

Extensive lymph node metastases found by ^{18}F -FDG-PET/CT in a patient with diffuse sclerosing variant of papillary thyroid carcinoma

To the Editor: The diffuse sclerosing variant of papillary thyroid carcinoma (DSPTC) is a relatively rare histologic subtype of papillary thyroid carcinoma (PTC). It was first described in 1985 [1] and accounts for 2%-10% of all PTC [2-5]. The major clinical features of DSPTC include: younger age at presentation, larger tumor size, greater incidence of cervical lymph node involvement, distant metastases (up to 25% lung metastases), and more frequent presence of high level serum antithyroglobulin antibody (TgAb) [6-8]. To date, few cases of DSPTC were reported in the literature [9]. Our case of DSPTC had extensive lymph node metastases including cervical, axillary, mediastinal and hilar lymph nodes found by ^{18}F -fluorodeoxyglucose (^{18}F -FDG) positron emission tomography/computed tomography (PET/CT).

A 44 years old man with thyroid carcinoma underwent total thyroidectomy with modified neck dissection. Surgical pathology revealed a 3.0X2.0X1.5cm PTC with diffuse

sclerosing variants and 65 metastatic lymph nodes involvement. He was treated with oral administration of 3700MBq of iodine-131 (^{131}I) for ablation of remnant thyroid tissue, one month after surgery and with 5550MBq of ^{131}I for detection and treatment of potential metastatic disease, five months later. Iodine-131 whole-body scan (^{131}I -WBS) demonstrated no evidence for residual active thyroid tissue or metastatic disease after two courses of ^{131}I treatment (Fig. 1).

Serum TgAb was higher than 4000IU/mL and thyroglobulin (Tg) was undetectable. The patient was suspected for high risk of metastatic disease and a ^{18}F -FDG-PET/CT examination was performed, which showed extensive lymph node metastases (including cervical, axillary, mediastinal and hilar lymph nodes) and a single left lung metastasis (Fig. 2, 3). To identify the axillary lesions, ultrasound-guided transthoracic biopsy was performed and pathohistology features were consistent with metastatic DSPTC. Histopathology showed



Figure 1. Whole body ^{131}I scan obtained after the second course of ^{131}I treatment demonstrated no ^{131}I uptake of the residual active thyroid tissue or metastatic disease.



Figure 2. Maximum intensity projection of ^{18}F -FDG whole-body PET acquisition showed extensive focal areas of increased ^{18}F -FDG uptake in the region of the neck, axilla and chest, indicating extensive lymph node metastases, including cervical, axillary, mediastinal and hilar lymph nodes.

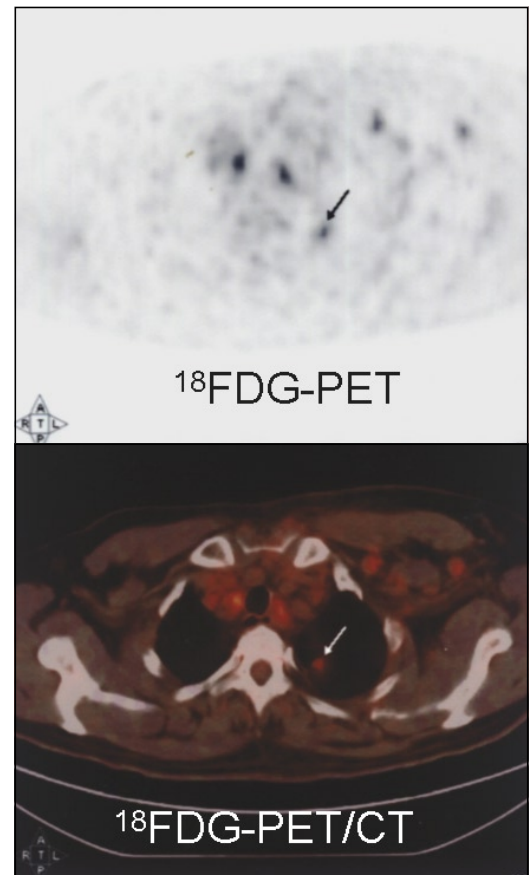


Figure 3. ^{18}F -FDG-PET/CT fusion image showed multiple focal areas of increased ^{18}F -FDG uptake in the region of mediastinum, left axilla and lung.

diffuse involvement of one or both thyroid lobes, sclerosis, abundant psammoma bodies, prominent squamous metaplasia and extensive lymphatic permeation.

In DSPTC a high level of serum TgAb is often found, which is known to influence the measurement of serum Tg [10]. Lately, it has been reported a DSPTC case with serum TgAb level greater than 3000IU/mL [11]. In our case, serum TgAb level was also high to 4000IU/mL and Tg was undetectable. Fluoro-18-FDG accumulation is generally reserved for imaging in patients with differentiated thyroid cancer (DTC) that de-differentiated and can not accumulate and trap iodine [12]. The ¹⁸F-FDG-PET/CT examination could provide additional information to ¹³¹I-WBS in detecting tumor recurrence in DTC patients with elevated TgAb [13].

The DSPTC is a kind of poorly differentiated thyroid cancer (PDTC) that also includes tall cell variant, columnar cell variant, as well as insular carcinoma [14]. Many studies suggested that DSPTC has a poorer prognosis than conventional PTC due to its aggressive nature with frequent lymph node and distant metastases at the time of presentation [11]. PTC metastases to cervical lymph nodes are common; however, metastases to axillary lymph nodes are extremely rare and are associated with systemic disease and poor prognosis [15]. Importantly, metastases from DSPTC may have reduced or not ¹³¹I uptake [12]. In our DSPTC case, the extensively metastatic lymph nodes had no ability to accumulate radioiodine but were well demonstrated by ¹⁸F-FDG-PET/CT.

In conclusion, ¹⁸F-FDG-PET/CT could be useful in the diagnosis of DSPTC. Extensive lymph node metastases with high TgAb level and undetectable Tg may be found in DSPTC.

All authors declare that they have no conflict of interest.

Bibliography

- Vickery AL, Carcangiu ML, Johannessen JV et al. Papillary carcinoma. *Semin Diagn Pathol* 1985; 2: 90-100.
- Sywak M, Pasięka J, Ogilvie T. A review of thyroid cancer with intermediate differentiation. *J Surg Oncol* 2004; 86: 44-54.
- Fujimoto Y, Obara T, Ito Y et al. Diffuse sclerosing variant of papillary carcinoma of the thyroid. Clinical importance, surgical treatment, and follow-up study. *Cancer* 1990; 66: 2306-12.
- Soares J, Limbert E, Sobrinho-Simoes M. Diffuse sclerosing variant of papillary thyroid carcinoma. A clinicopathologic study of 10 cases. *Pathol Res Pract* 1989; 2: 200-6.
- Papadopoulou F, Efthimiou E. Thyroid cancer after external or internal iodizing irradiation. *Hell J Nucl Med* 2009; 12: 266-70.
- Chow SM, Chan JK, Law SC et al. Diffuse sclerosing variant of papillary thyroid carcinoma-clinical features and outcome. *Eur J Surg Oncol* 2003; 29: 446-9.
- Imamura Y, Kasahara Y, Fukuda M. Multiple brain metastases from a diffuse sclerosing variant of papillary carcinoma of the thyroid. *Endocr Pathol* 2000; 11: 97-108.
- Duntas L, Grab-Duntas BM. Risk and prognostic factors for differentiated thyroid cancer. *Hell J Nucl Med* 2006; 9: 156-62.
- Lam AK, Lo CY. Diffuse sclerosing variant of papillary carcinoma of the thyroid: a 35-year comparative study at a single institution. *Ann Surg Oncol* 2006; 13: 176-81.
- Chung JK, Park YJ, Kim TY et al. Clinical significance of elevated level of serum anti-thyroglobulin antibody in patients with differentiated thyroid cancer after thyroid ablation. *Clin Endocr* 2002; 57: 215-21.
- Misra M, Parangi S, Ross DS et al. Case 38-2010: a 13-year-old girl with an enlarging neck mass. *N Engl J Med* 2010; 363: 2445-54.
- Wong TZ, Jain MK, Spratt SE. ¹³¹I, ¹²³I, and ¹⁸F-FDG-PET imaging in a patient with diffuse sclerosing variant of papillary thyroid cancer. *Clin Nucl Med* 2008; 33: 834-7.
- Seo JH, Lee SW, Ahn BC et al. Recurrence detection in differentiated thyroid cancer patients with elevated serum level of anti-thyroglobulin antibody: special emphasis on using ¹⁸F-FDG PET/CT. *Clin Endocrinol* 2010; 4: 558-63.
- Carling T, Ocal IT, Udelsman R. Special variants of differentiated thyroid cancer: does it alter the extent of surgery versus well-differentiated thyroid cancer? *World J Surg* 2007; 31: 916-23.
- Kepenekci I, Demirkan A, Cakmak A et al. Axillary lymph node metastasis as a late manifestation of papillary thyroid carcinoma. *Thyroid* 2009; 19:417-9.

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