ABSTRACT

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Nomogram for predicting early recurrence in patients with high-grade gliomas.

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OBJECTIVE: To develop a nomogram to predict early recurrence of high-grade glioma (HGG) based on clinical pathology, genetic factors and MRI parameters.

METHODS: 154 patients with HGG were classified into recurrence and non-recurrence groups based on the pathological diagnosis and RANO criteria. Clinical pathology information included age, sex, preoperative Karnofsky performance status (KPS) scores,grade, and cell proliferation index (Ki-67). Gene information included P53, IDH1, MGMT, and TERT expression status. All patients underwent baseline MRIs before treatment, including T1WI, T2WI, T1C, Flair, and DWI examinations. Tumor location, single/multiple tumors, tumor diameter, peritumoral edema, necrotic cyst, hemorrhage, average apparent diffusion coefficient(ADC) value, and minimum ADC values were evaluated. Univariate and multivariate logistic regression analyses were used to determine the predictors of early recurrence and build nomogram.

RESULTS: Univariate analysis showed that the number of tumors (OR, 0.258; 95% CI: 0.104, 0.639; P = 0.003) and peritumoral edema (OR, 0.965; 95% CI 0.942, 0.988; P = 0.003; mean in the recurrence group 22.04±17.21 mm; mean in the non-recurrence group 14.22±12.84 mm) were statistically significantly different in patients with early recurrence. Genetic factors associated with early recurrence included IDH1 (OR, 4.405; 95% CI 1.874, 10.353; P= 0.001), and MGMT (OR, 2.389; 95% CI 1.234, 4.628; P= 0.010). Multivariate logistic regression analysis revealed that the number of tumors (OR, 0.227; 95% CI 0.084, 0.616; P = 0.004), peritumoral edema (OR, 0.969; 95% CI 0.945, 0.993; P = 0.013), and IDH1 (OR, 4.200; 95% CI 1.602, 10.013; P= 0.004) were independent risk factors for early recurrence. The nomogram showed the highest net benefit when the threshold probability was less than 60%.

CONCLUSION: A nomogram prediction model can effectively aid in clinical treatment decisions for patients with newly diagnosed HGG .

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