatment (8). There are widely varying reports of stroke alert activation sensitivity and specificity for true ischemic stroke between different hospital systems and different activation settings (prehospital, emergency department (ED), inpatient). Given that SA protocols are a use of hospital resources and may lead to unnecessary diagnostic tests or treatments, we aim to evaluate trends among prehospital, ED, and inpatient SAs in order to identify predictors of stroke mimics and other characteristics that might further inform decisions to activate an alert.

Methods: This is a retrospective observational study of adult Stroke Alert activations at the University of Colorado Hospital. Data collected includes patient demographics, symptoms triggering a SA, stroke risk factors, initial neurologic evaluation data, final diagnosis and clinical outcome.

Results: Preliminary data analysis of 200 stroke alert patients over a 3-month period in 2019 revealed a true stroke diagnosis in 33% of alerts and mimics in 67%. The vast

majority (79%) of the institution's stroke alerts were activated in the ED. The most common presenting symptoms, alone or in combination with other symptoms, were unilateral weakness (37%), aphasia (17%), altered mental status (17%) and facial droop (15%). Initially paged symptoms included two or more symptoms in 39% of cases. True stroke was significantly associated with older age ($p = 0.029$). Stroke mimics were significantly associated with female sex (57% female, 43% male, $p = 0.01$ OR 2.222 (95% CI 1.2 – 4.1)). Unilateral weakness was the only presenting symptom significantly associated with true stroke ($p = .005$, OR 2.410 (95% CI 1.3 – 4.5)). Additionally, presentation with two or more symptoms was significantly associated with true stroke, with 55% of true strokes presenting with two or more symptoms and only 32% of mimics presenting as such ($p = .002$, OR 2.615 (95% CI 1.4 – 4.8)).

Conclusions: The UCH institution has 67% of stroke alert patients ultimately diagnosed with a stroke mimic. This preliminary result reveals a higher-than-average stroke mimic rate within SA activations compared to rates reported by other institutions, which may be related to a relatively low-threshold system in place at this institution. Female patients were more likely to be presenting with a mimic rather than a true stroke, while older patients and those presenting with unilateral weakness and/or greater than one symptom were more likely to have true stroke. Additional data collection and analysis is needed in this study in order to further qualify these findings and determine ways in which they can inform future stroke alert protocol and staff education.