Interesting images

Dual false positive of $^{68}$Ga-DOTA-TATE PET/CT scan in a patient with a history of pancreatic neuroendocrine tumor: A case report

Doble falso positivo de $^{68}$Ga-DOTA-TATE PET/CT en una paciente con antecedente de tumor neuroendocrino en páncreas: un caso clínico

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$^{68}$Ga-labeled octreotide analogs, including DOTATOC, DOTATATE and DOTANOC, are very useful PET radiopharmaceuticals in the management of neuroendocrine tumors (NETs). However, a considerable number of malignancies beyond NETs, including lymphomas, express somatostatin receptors and are eligible to accumulate radiolabeled octreotide analogs, leading to misleading findings on somatostatin receptor scintigraphic imaging (STRS). There are also several benign processes including granulomatous diseases such as tuberculosis demonstrating an increased uptake of radiolabeled octreotide derivatives and cause false positive results on STRS. Here, we present the case of a 65-year-old female patient with a history of operated pancreatic NET, who had been referred to our department for a $^{68}$Ga-DOTATATE PET/CT scan for restaging after slight elevation of Chromogranin-A level to 110 ng/ml during follow-up. On the PET/CT imaging of $^{68}$Ga-DOTATATE, there were multiple lymph nodes with increased somatostatin receptor expression in bilateral axillary regions, paraaortocaval chains of abdomen and bilateral inguinal areas of pelvis as well (Fig. 1). Additionally, focally increased uptake of the tracer was noted in D6, L2 and L3 vertebrae as well as right iliac bone, all of which have a polka-dot sign caused by thickened trabeculation of bone on the corresponding low-dose CT slices of PET/CT imaging (Fig. 2). Although a polka-dot sign is a characteristic sign for bone hemangioma on X-ray transmission images, a MR imaging was also performed to strength the diagnosis of the bone lesions. In all bone lesions, MR imaging showed hyperintense signals on both T1 and T2 weighted sequences, compatible with bone hemangiomas (Fig. 3). Increased $^{68}$Ga-DOTATATE uptake in bone hemangiomas was also reported in a previous paper with a case report supported by our findings. It has been hypothesized that $^{68}$Ga-DOTATATE binds to endothelial cells, which express SSTR receptors, leading to increased uptake in hemangiomas. On contrary, it has been reported that a vertebral hemangioma did not show a discernible $^{68}$Ga-DOTATATE accumulation in another case report paper.

Regarding $^{68}$Ga-DOTATATE positive lymphadenomegalies, the patient underwent an excisional lymph node biopsy from the left axillary region following an ultrasound evaluation and consequent histopathological examination revealed a low-grade follicular lymphoma. No further treatment was started for this secondary malignancy, as the patient had no symptom.

Fig. 1. Maximum intensity projection (MIP) image (A) and transaxial fusion slices (B–D) demonstrate increased uptake of Ga-68 DOTATATE in multiple lymphadenomegalies in bilateral axillary and inguinal regions as well as in the upper abdominal lymphatic chain.

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In conclusion, awareness of increased somatostatin receptor expression in secondary malignancies as well as in some benign processes is extremely important for correct interpretation of $^{68}$Ga-DOTATATE PET/CT scans. A careful reviewing of corresponding CT slices on bone window provides an easy diagnosis of bone hemangiomas that may express increased tracer uptake and cause a potential pitfall as seen in our case. Furthermore, a biopsy should be advised when the doubtful findings are encountered during STSR imaging interpretation.

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**References**