Brainstem glioma: Prediction of histopathologic grade based on conventional MR imaging.

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Objective The objective of this article is to investigate the association between specific MR imaging findings and histopathologic grading (low-grade vs. high-grade) of brainstem gliomas (BSGs). Methods Sixty-two males and 34 females (mean (standard deviation, SD) age of 24.61 (17.20) years, range = 3 to 70 years) with histologically diagnosed BSG underwent conventional 1.5 T MR imaging, which included T1-weighted (T1W), T2W, and post-contrast T1W sequences. There were 39 children (mean age of 9.38 years) and 57 adults (mean age of 35 years). A binary logistic regression analysis was used to explore associations between MRI features and histopathological grade of the BSG. Results Binary logistic regression revealed that necrosis (adjusted odds ratio (OR) = 16.07; 95% confidence interval (CI) = 3.20 to 80.52; p = 0.001) and inhomogeneous contrast enhancement (adjusted OR = 8.04; 95% CI = 1.73 to 37.41; p = 0.008) as significant predictors of high-grade BSG. The equation (Nagelkerke R² = 0.575) is Logit (p high-grade BSG) = (2.77 × necrosis) + (2.08 × heterogeneous contrast enhancement) - 3.13. Sensitivity and specificity values were respectively 66.7% and 96.0% for necrosis and 85.7% and 65.9% for inhomogeneous contrast-enhancing lesions. In the pediatric age group, only inhomogeneous contrast enhancement (adjusted OR = 40; 95% CI = 3.95 to 445.73; p = 0.002) was a significant predictor for high-grade BSG. Conclusion Conventional MR imaging features such as necrosis and inhomogeneous contrast enhancement in adults and heterogeneous contrast enhancement in children suggest high-grade BSG.

KEYWORDS: Glioma; adult; brainstem; central nervous system; magnetic resonance imaging; pathology; pediatrics; tumor

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