

²²⁵Ac-DOTATATE therapy in a case of metastatic atypical lung carcinoid

Hell J Nucl Med 2024; 27(1): 64-65

Epub ahead of print: 18 April 2024

Published online: 30 April 2024

A 67-year-old man underwent a right inferior lobectomy due to lung carcinoid 12 years ago. Seven years ago, the patient was diagnosed with liver metastases. The patient received 6 cycles of lutetium-177-oxodotreotide (¹⁷⁷Lu-DOTATATE) at another hospital. However, the patient's condition had become worse and had multiple systemic metastases. Therefore, the patient was enrolled in the clinical trial of actinium-225 (²²⁵Ac)-DOTATATE in solid tumors approved by the institutional review board of our hospital. Then the patient received 4 cycles of ²²⁵Ac-DOTATATE. Each treatment cycle lasted two months with averagely 185uCi per treatment. Then the patient's condition was partially relieved and the quality of life had improved significantly. He underwent gallium-68 (⁶⁸Ga)-DOTATATE positron emission tomography/computed tomography (PET/CT) before the first treatment and two months after the last treatment. The maximum intensity projection (MIP) before treatment showed multiple tracer uptake in the whole body (Figure 1A). Axial fusion images (Figure 1B-D) showed multiple metastatic lesions with obviously increased tracer uptake. After treatment, though the MIP image (Figure 1E) still showed multiple shallow tracer uptake in the whole body, axial fusion images (Figure 1F-H) showed those metastatic lesions with significantly decreased tracer uptake (SUVmax decreased by 13%-93%). Atypical lung carcinoids are well differentiated and can be collectively called neuroendocrine tumors along with typical carcinoids [1]. However, the median survival in patients diagnosed with distant metastases of lung carcinoids is 24 months, and the 5-year survival rate is 32% [2]. There is a lack of evidence or consensus on the best treatment methods for lung carcinoids [3]. Some studies have shown that peptide receptor radionuclide therapy (PRRT) could be effective in lung carcinoids, mostly ¹⁷⁷Lu-DOTATATE or yttrium-90 (⁹⁰Y)-DOTATATE [4-7]. Actinium-225 is a pure alpha-emitter, with a half-life of 9.9 days [8]. We reported for the first time that ²²⁵Ac-DOTATATE was used to treat atypical lung carcinoids. After treatments, the tracer uptake in almost all lesions was significantly reduced while disease progression after ¹⁷⁷Lu-DOTATATE. The patient's pain was significantly relieved. This report showed that ²²⁵Ac-DOTATATE may have a good prospect for the treatment of advanced atypical lung carcinoids. It may be a remedy when other treatments are ineffective.

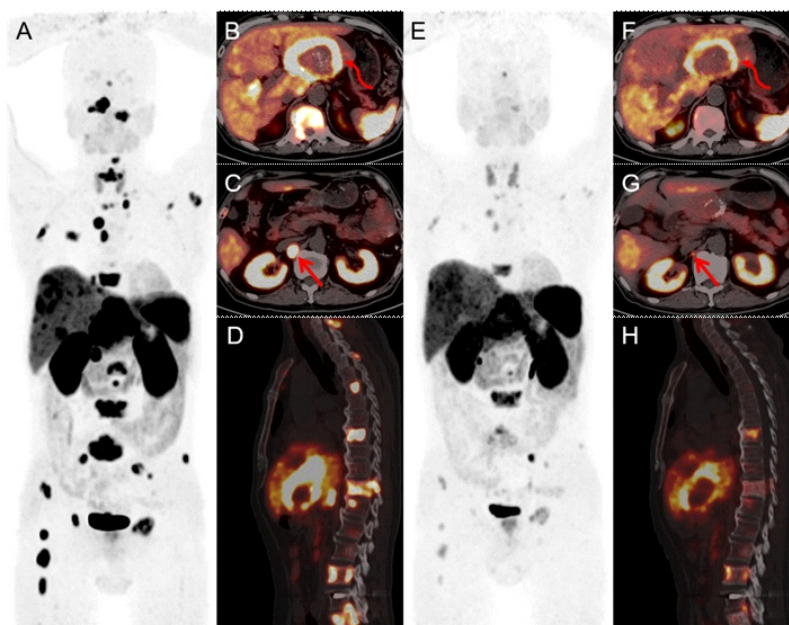


Figure 1. The MIP of ⁶⁸Ga-DOTATATE PET/CT before treatment showed multiple elevated tracer uptake in the whole body (A). The axial fusion images (B-D) showed multiple metastatic lesions with tracer uptake (liver metastases SUVmax 23.8, curved arrow; abdominal lymph nodes SUVmax 22.1, straight arrow; spine SUVmax 38.3). Two months after the last treatment, the MIP showed multiple shallow tracer uptake in the whole body (E). And axial (F-H) showed those metastatic lesions with significantly reduced tracer uptake (liver metastases SUVmax 15.0, curved arrow; abdominal lymph nodes SUVmax 7.0, straight arrow; spine SUVmax 16.5)

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