^{18}F -FDG PET/CT Presentation in a Patient Diagnosed with Large Cell Neuroendocrine Carcinoma of Uncertain Primary

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A 61-year-old man attended for a ^{18}F -fluorodeoxyglucose (^{18}F -FDG) positron emission tomography/computed tomography (PET/CT); he underwent a CT scan with contrast medium 2 days before, which showed numerous peritoneal nodules. He also had high levels of alpha-fetoprotein (500 mg/ml, normal < 20 mg/ml). ^{18}F -FDG PET/CT showed an extended peritoneal involvement (Fig. 1a,b, and c); multiple pulmonary bilateral nodules and abdominal lymph nodes also had high levels of FDG uptake (Fig. 1d). Maximum standard

uptake value (SUVmax) of the peritoneal lesions was 19.2. No clear primary could be found; in particular, no isolated uptakes in gastrointestinal tract could be detected, and pulmonary nodules were bilateral and small.

The patient finally underwent a fine needle biopsy of perihepatic omentum and was diagnosed with large cell neuroendocrine carcinoma, according to international standard criteria. In particular, there was an evidence of large cells with abundant cytoplasm (Fig. 1e), positive to synaptophysin (Fig. 1f) and with high mitotic index (Ki67 > 70 %, Fig. 1g).

First described in a paper by Bernick et al. [1], large cell neuroendocrine carcinoma is a rare, poorly differentiated tumor originating from the neuroendocrine system. Its diagnosis is based on the findings of a mitotic rate higher than 11 mitotic figures/2 mm², the expression of at least one neuroendocrine marker, and large cell size with abundant cytoplasm [2]. This tumor is reported to have FDG uptake higher than typical well-differentiated neuroendocrine carcinomas [3, 4].

Only a few reports of the use of ^{18}F -FDG PET/CT in large cell neuroendocrine carcinoma of uncertain primary can be found in literature [3–5]; most often, it was reported to have a homogeneously high FDG uptake [6], thus having great advantages both in staging and in prognostic assessment [3].

To the best of our knowledge, even if this kind of distribution of the lesions, very atypical and unusual for a neuroendocrine tumor, has been described before [7], no PET images are available.

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Fig. 1 ^{18}F -FDG PET/CT of a 61-year-old man. a, transaxial fused PET/CT images; b, sagittal fused PET/CT images; c, coronal fused PET/CT images; d, 3D maximum intensity projection (MIP); e, biptic

image, hematoxylin-eosin, showing large cells with abundant cytoplasm; f, biptic image showing positivity to synaptophysin; g, biptic image showing high mitotic index (Ki67 > 70 %)

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