Interesting image

Imaging of multiple brown tumors both in FDG (18F) and 68Ga DOTA-TATE PET/CT studies

Imagen de múltiples tumores pardos tanto en FDG (18F) como en 68Ga DOTA-TATE PET/TAC

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A 65-year-old female patient who had been operated 20 years ago for parathyroid adenoma presented with left arm mass suspicious for metastatic lesion. First she was referred for bone scintigraphy for evaluation of osteoblastic activity of this lesion and examining other possible lesions at the skeleton. 99mTc-MDP whole-body bone scan revealed multiple increased tracer uptake at the skeletal system suggested for multiple metastatic lesions (Fig. 1). The patient was referred for FDG (18F) PET/CT to search for primary disease. FDG (18F) PET/CT scan showed multiple lytic bone lesions with increased tracer uptake suggestive of metastatic disease (Fig. 2A, left two images). However there was no other lesion suspicious for primary tumor except skeletal system. In systemic evaluation high serum parathyroid hormone (PTH) level (1143 pg/ml) was noted. Hence, these lesions on both bone scan and FDG (18F) PET/CT were accepted as brown tumors. To evaluate somatostatin receptor-2 (sst-2) status of brown tumors, the patient underwent 68Ga-DOTA-TATE PET/CT. 68Ga PET/CT images demonstrated multiple bone lesions with increased tracer uptake at the FDG positive areas (Fig. 2B, right two images). After then the patient had parathyroidectomy and 1.2 × 0.7 × 0.4 cm and 1.3 × 0.6 × 0.3 cm sized mass from the right thyroid region and 1 × 0.7 × 0.3 cm and 1 × 0.3 × 0.3 cm sized mass from the left thyroid region which all were suspicious for parathyroid adenoma were removed. Histopathology confirmed that the mass at the left thyroid region was parathyroid adenoma. The serum parathyroid levels return to normal after surgery.

Here, we present a case of multiple brown tumors which were shown both with FDG and 68Ga PET/CT imaging. Brown tumor is not a malignant tumor although it mimics bone metastasis. They represent an unusual skeletal change in <2% of cases of primary hyperparathyroidism. FDG (18F) PET/CT has a sensitivity of 86% and a specificity of 78% for the preoperative localization of primary hyperparathyroidism. As in our case, it also may show brown tumors due to hyperparathyroidism by depicting significant FDG uptake in the bone lesions despite of any abnormal uptake evoking a primary neoplasm.1,2 68Ga-DOTA-TATE PET/CT is routinely used for sstr-2 status.3 This case report showed us that brown tumors express somatostatin receptors. According to the best of our knowledge, this is the first brown tumor case which is shown by both 68Ga DOTA-TATE and FDG (18F) PET/CT.

![Image](image_url)

**Fig. 1.** 99mTc MDP whole-body bone scan revealed multiple increased tracer uptake at the axial and appendicular skeleton.
Fig. 2. (A and B) FDG PET/CT imaging showed multiple hypermetabolic lesions at the skeletal system (left two images). $^{68}$Ga DOTA-TATE depicted multiple hyperactive bone lesions at the skeleton (right two images).

References

