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Case Report

Rare images of an intense 18F-FDG PET-scan uptake in an incidentally discovered thyroid lesion: A case report ☆,☆☆

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ABSTRACT

Thyroid carcinoma is a type of cancer that starts in the cells of the thyroid gland, which plays a crucial role in regulating the body's metabolism. Thyroid cancer can manifest in various forms. We report the case of an 89 year-old patient presenting an incidental intense Fluorine-18-fluorodeoxyglucose (18F-FDG) PET-computed tomography (PET-CT) uptake within a thyroid lesion and the role of 18F-FDG PET-CT guiding the anatomopathological examination. The prevalence of FDG-avid thyroid incidentaloma ranges between 0.2% and 8.9%. Higher risks of cancer seems to be related to focal or unilateral uptake of 18F-FDG. Lesions with higher standardized uptake values or suspicious CT are more likely to be cancers. The diagnosis is clinically challenging. Nuclear and radiological images can guide practitioners.

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Introduction

Thyroid carcinoma is a type of cancer that starts in the cells of the thyroid gland, which plays a crucial role in regulating the body's metabolism [1]. Thyroid cancer can manifest in various forms.

We report the case of an 89 year-old patient presenting an incidental intense Fluorine-18-fluorodeoxyglucose (18F-FDG) PET-computed tomography (PET-CT) uptake within a thyroid lesion and the role of 18F-FDG PET-CT guiding the anatomopathological examination.

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☆☆ Ethical approval for this study was not necessary.

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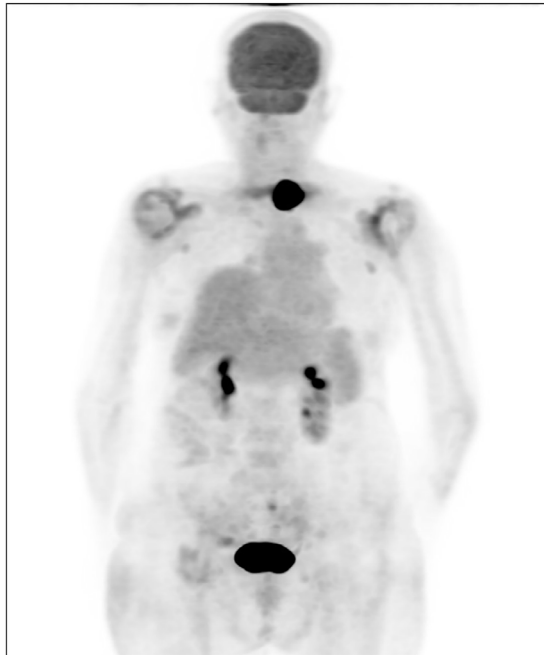


Fig. 1 – Maximum intensity projection (MIP) shows increased uptake in the region of the left thyroid.

Case report

An 89 year-old female patient with a history of untreated diabetes presented 4 months ago with joint pain for which she consulted and was put on corticoids during a general visit. The patient was diagnosed with rheumatoid arthritis. The signs persisted even under treatment which made her doctor reconsider the diagnosis and search for neoplastic origin.

On questioning, no signs of deterioration of general health were found neither a history of neoplasm.

In front of these elements, 18F-FDG PET/CT was requested.

The patients fasted for at least 12 hours before the intravenous administration of 255 MBq of 18F-FDG, an hour prior to imaging. The blood sugar level was measured prior to the injection of 18F-FDG and was at 1.66 g/L. A nonenhanced low-dose CT-Scan was obtained for attenuation correction before the FDG PET/CT-Scan. 18F-FDG uptake in the lesions was measured by standardized uptake values (SUV) calculated by generating a manual region of interest over the site of abnormally increased 18F-FDG activity. The intensity of uptake, defined by SUVmax, and the uptake appearance (homogenous/diffusely nonhomogenous vs nonhomogenous with photopenic center) were evaluated. The patient's reference values were at 1.73 for mediastinal SUV and 3.03 for liver SUV.

18F-FDG PET-CT revealed a hypermetabolic thyroid mass in the left lobe with a SUVmax at 65.88 and a metabolic volume at 13.35 cm³. This lesion measured 4.1 × 3.8 × 4.2 cm (Figs. 1 and 2).

Nonenhanced CT lesion density in mean Hounsfield units (HU) (measured using a circular region of interest at the center of the suspicious F-18 FDG thyroid lesion) was estimated at 43 (soft tissue density lesion) (Fig. 3).

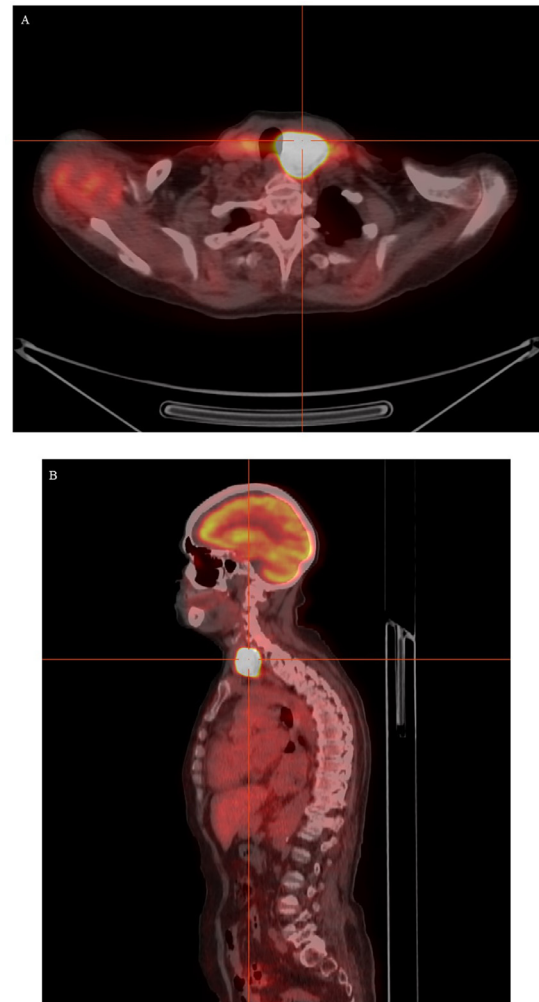


Fig. 2 – PET-CT axial (A) and coronal (B) views of a soft tissue thyroid lesion developed depending on the left lobe, hypermetabolic on fusion images.

We highly suspect a malignant lesion. The patient was addressed for a cytopunction biopsy and anatomopathological examination but unfortunately refused other explorations.

Discussion

The prevalence of FDG-avid thyroid incidentaloma ranges between 0.2% and 8.9% [2].

Higher risks of cancer seems to be related to focal or unilateral uptake of 18F-FDG [3]. Indeed, lesions with higher SUV or suspicious CT are more likely to be cancers, while diffuse uptake is mainly associated with benign pathologies [3].

Increased tissue density (HU > 42) and SUVmax > 4.7 are highly predictive factors of malignancy in thyroid lesions incidentally detected on 18F-FDG PET-CT, as reported by Nasr et al. [4]. In accordance with our case, we found a fortuitous thyroid lesion with tissue density of 43 UH and SUVmax at 65.

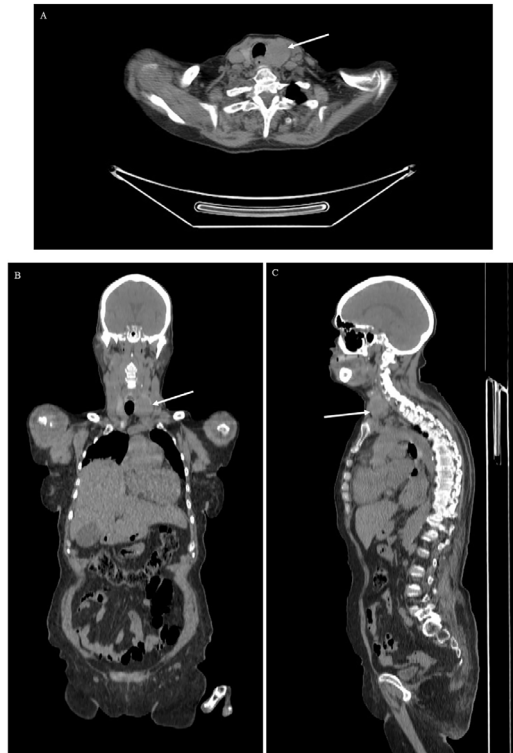


Fig. 3 – Axial (A), sagittal (B), and coronal (C) nonenhanced CT-Scan images demonstrating a nodular oval well-defined, homogeneously dense soft tissue left thyroid lobe lesion (white arrow), with no calcifications, discovered incidentally. It is respecting vascular structures.

The most aggressive and rarest form of thyroid cancer remains the anaplastic thyroid carcinoma (ATC). It demonstrates intense uptake on 18F-FDG PET-CT images [5]. Indeed, Bogsrud [6] and al conducted a study with 18 patients presenting an ATC and referred for 18F-FDG PET-CT. This one indicates that primary ATC, residual tumors, recurrent disease, lymph node metastases, and extranodal metastases consistently show high to very intense FDG uptake [6]. Patient number 1 showed similitudes with our patient concerning the uptake of the lesion whom was at 72 vs 65 in our case [6]. It was the only patient addressed for an initial management of an ATC grade 4 [6].

They concluded that ATC demonstrate intense uptake on 18F-FDG PET-CT images [6]. Furthermore, the medical records reported an impact of the PET findings on the clinical man-

agement with a significant prognostic marker, and could have a clinical impact on the management of ATC patients [5,6].

Due to the intense uptake of 18F-FDG, we can highly suspect the presence of an ATC without being able to confirm it due to the absence of the anatomopathological examination.

Conclusion

The diagnosis is clinically challenging. 18F-FDG PET-CT present an impact on patient management in patients with ATC and should improve disease detection. Knowing the low prevalence of the disease, clinical trials are challenging to conduct and more studies involving detailed pathological analyses and longer follow-up periods are required.

Patient consent

Consent for publication has been obtained from the patient.

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