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[^{177}Lu]Lu-DOTAGA.Glu.$(FAPi)_2$ Radionuclide Therapy: a New Treatment Option for Patients with Glioblastoma Multiforme

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Abstract

In this case report, we present the clinical management of a 52-year-old female patient with a recurrent right temporo-parietal glioblastoma multiforme (GBM). The patient presented with symptoms of headache and loss of balance and recurrence on magnetic resonance imaging (MRI). To evaluate the fibroblast activation protein inhibitor (FAPi) expression in the recurrent lesion, an exploratory [^{68} Ga]Ga-DOTA.SA.FAPi PET/CT scan was performed. The imaging results revealed FAPi expression in the lesion located in the right temporo-parietal region. Based on the findings of FAPi expression, the patient underwent [^{177}Lu]Lu-DOTAGA.Glu.$(FAPi)_2$ treatment. After completing two cycles of [^{177}Lu]Lu-DOTAGA.Glu.$(FAPi)_2$ therapy, a follow-up [^{68} Ga]Ga-DOTA.SA.FAPi PET/CT scan was conducted. The post-treatment imaging showed a significant reduction in FAPi uptake and regression in the size of the lesion, as well as a decrease in perilesional edema, as observed on the MRI. Furthermore, the patient experienced an improvement in symptoms and performance status. These results suggest that [^{68} Ga]Ga-DOTA.SA.FAPi monomer imaging and [^{177}Lu]Lu-DOTAGA.Glu.$(FAPi)_2$ dimer therapeutics hold promise for patients with recurrent GBM when other standard-line therapeutic options have been exhausted. This case highlights the potential of using FAPi-based theranostics in the management of recurrent GBM, providing a potential avenue for personalized treatment in patients who have limited treatment options available.

Keywords: Ga-DOTA.SA.FAPi PET/CT; [177Lu; Glioblastoma multiforme; [68 Ga; Lu-DOTAGA.Glu.(FAPi)2 therapy.