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A nomogram for predicting post-operative hydrocephalus in children with medulloblastoma

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Abstract

Post-operative hydrocephalus is common among children with medulloblastoma after initial tumor resection. This study aimed to establish a novel model for predicting the development of post-operative hydrocephalus in children with medulloblastoma. Only pediatric patients who received initial medulloblastoma resection at Beijing Tiantan Hospital between January 2018 and May 2021 were included in this study. The potential risk factors associated with post-operative hydrocephalus were identified based on multivariate logistic regression and the nomogram. Receiver operating characteristic (ROC) curve were used to evaluate the performance of the nomogram model based on an independent cohort of medulloblastoma patients who underwent surgery from June 2021 to March 2022. A total of 105 patients were included in the primary cohort. Superior invasion (P = 0.007), caudal invasion (P = 0.025), and intraventricular blood ≥ 5 mm (P = 0.045) were significantly related to the development of post-operative hydrocephalus and thus were assembled into the nomogram model. The model accurately predicted post-operative hydrocephalus based on the calibration curve. The area under the ROC curves for the primary and validation cohorts was 0.849 and 0.855, respectively. In total, the nomogram we developed may aid clinicians in assessing the potential risk of pediatric patients with MB developing post-operative hydrocephalus, especially those who would otherwise not have received a diversionary procedure at presentation.

Keywords: Hydrocephalus; MRI; Medulloblastoma; Nomogram; Surgery.