Temporal Muscle Thickness (TMT) as a Supplementary Prognostic Indicator in Glioblastoma Patients Survivial: The Interplay with Age

Abstract No:

1117

Submission Number:

1117

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Purpose:

The aim of this study is to evaluate the prognostic value of temporal muscle thickness (TMT) in patients with glioblastoma classified according to the WHO CNS tumor classification of 2021, while considering various clinical and genetic factors of the patients.

Materials and Methods:

A retrospective analysis was conducted on 426 consecutive patients with IDH-wildtype glioblastoma (median age: 59 (51-69) years; 242 males [56.81%]) who had comprehensive molecular profiling at Seoul National University Hospital. Temporal muscle thickness (TMT) was measured using preoperative 3D T1-weighted brain MRIs. Patients were categorized into two groups based on TMT: non-sarcopenic and sarcopenic, defined by TMT values at first quartile. Clinical characteristics (age, sex, Karnofsky Performance Status [KPS]), molecular

features (IDH mutation, MGMT promoter methylation, TERT promoter mutation, EGFR alteration, and PTEN mutation status), as well as the status of molecular glioblastoma, were examined. Cox regression analysis was employed to identify predictors of overall survival (OS) in glioblastoma patients, and propensity score matching (PSM) was utilized to control for potential confounders. Furthermore, we assessed the age-stratified prognostic enhancement associated with sarcopenia.

Results:

The median overall survival (OS) was 504 days [IQR: 327 - 868 days], with the non-sarcopenic group experiencing a median OS of 519 days [IQR: 338-931 days] compared to 472 days [IQR: 317-692 days] for the sarcopenic group. Initial Cox regression analysis, Sarcopenia, age, KPS, and MGMTp methylation were independent OS factors before PSM; after adjustment, these factors plus EOR remained significant. The sarcopenic group exhibited a worse 1-year OS rate than the non-sarcopenic group before and after PSM (hazard ratio [HR] 1.41 [95% confidence interval (CI): 1.06-1.90], p = 0.020, HR 1.5 [95% CI: 1.10-2.27], p = 0.01, respectively). Inclusion of sarcopenia in the survival model, paired with other clinical and molecular attributes, improved the concordance index (C-index) to 0.713, compared to 0.706 for the model excluding sarcopenia. The prognostic impact of sarcopenia on 1-year OS became more pronounced with increasing patient age according to the prognostic value plot.

Conclusion:

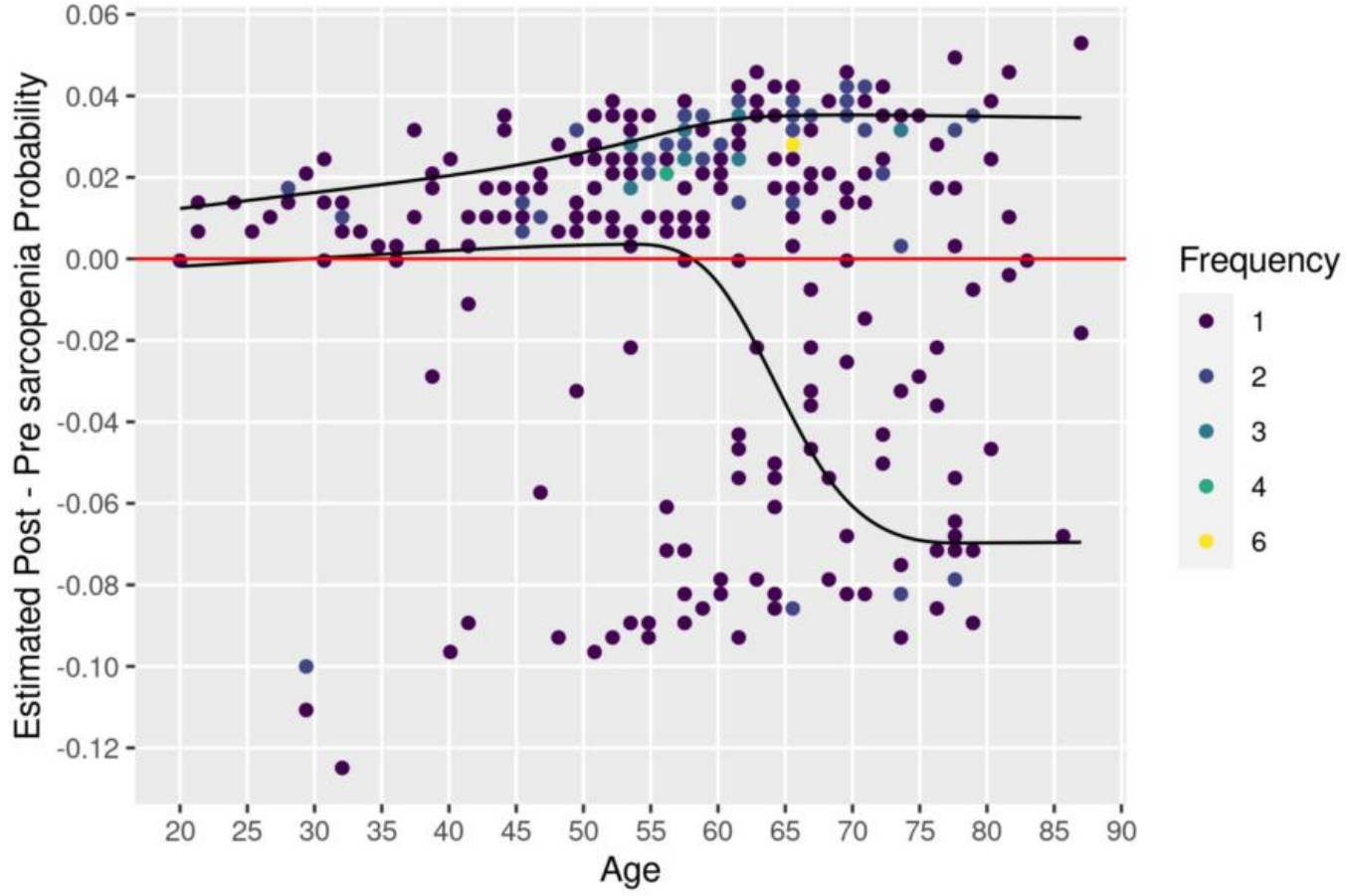
This study suggests that sarcopenia, as determined by TMT, serves as a useful independent prognostic marker for glioblastoma patients' 1-year OS. Additionally, the prognostic predictive power of sarcopenia intensifies as patients age.

Awards:

Cornelius G. Dyke Memorial Award (requires subsequent manuscript submission to be considered)

Categories:

ADULT BRAIN, Tumor



Has this work been previously presented?

No

Will this work be presented in the future?

No

Reference One:

Furtner J, Genbrugge E, Gorlia T, et al. Temporal muscle thickness is an independent prognostic marker in patients with progressive glioblastoma: translational imaging analysis of the EORTC 26101 trial. Neuro-oncology 2019;21:1587-1594

Reference Two:

Liu F, Xing D, Zha Y, et al. Predictive value of temporal muscle thickness measurements on cranial magnetic resonance images in the prognosis of patients with primary glioblastoma. Frontiers in neurology 2020;11:523292

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