Introduction: Intra-arterial therapy (IAT) is a recent breakthrough in acute stroke treatment. Results from the EXTEND-IA, ESCAPE and MRCLean trials revealed IAT is superior to intravenous (IV) tissue plasminogen activator (tPA) alone for treating patients with large-vessel occlusions. IAT usually involves guiding a catheter to the occlusion site to remove the clot. Success of recanalization is judged using the modified thrombolysis in cerebral ischemia (TICI) scale on post-treatment digital subtraction angiography (DSA) images – with scores of 2b or 3 indicating near-complete or complete recanalization respectively. However, recanalizing blocked arteries does not always lead to reperfusion of the ischemic tissue or good functional outcomes (defined as modified Rankin score (mRS) between 0-2, indicating minor disability and no loss of independence). In three major IAT clinical trials, ~16% of IAT-treated patients had TICI scores of 2b or 3 but still suffered poor clinical outcomes. It is possible that post-procedural CT Perfusion (CTP) could help identify patients who may have poor functional outcomes due to incomplete tissue reperfusion after IAT. Therefore, the objective of this study is to determine the association between reperfusion and clinical outcomes in a group of IAT-treated ischemic stroke patients who underwent successful recanalization (TICI 2b or 3).

Methods: Ischemic stroke patients treated with IAT received admission CTP, 24hr follow-up CTP, and post-procedural DSA. Ischemic tissue volume was quantified on admission and 24hr CTP images using predetermined time-to-max (Tmax) thresholds from our group’s prior research. The difference in ischemic tissue volume from admission to 24hr post relative to the admission volume was used to quantify reperfusion scores. The association between good functional outcome and reperfusion score was evaluated using logistic regression and ROC analysis.

Preliminary Results: CTP images were generated for 13 patients with mRS scores ranging from 0-5. The mean reperfusion scores for patients with good (n = 7) and poor (n = 6) functional outcomes were 0.93 ± 0.02 and 0.61 ± 0.17 respectively. Reperfusion scores and functional outcomes were imported into Matlab for ROC analysis. The AUC of the ROC curve was 0.70, and the optimal operating point of the curve had a sensitivity of 0.67 and a specificity of 1.

Conclusion: CTP may help identify patients who in future will report poor functional outcomes due to impaired tissue reperfusion after IAT.