ABSTRACT

Prediction of H3 K27M-mutant in midline gliomas by magnetic resonance imaging: a systematic review and meta-analysis.

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PURPOSE: To summarize the predictive value of MRI for H3 K27M-mutant in midline gliomas using meta-analysis.

METHODS: Systematic electronic searches of the PubMed, Embase, ISI Web of Science, and Cochrane Library up to Jun 31, 2021, were conducted by two experienced neuroradiologists with the keywords of "MRI," "Glioma," and "H3 K27M." The hierarchical summary receiver-operating characteristic (HSROC) model was used to calculate the pooled sensitivity, specificity, positive likelihood ratio (LR +), negative likelihood ratio (LR -), and diagnostic odds ratio (DOR). Coupled forest plots were used to evaluate the heterogeneity of the included studies.

RESULTS: Of seven original studies with a total of 593 patients, 240 glioma patients were included, with 45.5-70.6% H3 K27M-mutant gliomas. Using MRI, a pooled sensitivity of 0.78 (95% CI, 0.66-0.87), specificity of 0.85 (95% CI, 0.76-0.91), LR + of 5.07 (95% CI, 3.19-8.08), LR - of 0.26 (95% CI, 0.16-0.42), and DOR of 19.80 (95% CI, 9.28-42.28) were achieved for H3 K27M-mutant prediction. Significant heterogeneity was observed among the studies in terms of sensitivity (Q = 16.83, df = 7, p = 0.02; I2 = 58.40 [95% CI, 25.83-90.97]), LR - (Q = 16.61, df = 7, p = 0.02; I2 = 57.87 [95% CI, 24.81-90.93]), and DOR (Q = 14.05, df = 7, p = 0.05; I2 = 50.18 [95% CI, 10.06-90.31]).

CONCLUSIONS: This meta-analysis demonstrated a clinical value of MRI to predict H3 K27M-mutant in midline gliomas with a pooled sensitivity of 0.78 and specificity of 0.85.

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