Prediction score

A “prediction score” refers to a metric that evaluates the accuracy or effectiveness of a predictive model in machine learning or statistics.

Accuracy: The proportion of correct predictions over the total predictions, ideal for balanced datasets.

Precision: Measures how many of the predicted positive cases are actually positive, useful when false positives are costly.

Recall (Sensitivity): Indicates how well the model captures actual positive cases, important in scenarios where false negatives are critical.

F1 Score: The harmonic mean of precision and recall, ideal for imbalanced datasets where both false positives and false negatives matter.

AUC-ROC (Area Under the ROC Curve): Shows how well the model distinguishes between classes, with 1.0 as perfect separation and 0.5 as random guessing.

Log Loss: Assesses the certainty of predictions, where lower values indicate better performance, useful in probabilistic models and multiclass classification.

Each of these scores helps gauge different aspects of model performance based on the specific goals and data structure.

Matsukawa et al. aimed to develop and validate a prediction score for futile recanalization (FR) for large vessel occlusion (LVO) presenting low Alberta Stroke Program Early Computed Tomography Score (ASPECTS) for patients who underwent endovascular thrombectomy (EVT).

Methods: Patients with anterior circulation LVO with low ASPECTS (<6) who underwent successful EVT (modified treatment in cerebral ischemia score ≥2b) from Stroke Thrombectomy and Aneurysm Registry were retrospectively analyzed. FR was defined as 90-day modified Rankin Scale (mRS) scores ≥4 despite successful EVT. Multivariable logistic regression was used to identify independent predictors of FR, and they were used to create a clinical score. The performance of the score was assessed by receiver operating characteristic curve analyses.

Results: Of 219 patients, 170 and 49 patients were randomly assigned to the training and validation cohort, respectively. Independent predictors of FR identified in the training cohort were used to construct the SNAP score: site of occlusion (middle cerebral artery = 0, internal carotid artery = 1), National Institutes of Health Stroke Scale score at admission (≤10 = 0, 10 to 19 = 1, ≥20 = 2), age (<75 = 0, ≥75 = 2), and prestroke mRS score (0-3). Receiver operating characteristic curve analyses of the SNAP score in the training and validation cohorts showed areas under the curve of 0.79 (95% CI 0.72-0.86) and 0.79 (95% CI 0.65-0.92) for predicting FR, respectively. A SNAP score ≥5 had a positive predictive value of 92.1% [95% CI 78.8%-97.3%] for FR.

Conclusion: The SNAP score may be useful in predicting FR after EVT in low-ASPECTS patients with LVO. It can provide patients, family members, and physicians with reliable outcome expectations among patients with acute ischemic stroke with large infarcts [1].

1)
Matsukawa H, Chen H, Elawady SS, Cunningham C, Uchida K, Sowlat MM, Maier I, Jabbour P, Kim JT, Wolfe SQ, Rai A, Starke RM, Psychogios MN, Samaniego EA, Arthur A, Yoshimura S, Cuellar H, Grossberg JA, Alawieh A, Romano DG, Tanweer O, Mascitelli J, Fragata I, Polifka A, Osbun J, Crosa R, Matouk C, Park MS, Levitt MR, Brinjikji W, Moss M, Williamson R Jr, Navia P, Kan P, De Leacy R, Chowdhry S, Ezzeldin M, Spiotta AM; Stroke Thrombectomy and Aneurysm Registry (STAR) Collaborators. Predicting Futile Recanalization After Endovascular Thrombectomy for Patients With Stroke With Large Cores: The SNAP Score. Neurosurgery. 2024 Oct 11. doi: 10.1227/neu.0000000000003220. Epub ahead of print. PMID: 39471074.