



Impact of Smartphone Applications on Timing of Endovascular Therapy for Ischemic Stroke: A Preliminary Study

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■ **BACKGROUND:** The metrics of imaging-to-puncture and imaging-to-reperfusion were recently found to be associated with the clinical outcomes of endovascular thrombectomy for acute ischemic stroke. However, measures for improving workflow within hospitals to achieve better timing results are largely unexplored for endovascular therapy. The aim of this study was to examine our experience with a novel smartphone application developed in house to improve our timing metrics for endovascular treatment.

■ **METHODS:** We developed an encrypted smartphone application connecting all stroke team members to expedite conversations and to provide synchronized real-time updates on the time window from stroke onset to imaging and to puncture. The effects of the application on the timing of endovascular therapy were evaluated with a secondary analysis of our single-center cohort. Our primary outcome was imaging-to-puncture time. We assessed the outcomes with nonparametric tests of statistical significance.

■ **RESULTS:** Forty-five patients met our criteria for analysis among 66 consecutive patients with acute ischemic stroke who received endovascular therapy at our institution. After the implementation of the smartphone application, imaging-to-puncture time was significantly reduced (preapplication median time, 127 minutes; postapplication time, 69 minutes; $P < 0.001$). Puncture-to-reperfusion time was not affected by the application use (42 minutes vs. 36 minutes).

■ **CONCLUSION:** The use of smartphone applications may reduce treatment times for endovascular therapy in acute ischemic stroke. Further studies are needed to confirm our findings.

INTRODUCTION

Multiple randomized controlled trials (RCTs) have demonstrated the efficacy and safety of endovascular treatment for acute ischemic stroke secondary to large vessel occlusions.¹ Subsequent studies have established multiple predictors of functional outcomes after endovascular treatment, including age, preoperative clinical status, infarct volume, and, most importantly, the timing of endovascular intervention—a modifiable factor.^{2,3} Accordingly, streamlining of the current protocols for patient assessment, transfer, and imaging has become a top priority at many large stroke centers.

Mobile and smartphone applications for stroke are an evolving technology, the important of which has been highlighted recently by the American Heart Association in a scientific statement.⁴ Smartphone applications have been evaluated previously for improving tele-stroke communications in prehospital assessments,⁵ transferring neuroimaging,⁶ and monitoring patients after stroke.⁷ To our knowledge, the impact of smartphone applications on the timing of endovascular therapy has not yet been explored in the literature. Therefore, the aim of this preliminary study was to examine our institutional experience with a novel smartphone application, developed in house, to improve our timing metrics for endovascular treatment in acute ischemic stroke.

Key words

- Application
- Endovascular
- Mobile
- Smartphone
- Stroke
- Thrombectomy

Abbreviations and Acronyms

- CT:** Computed tomography
IV-tPA: Intravenous thrombolysis with tissue plasminogen activator
RCT: Randomized controlled trials
TICI: Thrombolysis in cerebral infarction

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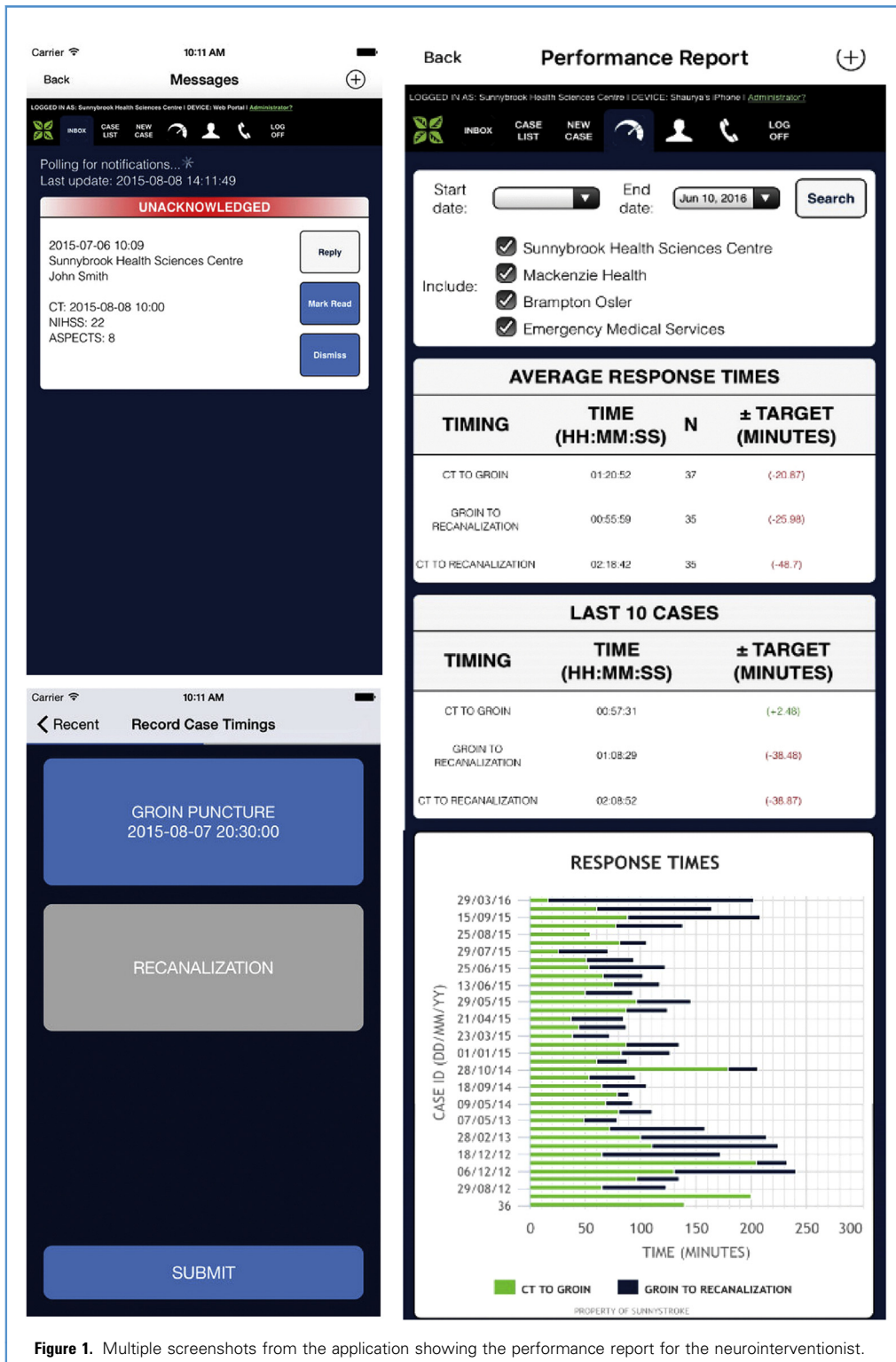


Figure 1. Multiple screenshots from the application showing the performance report for the neurointerventionist.

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