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IMAGE OF THE MONTH

Near complete response recurrent glioblastoma after treatment with [^{131}I]-Iodofalan

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Glioblastoma is an incurable disease with 5-year survival rates below 10%. Despite advances in molecular diagnostics and subtyping of these high-grade tumors, an effective treatment to replace temozolomide-based chemoradiation as the standard of care has yet to emerge. One promising therapy under investigation is Iodofalan (^{131}I) ([^{131}I]IPA), a form of radionuclide therapy [1].

A 56-year-old man presented with progressive, treatment-refractory glioblastoma (WHO grade 4, IDH-wild-type, with methylated MGMT promoter) that diffusely infiltrated the left parietotemporal lobes, causing dysarthria and hemifacial spasms. After biopsy, treatment consisted of temozolomide-based chemoradiation and adjuvant cycles of adjuvant temozolomide. Twelve months after initial presentation, following suspected tumor progression on MRI, subsequent [^{18}F]FET-PET/CT confirmed progression. Neurosurgeons deemed the recurrence inoperable due to its location. As the standard-of-care options were limited, intravenous treatment with [^{131}I]IPA in compassionate use was considered. Treatment was initiated with 2 cycles of 5 GBq per 4 weeks interval. Consequently, due to delivery problems, 3 cycles of lomustine were given as bridging therapy, but lomustine had to be discontinued due to pancytopenia. Two additional cycles of 5 GBq [^{131}I]IPA were given. The patient tolerated all [^{131}I]IPA cycles well and showed improvement of all neurologic deficits over time, with decrease in dysarthria and improved overall wellbeing. Tumor response on serial MRI every 3 months and [^{18}F]FET-PET/CT every 2 months demonstrated ongoing regression of the residual enhancing, [^{18}F]FET-positive tumor (partial response according to PET RANO criteria) [2]. To date, 31 months after initial biopsy (23 months after starting [^{131}I]IPA) his treatment response is ongoing. Pancytopenia has completely recovered during follow-up and no side effect or long-term complications have been observed to date (Fig. 1).

Prospective studies are currently ongoing with [^{131}I]IPA as a concomitant treatment with first-line chemoradiation for glioblastoma. This promising case warrants validation in prospective studies of [^{131}I]IPA, possibly with chemotherapy, for recurrent [^{18}F]FET-positive high-grade glioma.

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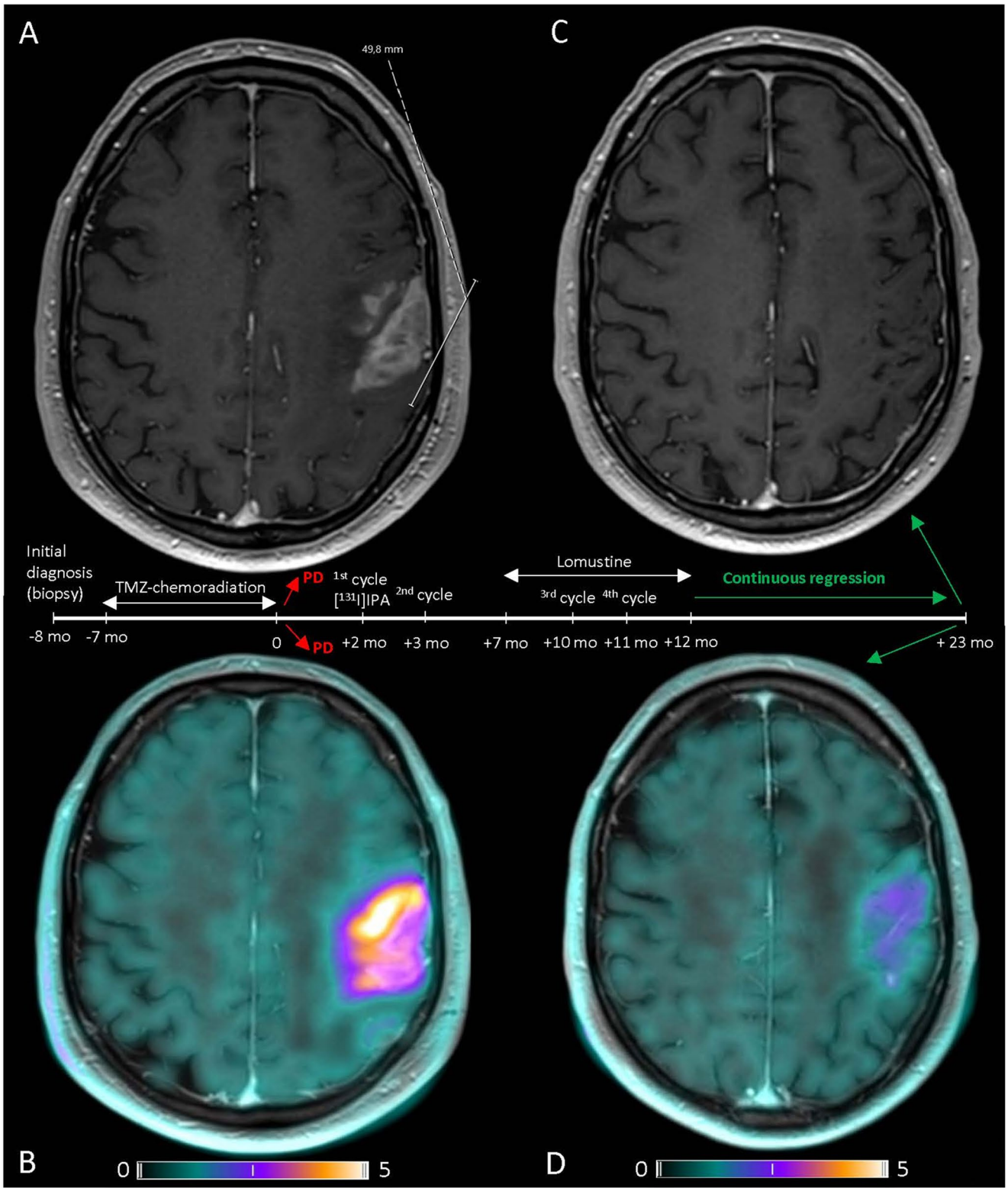

Fig. 1 Timeline and imaging response of recurrent glioblastoma after combined [^{131}I]IPA and lomustine. **A** Pre-[^{131}I]IPA gadolinium-enhanced T1-weighted MRI (gdMR) demonstrating recurrence of a glioblastoma in the left parietotemporal lobe with a maximum diameter of 49 mm. **B** Pre-[^{131}I]IPA [^{18}F]FET-PET/CT revealing pathological uptake with a maximum tumor-to-background ratio (TBRmax) of 5.6, confirming tumor recurrence and validating the patient's eligibility for treatment with [^{131}I]IPA. **C** Follow-up gdMR performed 23 months (mo) after having completed 4 cycles of [^{131}I]IPA and 3 cycles of lomustine, showing near-complete resolution of contrast enhancement. **D** Follow-up [^{18}F]FET-PET/CT demonstrating significantly decreased pathological uptake with a residual TBRmax of 2.8, consistent with a partial response 23 months after initiating [^{131}I]IPA treatment

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Data availability All relevant data supporting the findings of this case report are included within the manuscript.

Declarations

Ethics approval The patient provided informed consent for the publication of their case details.

Competing interests Nelleke Tolboom is consultant for Telix Pharmaceuticals and Theranova and receives in kind research support from Curium Pharmaceuticals. Arthur Braat is consultant for Boston Scientific, Terumo, GE Healthcare & Telix Pharmaceuticals, receives research support from Boston Scientific, Telix Pharmaceuticals, Ariceum Therapeutics & Siemens Healthineers. All others authors have no relevant financial or non-financial interests to disclose.

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