



## Treatment of brain metastases of castration-resistant prostate cancer with $^{225}\text{Ac}$ -PSMA-617

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Brain metastases are not common in prostate cancer; they typically occur in patients with end-stage disease who are castrate-resistant. Patients with brain metastases have very limited survival [1]. Traditionally, the mainstays of therapy have been surgical resection, chemotherapy and external beam radiotherapy. Recently, combination of  $^{177}\text{Lu}$ -Prostate-specific membrane antigen (PSMA)-617 and external radiotherapy for the treatment of cerebral metastases in patients with castration-resistant metastatic prostate cancer (mCRPC) showed significant regression in the sizes and PSMA-ligand avidity of the lesions over time [2]. Recent studies have

demonstrated that targeted  $\alpha$ -radiation therapy with  $^{225}\text{Ac}$ -PSMA-ligand can significantly benefit patients with mCRPC in the appropriate setting [3, 4]. Targeted  $\alpha$ -radiation therapy may be more effective for the treatment of mCRPC, and has been shown, in a limited number of patients, to be effective in the setting of resistant to  $^{177}\text{Lu}$ -PSMA-617 therapy [5].

We present a remarkable response of prostate cancer cerebral metastases following treatment with  $^{225}\text{Ac}$ -PSMA-617 in a patient with mCRPC whose disease progressed under androgen deprivation with Goserelin and chemotherapy with docetaxel. Initial assessment with  $^{68}\text{Ga}$ -PSMA-ligand PET/CT showed tracer-avid cerebral metastases and widespread skeletal metastases (Fig. 1a). The patient was treated with one cycle of  $^{225}\text{Ac}$ -PSMA-617 with an activity of 8 MBq. Restaging with  $^{68}\text{Ga}$ -PSMA-ligand PET/CT after one cycle showed a remarkable functional response (resolution of cerebral and extensive skeletal metastases) and biochemical response (decrease in serum PSA level from 788.63  $\mu\text{g/L}$  to 6.52  $\mu\text{g/L}$ ) (Fig. 1b). Four months later, the serum PSA dropped to 0.32  $\mu\text{g/L}$  after a second cycle of therapy with  $^{225}\text{Ac}$ -PSMA-617. This case highlights the potential of  $^{225}\text{Ac}$ -PSMA-617 for treatment of brain metastases of mCRPC in patients with limited treatment option.

This article is part of the Topical Collection on Image of the Month.

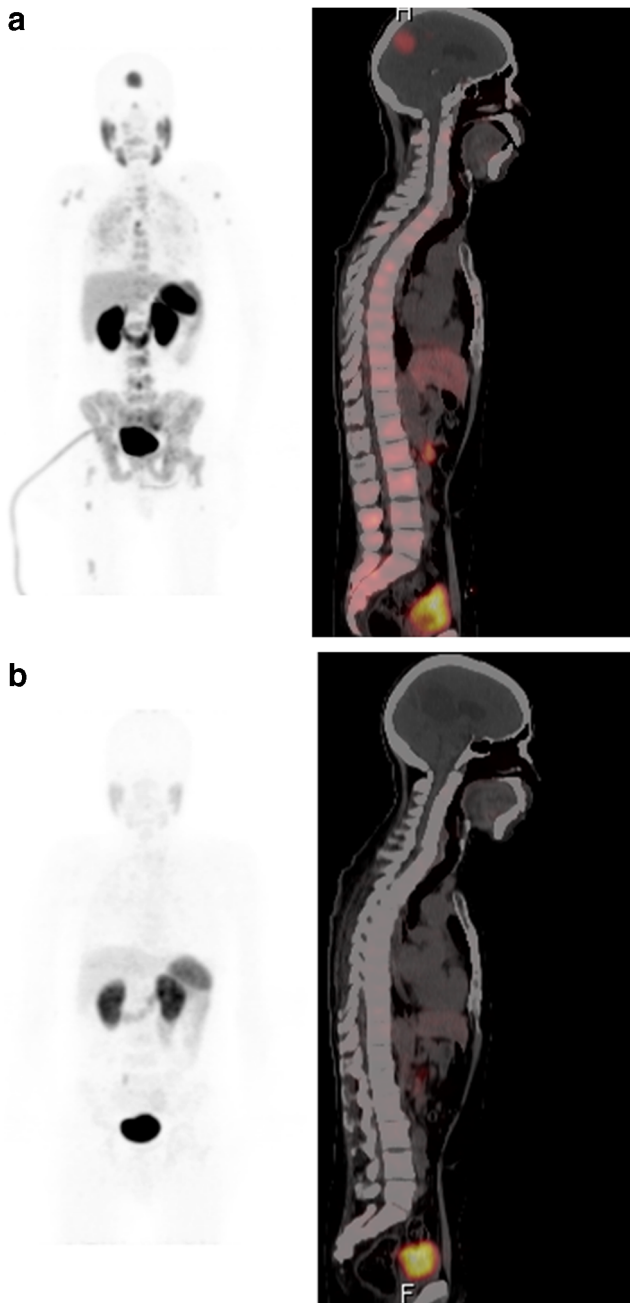
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## Compliance with ethical standards

**Conflicts of interest** None

**Informed consent** Written informed consent was obtained from the patient.

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