

Rapid Identification of Large Vessel Occlusion Stroke Subtype in the Pre-Hospital Setting

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Background and Hypothesis:

Stroke treatment is highly time-sensitive, with an estimated 1.9 million neurons dying per minute during an untreated ischemic stroke. The recent advent of mechanical thrombectomy (MT) and its illustrated safety and efficacy in treating large vessel occlusion (LVO) strokes has generated a need to rapidly identify LVO patients who may otherwise be brought to the nearest hospital, which may not have the capability to perform the procedure. Accurate identification of LVO in the pre-hospital setting would allow immediate EMS transport to an MT-capable Comprehensive Stroke Center, thus reducing time-to-treatment and improving patient outcome. While various grading scales, such as the C-STAT, have been developed for this purpose, all have shown to lack sensitivity and specificity for accurate LVO determination. We hypothesize that a new scale combining common LVO presentations as positive values and those of other stroke subtypes, such as small vessel occlusion (SVO) and cardioembolic stroke (CE), as negative values will increase the accuracy of LVO determination.

Methods:

This is a retrospective chart review analysis of 86 patients evaluated for stroke between January 2017-May 2018 at the Parkview Regional Medical Center with imaging confirmed LVO, SVO or CE diagnoses.

Results:

C-STAT stroke scale had a sensitivity of 54.5% and a specificity of 86.7% in differentiating LVO from other stroke subtypes. Compared to C-STAT, our new model showed a significantly higher sensitivity of 81.8% ($p=0.0038$) and a non-significant decreased specificity of 75.0% ($p=0.061$).

Conclusion:

Our findings suggest that our new scale combining common clinical presentations in LVO stroke patients as positive predictor values and those in SVO and CE stroke patients as negative predictor values may allow for a more accurate determination of LVO stroke in the pre-hospital setting without significant delay. A prospective, larger patient cohort in a pre-hospital setting is needed to validate these findings.