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ENDOCRINE IMAGING

Thyroid metastasis from breast cancer detected by 18F-FDG PET/CT

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A 72-years-old patient with history of breast cancer (invasive ductal carcinoma, G3, estrogen- and progesterone-receptor positive, C-ERB-B2 0%) previously treated with quadrantectomy, axillary lymph node dissection, chemotherapy, and external beam radiation therapy underwent a restaging 18fluorine-fluorodeoxiglucose positron emission tomography/computed tomography (18F-FDG PET/CT). PET/CT images were acquired 60 min after the intra-venous injection of 3.5 MBq/kg of18F-FDG on a Discovery 690 tomograph (GE; Milwaukee, Wis; 64-slice CT, 80 mA, 120 kV; 2.5 min/bed; 256 × 256 matrix, 60-cm field of view). PET/CT images revealed a mild focal uptake on the lower part of the left lobe of the thyroid and high uptakes were seen on the third lumbar vertebrae and left iliac bone (Fig. 1). Subsequent ultrasound sonography and fine-needle aspiration cytology (FNAC) of the left thyroid lobe were carried out and showed a metastasis from primary breast cancer. The patient was euthyroid (serum thyroid-stimulating hormone, T4, and T3 levels in the normal range).

Metastases to thyroid are very uncommon despite the high vascularization of the gland. They account for ~7.5% of thyroid malignancies and come mainly from renal cell carcinoma(20–50%), followed by malignancies of the gastrointestinal tract, lungs, and skin, with breast cancer metastases to the thyroid being rare [1]. Thyroid incidentalomas on FDG PET/CT are relatively frequent and mostly caused by benign diseases but nevertheless almost one third of focal uptakes are caused by malignancies, papillary thyroid cancer being the most frequent [2]. The more frequent use of FDG PET/CT in oncology has certainly increased the detection of incidental findings; however, there is no safe standard uptake value (SUV) cutoff over which it is certain or reasonably safe to suspect or rule out malignancies [2]. Above all thyroid incidentalomas on FDG PET/CT, only few cases of breast cancer metastases have been reported. Therefore metastases to the thyroid gland may cause a diagnostic challenge. Furthermore, sonographic features alone, in patients with thyroid nodules, cannot discern primary and metastatic malignancies. However, ultrasound risk-adapted systems can classify thyroid nodules and identify those few who needs FNAC [3]. In our case the ultrasound feature were a solid, hypoechoic with irregular margin single thyroid nodule.

In conclusion, this report underlines the importance of further investigation of incidental findings in the thyroid at FDG PET/CT, especially in patients with history of malignancy, potentially pivotal for an adequate patient management.

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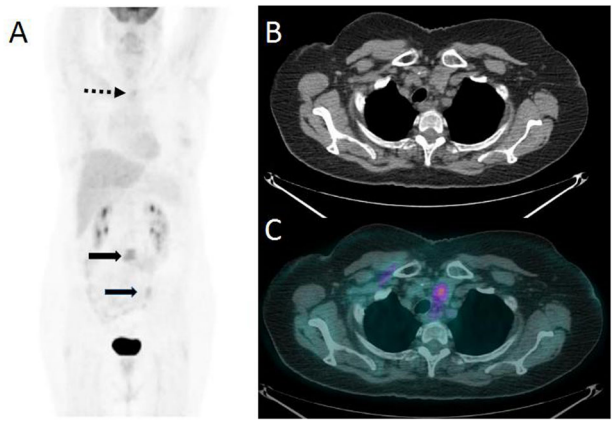

Fig. 1 Maximum intensity projection (MIP) showing a mild increased FDG uptake on left thyroid lobe (dashed arrow) with high uptakes in the third lumbar vertebrae and left iliac bone(arrows) **a**. Axial non-contrast enhanced CT showing a nodule of 15 mm on the lower part of the left thyroid lobe **b** and PET/CT fused images with the FDG uptake corresponding to the nodule detected by CT (SUVmax 3.5) **c**

Compliance with ethical standards

Conflict of interest The authors declare they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study formal consent is not required.

Informed consent Informed consent was obtained from all individual participant included in the study.

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