

Treatment of bone metastases of pancreatic cancer with ^{177}Lu -DOTA-IBA

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A 54-year-old man was diagnosed with pancreatic cancer with bone metastases 12 months ago. His pain score (numerical rating scale) and physical state score (Eastern Cooperative Oncology Group standard) were 7 and 3, respectively. Besides, his appetite and sleep decreased. Subsequently, he received a total of 12 cycles of chemotherapy, 5 times of vertebral radiotherapy combined with oral chemotherapy drugs. But his pain symptoms were obviously not eased. Subsequently, the man was included in our clinical study of lutetium-177-DOTA-ibandronic acid (^{177}Lu -DOTA-IBA), a new radiopharmaceutical for the treatment of bone metastasis [1, 2]. This study was approved by the ethics committee of our hospital (ethics committee approval no. KY2022114; clinical trial registration no. ChiCTR2200064487). Before treatment, he underwent positron emission tomography/computed tomography (PET/CT) imaging with gallium-68 (^{68}Ga)-DOTA-IBA (a new tracer for evaluating bone metastasis) [1-3]. Maximum intensity projection (MIP) (A) image showed multiple elevated tracer uptake in the whole body bones. Subsequently, the man received ^{177}Lu -DOTA-IBA treatment at a dose of 1110MBq. Four days after treatment, his symptoms were significantly relieved, and the pain score decreased to 1 point. Besides, the physical state score was increased to 2 point. Four weeks after treatment, the pain was completely relieved, and the physical state score was increased to 1 point. Besides, his appetite increased, and sleep significantly improved. Two months after completing the fourth cycle of ^{177}Lu -DOTA-IBA therapy, she underwent ^{68}Ga -DOTA-IBA PET/CT imaging to evaluate the efficacy, which was also 7 months after the first ^{68}Ga -DOTA-IBA PET/CT imaging. Maximum intensity projection (F) image showed that the tracer uptake in bone metastases was significantly decreased. And he was treated 7 times in all. This case showed ^{177}Lu -DOTA-IBA had a satisfactory therapeutic efficacy in the treatment of bone metastases. Previous studies have shown that bisphosphonates can be used to prevent or delay bone-related events [5]. Bone pain caused by secondary bone malignancies is one of the most common types of chronic pain in cancer patients, and radionuclide therapy is an effective treatment for pain relief in bone metastases, with improved clinical outcomes in terms of overall and progression-free survival [6, 7] bisphosphonates are the first targeted drug that has been shown to have good efficacy in patients with bone metastases [8, 9]. DOTA-IBA is new a precursor targeting bone metastasis, which can be used for radionuclide labeling with ^{68}Ga , ^{177}Lu , and actinium-225 (^{225}Ac) for the diagnosis or treatment of bone metastasis [1-4, 10-12]. Our case encourages ^{177}Lu -DOTA-IBA as a promising therapeutic option in patients with bone metastasis of pancreatic cancer, but more studies and experiments are needed.

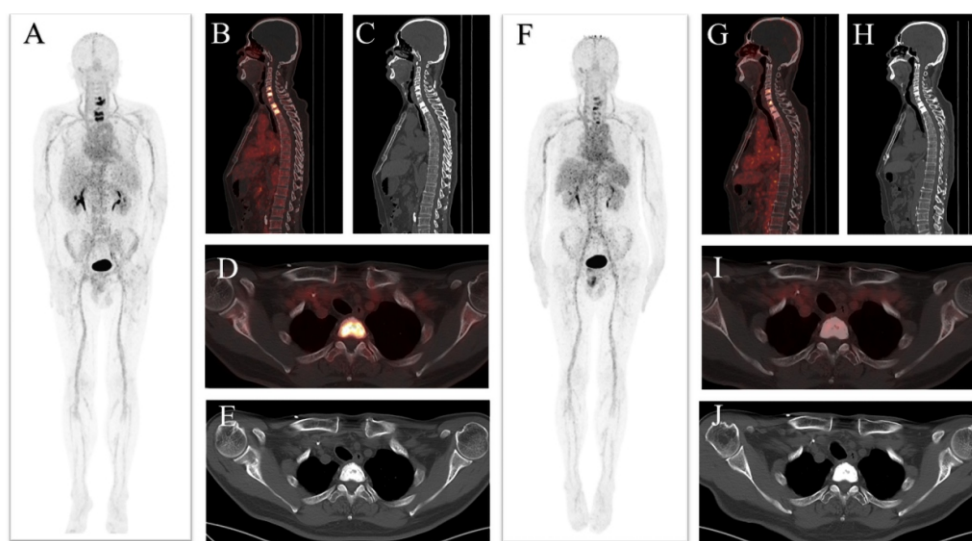


Figure 1. The MIP of ^{68}Ga -DOTA-IBA PET/CT before treatment showed multiple elevated tracer uptake in the whole body bones. Sagittal images showed C5-T2 vertebral bodies (B, fusion; C, CT; Arrow) Osteogenic changes with increased uptake of imaging agent. Axial images showed T2 vertebral body (D, fusion; E, CT; Thin arrow, SUVmax, 13.7) Osteogenic changes, increased uptake of imaging agent. Two months after completing the fourth cycle of ^{177}Lu -DOTA-IBA therapy, she underwent ^{68}Ga -DOTA-IBA PET/CT imaging to evaluate the efficacy, which was also 4 months after the first ^{68}Ga -DOTA-IBA PET/CT imaging. Maximum intensity projection (F) image showed that the tracer uptake in bone metastases was significantly decreased. Sagittal images showed C5-T2 vertebral bodies (G, fusion; H, CT; Arrow), axial image shows T2 vertebral body (I, fusion; J, CT; Thin arrow, SUVmax, 6.4).

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