

## Quantitative assessment of chemotherapeutic response after bevacizumab treatment using L-methyl-<sup>11</sup>C-methionine PET

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### Abstract

Restoring disrupted blood-brain barriers within a glioma due to the effects of bevacizumab (BEV) occasionally leads to false favorable responses (pseudo-response) on magnetic resonance images (MRI) with contrast medium. To clarify the frequency of the pseudo-responses on MRI at the early stage of BEV treatment for glioblastomas, we compared therapeutic responses between MRI and positron emission tomography with <sup>11</sup>C-methionine (MET-PET). In addition, we determined when met-PET should be performed to predict prognosis.

MRI and MET-PET were performed before, and at 4 and 8 weeks after starting biweekly treatment with BEV plus temozolomide in 14 patients with recurrent glioblastoma. The response on MRI was identified as either complete or partial response according to the Response Assessment in Neuro-Oncology criteria. The MET-PET response was defined as the tumor-to-normal brain ratio of a standardized uptake value (SUV) of < 1.6. Therapeutic responses between MRI and MET-PET were compared at each 4 or 8 weeks. True- and pseudo-responses were identified as appearing responses on both MRI and PET images, and those on MRI but not on PET images, respectively. Progression-free survival (PFS) rate was then compared between patients with true- and pseudo-responses at each time point. Frequencies of patients whose MRI was response but met-PET was not response (pseudo-responders) were around 20%. The PFS was significantly prolonged among true responders at 8 weeks, but did not significantly differ between true and pseudo-responders at 4 weeks.