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FDG-avid external iliac lymph node suspicious for metastatic involvement in progressive radioiodine-refractory papillary thyroid carcinoma: a case report and brief literature review

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Abstract

Introduction: Papillary thyroid carcinoma (PTC) generally has a favorable prognosis; however, a subset of patients develops progressive radioiodine-refractory disease. Pelvic lymph node involvement is uncommon. We report a case of progressive radioiodine-refractory PTC with an FDG-avid external iliac lymph node suspicious for metastatic involvement.

Case presentation: A 72-year-old woman diagnosed with PTC in 2019 underwent total thyroidectomy followed by three courses of radioactive iodine therapy (cumulative activity, 450 mCi). Serum thyroglobulin remained persistently elevated (>300 ng/mL). Lenvatinib therapy was discontinued because of severe gastrointestinal adverse effects and reported cardiovascular complications. Following thoracic radiotherapy, [18F]FDG PET/CT in August 2025 demonstrated a partial metabolic response in the irradiated lesions. However, follow-up imaging in April 2026 revealed progressive FDG-avid disease, including a newly developed, intensely FDG-avid external iliac lymph node (SUVmax, 37) suspicious for metastatic involvement. Small bilateral FDG-avid renal lesions were also identified. Histopathological confirmation of these findings was unavailable.

Discussion: The external iliac lymph node represents an unusual site of suspected disease involvement in PTC. Although its intense FDG uptake and interval appearance in the setting of progressive systemic disease raise suspicion for metastatic involvement, the absence of pathological confirmation prevents a definitive diagnosis. The renal lesions also remain indeterminate without dedicated imaging or histopathological evaluation.

Conclusion: This case highlights the potential value of [18F]FDG PET/CT in identifying atypical sites of suspected disease involvement in progressive radioiodine-refractory PTC. Unusual FDG-avid findings should be interpreted cautiously when pathological confirmation is unavailable.

Keywords: Papillary thyroid carcinoma, Radioiodine-refractory, [^{18}F]FDG PET/CT, Suspicious external iliac lymph node metastasis

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Introduction

Papillary thyroid carcinoma (PTC) is the most common subtype of differentiated thyroid carcinoma and usually has an excellent prognosis after total thyroidectomy and radioactive iodine (RAI) therapy. Nevertheless, a small proportion of patients develop persistent, recurrent, or metastatic disease, particularly when tumor deposits lose iodine avidity and become radioiodine-refractory. This subgroup is clinically important because it is associated with progressive structural disease, limited response to further RAI administration, and a higher risk of disease-specific morbidity and mortality (1,2)

Pelvic lymph node involvement, including the external iliac nodal chain, is uncommon in papillary thyroid carcinoma and may be overlooked during routine imaging interpretation.

[18F]FDG PET/CT has an established role in the assessment of differentiated thyroid carcinoma with suspected dedifferentiation, particularly in patients with elevated thyroglobulin levels and negative or discordant radioiodine imaging.

Increased FDG uptake is generally associated with more aggressive tumor biology and may identify metabolically active lesions that are not adequately demonstrated by iodine-based imaging (3,4)

We present a case of progressive radioiodine-refractory papillary thyroid carcinoma illustrating the importance of evaluating unusual pelvic nodal findings on whole-body [18F]FDG PET/CT and the diagnostic challenges associated with suspected metastatic involvement at atypical anatomical sites.

Case presentation

A 72-year-old woman with a history of papillary thyroid carcinoma (PTC), initially diagnosed in 2019, underwent total thyroidectomy followed by radioactive iodine (RAI) therapy. The original thyroidectomy histopathology report was unavailable for review; therefore, details regarding the histological variant, primary tumor size, extrathyroidal extension, lymphovascular invasion, and initial nodal status could not be verified.

Post-therapeutic whole-body scintigraphy after the first RAI treatment with an administered activity of 150 mCi demonstrated diffuse pulmonary uptake. In the presence of markedly elevated serum thyroglobulin exceeding 300 ng/mL, pulmonary metastatic involvement was suspected.

Because of persistent thyroglobulin elevation, the patient received two additional courses of RAI therapy in 2020 and 2021, each with an administered activity of 150 mCi. Serum thyroglobulin (Tg) levels remained persistently elevated above 300 ng/mL throughout the clinical follow-up period, including the major [18F]FDG PET/CT evaluations in August 2025 and April 2026. Anti-thyroglobulin antibody (TgAb) levels remained within the lower end of the laboratory reference range.

Owing to the discrepancy between post-therapeutic radioiodine scan findings and the markedly elevated thyroglobulin level, [18F]FDG PET/CT was performed and demonstrated FDG-avid lymph nodes in the mediastinal and supraclavicular regions, suspicious for metastatic involvement. No suspicious external iliac lymph node involvement was identified at that time.

Given the persistent structural disease despite repeated radioactive iodine therapy and the discordance between radioiodine imaging and FDG-avid lesions, the disease was considered radioiodine-refractory.

The patient was subsequently treated with lenvatinib, a tyrosine kinase inhibitor (TKI). However, treatment was discontinued because of severe nausea, vomiting, and reported cardiovascular complications. The exact administered dose and duration of lenvatinib therapy could not be verified from the available medical records. Further details regarding the cardiovascular complications were unavailable.

In 2024, the patient underwent thoracic radiotherapy for progressive thoracic disease. Follow-up [^{18}F]FDG PET/CT performed on August 16, 2025, demonstrated a partial metabolic response of the irradiated thoracic lesions. No further systemic therapy was documented

between the August 2025 examination and the subsequent follow-up imaging evaluation.

During routine oncologic follow-up, [18F]FDG PET/CT performed on April 21, 2026, demonstrated interval disease progression, with increased FDG uptake in multiple nodal stations, including the supraclavicular, mediastinal, and hilar lymph nodes (SUVmax up to 38.2).

Numerous pulmonary metastatic lesions were also identified, consistent with extensive metastatic lung involvement (SUVmax up to 8.7). In addition, a newly detected focal FDG-avid lesion was observed in the right sixth rib (SUVmax= 9.1), suspicious for osseous metastatic involvement. The scan demonstrated a newly developed, enlarged, intensely FDG-avid external iliac lymph node (SUVmax, 37), suspicious for metastatic involvement. In addition, small bilateral FDG-avid renal lesions with SUVmax values up to 11.6 were identified (Figures 1- 3).

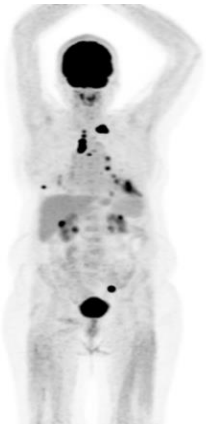


Figure 1. Maximum-intensity-projection (MIP) [18F]FDG PET image demonstrating multiple FDG-avid lesions suspicious for metastatic involvement in a patient with progressive radioiodine-refractory papillary thyroid carcinoma.

Abbreviations: [18F]FDG, fluorine-18 fluorodeoxyglucose; PET, positron emission tomography; MIP, maximum-intensity projection.

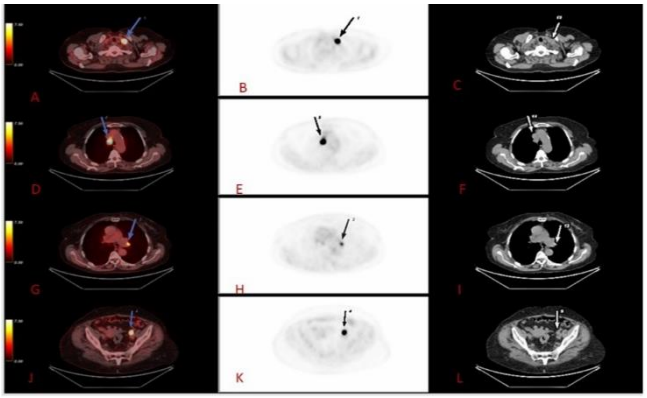


Figure 2. [18F]FDG PET/CT images demonstrating FDG-avid lymph nodes at multiple anatomical sites, suspicious for metastatic involvement. Fused PET/CT, PET, and CT images are presented for the supraclavicular lymph node (A–C), mediastinal lymph node (D–F), hilar lymph node (G–I), and newly developed external iliac lymph node (J–L). The external iliac lymph node represents an unusual site of suspected disease involvement in papillary thyroid carcinoma.

Abbreviations: [18F]FDG, fluorine-18 fluorodeoxyglucose; PET, positron emission tomography; CT, computed tomography.

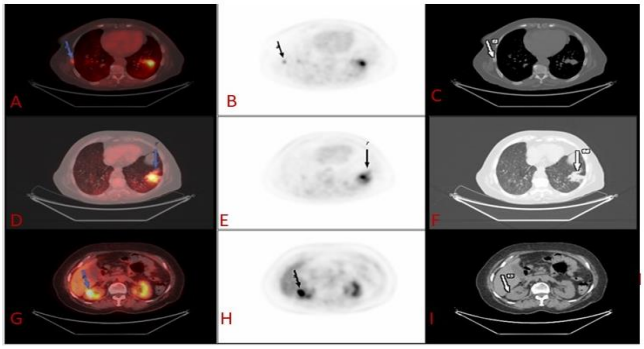


Figure 3. [18F]FDG PET/CT images demonstrating FDG-avid lesions at extranodal sites. Fused PET/CT, PET, and CT images are presented for the right sixth-rib lesion suspicious for osseous metastatic involvement (A–C), pulmonary lesion suspicious for metastatic involvement (D–F), and renal lesion suspicious for metastatic involvement (G–I). The nature of these lesions remains unconfirmed histopathologically.

Abbreviations: [18F]FDG, fluorine-18 fluorodeoxyglucose; PET, positron emission tomography; CT, computed tomography. These renal lesions had not been described as a dominant finding on prior imaging and were detected in association with simultaneous progression at multiple metastatic sites. Given the patient's history of progressive radioiodine-refractory PTC, persistently elevated thyroglobulin levels, and widespread FDG-

avid disease, the bilateral renal lesions were considered suspicious for metastatic involvement. However, their nature remained uncertain because dedicated renal imaging and histopathological confirmation were unavailable.

No dedicated renal imaging with contrast-enhanced CT, MRI, or ultrasonography was performed, and histopathological confirmation was unavailable. Therefore, the renal lesions remained indeterminate, and benign or primary renal pathologies could not be excluded.

No subsequent clinical or imaging follow-up data were available for review after the [18F]FDG PET/CT examination performed on April 21, 2026. Consequently, the subsequent evolution of the external iliac lymph node and bilateral renal lesions, including potential progression or treatment response, could not be assessed.

Discussion

The present case illustrates the diagnostic challenges associated with progressive radioiodine-refractory papillary thyroid carcinoma, particularly the identification of an unusual FDG-avid external iliac lymph node during follow-up.

The principal limitation of this case is the absence of histopathological confirmation of the external iliac lymph node. Although its interval appearance and intense FDG uptake in the setting of progressive systemic disease raise suspicion for metastatic involvement, neither its metastatic nature nor its thyroid origin can be definitively established from imaging alone.

This finding highlights the importance of careful interpretation of atypical PET/CT abnormalities and consideration of further diagnostic evaluation when clinically appropriate.

In addition, small bilateral FDG-avid renal lesions were identified on follow-up PET/CT. Although these findings were suspicious for metastatic involvement, no dedicated renal imaging or histopathologic confirmation was available. Therefore, they should be interpreted cautiously and considered suspicious rather than definitive metastatic lesions (5,6). These findings underscore the importance of interpreting PET/CT abnormalities in conjunction with clinical and anatomical imaging findings (7).

Subdiaphragmatic lymph node involvement is uncommon in differentiated thyroid carcinoma, with previously reported cases predominantly describing inguinal lymph node metastases. Damle et al. reported inguinal nodal involvement in follicular thyroid carcinoma, whereas Aparici et al. described a histopathologically confirmed inguinal lymph node metastasis in papillary thyroid carcinoma. More recently, Suliman et al. reported bilateral inguinal lymphadenopathy as the initial presentation of papillary thyroid carcinoma (8–10). We present a case of progressive radioiodine-refractory papillary thyroid carcinoma illustrating the importance of evaluating unusual pelvic nodal findings on whole-body [18F]FDG PET/CT and the diagnostic challenges associated with suspected metastatic involvement at atypical anatomical sites.

The comparison with previously reported cases is summarized in Table 1.

Table 1. Selected Reports of Unusual Subdiaphragmatic Lymph Node Involvement in Differentiated Thyroid Carcinoma.

Study	Histology	Nodal Site	Confirmation Method	Clinical Remark
Damle et al., 2013	FTC	Inguinal	Fine-needle aspiration cytology (FNAC)	Rare distant nodal spread
Aparici et al., 2014	PTC	Inguinal	Histopathology	Pathology-proven inguinal metastasis
Suliman et al., 2025	PTC	Bilateral Inguinal	Histopathology	Initial presentation of PTC
Present Case	PTC	External Iliac	FDG PET/CT	Suspicious nodal involvement in progressive radioiodine-refractory disease

Tyrosine kinase inhibitors (TKIs) are established systemic treatment options for patients with progressive radioiodine-refractory differentiated thyroid carcinoma (11,12).

Conclusion

An FDG-avid external iliac lymph node suspicious for metastatic involvement represents an unusual imaging finding in progressive radioiodine-refractory papillary thyroid carcinoma.

This case highlights the value of [18F]FDG PET/CT in detecting atypical sites of suspected disease involvement in patients with progressive radioiodine-refractory papillary thyroid carcinoma. Recognition of atypical sites of involvement may provide valuable information for disease assessment and help avoid underestimation of tumor burden during follow-up.

Author contribution

FS: Conceptualization, data collection, investigation, and manuscript drafting.

MRGh: Data collection, clinical evaluation, and manuscript review.

ShN: Data collection, literature review, and manuscript editing.
MA: Clinical evaluation and critical revision of the manuscript.
SMo: Clinical evaluation, data interpretation, and manuscript review.
SMi: Conceptualization, supervision, data interpretation, manuscript drafting, and critical revision.
MK: Clinical evaluation, data interpretation, and critical revision of the manuscript.

All authors reviewed and approved the final version of the manuscript and agreed to be accountable for the work.

Statement of Ethics

This case report was prepared based on clinical evaluations, diagnostic imaging, and treatment performed as part of routine clinical care. Informed consent was obtained from the patient for publication of the clinical information and accompanying images. No additional research-related interventions were performed. The report was prepared in accordance with the applicable ethical principles of the Declaration of Helsinki

Conflicts of interest

There are no conflicts of interest.

Funding

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