Background Delayed functional independence (DFI) in patients who do not experience early improvement after endovascular thrombectomy (EVT) is commonly observed in clinical practice. Recent studies suggest that the rate of DFI is approximately 30%. Younger age, lower discharge NIHSS score, and absence of any hemorrhage are independent predictors of DFI. We aim to validate the recently reported DEFIANT score to predict delayed functional improvement in the TIGER Study.

Methods Demographic, clinical, radiological, treatment, and procedural information were analyzed from Tiger Trial (patients with complete data and undergoing EVT for anterior circulation LVO). Incidence of delayed functional independence (DFI, mRS score 0–2 at 90 days in non-EFI patients) was analyzed and the DEFIANT score was validated in the TIGER study. The DEFIANT score incorporates age, discharge NIHSS score, and presence/absence of any hemorrhage at discharge (Online calculator: https://bit.ly/3KZRvq5) probability of DFI = $e^{(3.9699 - (0.0359 \times \text{age}) - (2.276 \times \text{discharge NIHSS}) - (0.6013 \times \text{hemorrhage})/\left[1 + e^{(3.9699 - (0.0359 \times \text{age}) - (2.276 \times \text{discharge NIHSS}) - (0.6013 \times \text{hemorrhage})}\right]}$

Results A total of 137 patients met study criteria. DFI was observed in 38% (30/79) of non-early improvers (79/137). Receiver operating curves for the DEFIANT score showed a robust capacity to predict delayed functional independence (using optimal cut-off of 0.42 for predicting DFI) (figure 1: area under the curve 0.775). The DEFIANT score had sensitivity 69%, specificity 86%, positive predictive value 74%, and negative predictive value 87% for detecting DFI. If the TIGER study had stopped follow-up for outcomes at discharge and used the DEFIANT score, rate of predicted 90-day mRS 0–2 would be similar to actually observed 90-day mRS 0–2 (60.5% vs 61.3%, p=0.90).

Conclusion The DEFIANT score, utilizing readily available variables such as age, discharge NIHSS score, and presence/absence of any hemorrhage, is a reliable tool to predict the probability of delayed functional independence after stroke thrombectomy.


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Background Adjunct intra-arterial tPA following successful reperfusion with mechanical thrombectomy (MT) has been reported to improve outcomes. We sought to evaluate the impact of pre-procedural IV-tPA on functional outcomes after achieving full reperfusion with MT.

Methods A prospectively collected MT database from October 2010 to June 2021 was reviewed. Patients were included if they had anterior circulation large vessel occlusion strokes secondary to ICA or MCA-M1/M2 occlusion, pre-morbid modified Rankin Scale ≤2, last known well (LKW) to puncture time ≤6 hours, and baseline extended Thrombolysis In Cerebral Infarction (eTICI) score of 0. The cohort was divided into two groups: bridging (pre-procedural IV-tPA plus MT) and non-bridging (MT alone) groups. Matching analysis was performed to balance the two groups. Subgroup analysis was performed to identify the effect size of pre-procedural IV-tPA on functional independence (90-day mRS0–2) as a function of robust capacity to predict delayed functional independence (using optimal cut-off of 0.42 for predicting DFI) (figure 1: area under the curve 0.775). The DEFIANT score had sensitivity 69%, specificity 86%, positive predictive value 74%, and negative predictive value 87% for detecting DFI. If the TIGER study had stopped follow-up for outcomes at discharge and used the DEFIANT score, rate of predicted 90-day mRS 0–2 would be similar to actually observed 90-day mRS 0–2 (60.5% vs 61.3%, p=0.90).

Conclusion The DEFIANT score, utilizing readily available variables such as age, discharge NIHSS score, and presence/absence of any hemorrhage, is a reliable tool to predict the probability of delayed functional independence after stroke thrombectomy.
Background Endovascular therapy (ET) has been established as the gold standard in the management of anterior circulation large vessel occlusion strokes (LVOS) up to 24 hours from symptoms onset. However, despite high odds of successful recanalization and improved clinical outcomes, up to 50% of treated patients do not achieve favorable functional outcomes. Being able to reliably identify patients that would benefit from thrombectomy is paramount. Artificial intelligence (AI) and machine learning (ML) tools have gained increasing popularity in stroke outcome prognostication due to their flexibility, easy implementation, and high performance. Using a large comprehensive stroke center registry, we sought to apply various ML techniques to predict 90-day outcomes after stroke ET.

Methods We used individual patient data from our prospectively collected thrombectomy database between 09/2010 and 03/2020. Patients with anterior circulation LVOS and complete 90-day outcome data were included. A random forest imputation algorithm was used for missing data. Our primary outcome was 90-day functional independence (defined as modified Rankin Scale score 0–2) and secondary outcome was 90-day mortality. Pre- and post-procedure models including clinical and neuroimaging parameters were developed. Several high performing classification algorithms were implemented (Logistic Regression, Elastic Net Regression, Support Vector Machine, Random Forest, Gradient Boosting, K-nearest neighbors, Naive Bayes, and Artificial Neural Network) were implemented using a random 70%/30% training-test data split and 10-fold repeated cross-validation with 5 iterations on the training data for model calibration. Discriminative performance was evaluated using the area under the receiver operator characteristic curve (AUC) metric.

Results 1231 patients were included in the analysis split into training set (n= 861) and test set (n= 370). In the training data, 49.6% of the patients achieved independence at 90-days while 13.7% were dead. For functional independence prediction, the Elastic Net algorithm was the best performing on both pre-and post-procedure parameters with an AUC of 0.766 and 0.784 respectively. For mortality prediction, the Random Forest algorithm was the top performing model on the pre-procedure data (AUC=0.750) while the Artificial Neural Network algorithm performed best on post-procedure data (AUC=0.767). The inclusion of post-procedure information resulted in an improved discriminative performance for all developed algorithms. The prognostication models are made available in a web-based graphical user interface for easy use.

Conclusions Our pre-and post-procedural models reliably estimated clinical outcomes in stroke patients undergoing thrombectomy. They represent a step forward in creating simple and efficient prognostication tools to aid treatment decision-making.

Disclosures M. Bouslama: None. L. Pisani: None. D. Haussen: 2; C; Stryker, Vaselio, 4; C; Viz.AI. A. Al-Bayati: 2; C; Stryker Neurovascular. R. Nogueira: 2; C; Stryker Neurovascular,Cerenovus, Medtronic, Phenox, Anaconda, Genentech, Biogen, Prolong Pharmaceuticals, Imperative Care. 4; C; Brainomix, Viz-AI, Corindus Vascular Robotics, Vaselio, Ceretrieve, Astrocyte and Cerebrotech.

O-024 QUANTITATIVE ASSESSMENT OF DEVICE-CLOT INTEGRATION STRENGTH FOR THROMBECTOMY

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Introduction Both aspiration catheters (when clot ingestion is not achieved) and stent retrievers apply tensile force during device withdrawal to dislodge and remove clots. As the tensile force exceeds the device-clot integration strength (DCIS), the clot will disintegrate from the device and embolize. In this study, we aim to propose a standardized