

A Modified Disease-Specific Graded Prognostic Assessment (ds-GPA) Scale for Melanoma Consisting of Age, Karnofsky Performance Score (KPS), Cumulative Intracranial Tumor Volume (CITV), and BRAF Mutation Status

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Introduction

Survival prognostication is an important aspect of personalizing oncologic care for patients with melanoma brain metastasis (BM). We previously demonstrated the utility of a cumulative intracranial tumor volume modified diagnosis-specific graded prognostic assessment scale (CITV-dsGPA) for SRS-treated melanoma BM patients. Pertinent prognostic variables in this model included age, Karnofsky performance status (KPS), and CITV. Here we determined whether the incorporation of BRAF mutation status into this CITV-modified scale further enhanced its prognostic accuracy.

Methods

We collated the survival pattern of 331 melanoma BM patients with known BRAF mutation status treated with stereotactic radiosurgery (SRS) and validated our findings in an independent cohort of 174 patients. All patients with BRAF mutation were treated with BRAF inhibitors. The prognostic utility of the model with and without BRAF mutation information was compared using the net reclassification index (NRI > 0) and integrated discrimination improvement (IDI) metric.

Results

BRAF mutation status is an important determinant of clinical survival in both univariate analysis (Hazard Ratio for death for BRAF mutated melanomas (HR) = 0.74, $p < 0.001$) as well as a multivariate Cox proportional hazard model that included age, KPS, and CITV (HR for BRAF mutated melanoma = 0.72, $p < 0.001$). Addition of BRAF mutation status to the CITV-ds-GPA model for melanoma significantly improved its prognostic value, with NRI > 0 of 0.294 ($p = 0.01$) and IDI of 0.017 ($p = 0.02$). We validated these the prognostic utility of this model in an independent cohort of 174 melanoma patients.

Learning Objectives

- 1) Understand the importance of BRAF mutation status as a prognostic factor for patients afflicted with Melanoma brain metastases (BM)
- 2) Understand how best to determine survival expectation for patients afflicted with Melanoma BM, who underwent stereotactic radiosurgery (SRS) for treatment
- 3) Create a more robust, synthesized prognostic tool to help guide clinical decision making for patients suffering from Melanoma BM, who were treated by SRS

Conclusions

Optimal survival prognostication for SRS-treated patients with melanoma BM requires an integrated assessment of age, KPS, CITV, and BRAF mutation status.

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