Development and validation of a model for predicting malignant events for rupture intracranial aneurysm: A retrospective cohort study and clinical decision curve analysis

Shifei Cai[1]

[1]*Tianjin Medical University/ Tianjin Medical University General Hospital/ Department of Neurosurgery, Tianjin, China*

Abstract

Background: Patients with aneurysms, especially those treated by craniotomy, have a high probability of a poor functional outcome, as the disease pathogenesis is multifactorial and remains implicitly understood.

Objective: We derived a new algorithm to predict malignant events in craniotomy for IAs and to help guide management in this patient population.

Methods: This was a retrospective study in which logistic regression analysis was performed to combine predictors and malignant events. In total, 394 patients were included as a development dataset. The established model was validated internally and externally. The main outcome was the risk of malignant events in craniotomy for IAs according to the GOS.

Results: Clinical malignant outcomes were observed in 24.9% and 23% of patients in the two cohorts. The development model had an internally validated AUC of 0.860 (95% CI: 0.8106-0.9087). The Brier score, calibration intercept and calibration slope were 0.108, 0.000 and 1.000, respectively. The ROC and calibration curves showed that the development model performed well in discrimination and calibration. In external validation, the AUC was 0.930 (95% CI: 0.8495-1), the Brier score was 0.095, the calibration intercept was -0.583, and the calibration slope was 1.376. DCA demonstrated that the evident net benefit was significant in both the derivation and validation datasets.

Conclusions: We developed an original nomogram based on prediction algorithms to support patient education, clinical practice, and future research. It can reliably estimate the outcome of adverse events in craniotomy for rupture intracranial aneurysms at hospital admission..

Biography

Shifei Cai is now a graduate student of neuroscience in Tianjin medical University(TMU), and is working on the development and verification of clinical prediction models, and is studying the risk of aneurysm rupture based on cerebrovascular CTA imaging combine the CFD technique.