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Isolated adrenal metastases of papillary thyroid carcinoma

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Papillary thyroid cancer (PTC) usually runs an indolent clinical course, spreading to the regional lymph nodes (LN) and, less frequently, to the lungs or bones [1]. Distant metastases are found in less than 5% of patients at initial diagnosis and are associated with poor prognosis [2]. Adrenal metastases (AMs) in this setting are rare and usually associated with other distant metastases [3].

To our knowledge, there have been very few reported cases of PTC with metastatic spread only to the adrenal gland [1, 2, 4, 5]. None of these cases achieved remission previously to the diagnosis of AMs. Herein, we report the first case of a patient with a PTC, who developed AMs after a period of complete remission.

A 68-year-old man underwent total thyroidectomy and left cervical lymphadenectomy (September 2015), following PTC diagnosis by fine-needle biopsy of a left thyroid nodule.

Pathology revealed a mixed classic and follicular variant of PTC with the largest diameter of 48 mm with extensive angioinvasion and cervical LN metastases. The first treatment with 3.7 GBq (100 mCi) of radioactive iodine (RAI) under recombinant TSH (rhTSH) was performed (February 2016). The stimulated serum thyroglobulin (Tg) was 22.6 ng/mL, and the whole-body scan (WBS) performed 48 hours after RAI treatment only revealed slight neck uptake. Serum Tg was 9 ng/mL 3 months after treatment, which gradually increased to 19 mg/mL (TSH < 0.02 μ UI/mL) until March 2017, when he underwent a right cervical LN dissection due to recurrent LN disease. Pathology showed LN metastases of PTC. Two months after this surgery, serum Tg was 17 ng/mL (TSH < 0.02 μ UI/mL).

A second RAI treatment with 3.7 GBq (100 mCi) and rhTSH was administered (May 2017), with stimulated Tg of 53.5 ng/mL and WBS showing no abnormal uptake. Serum Tg level 3 months after treatment was 22 ng/mL, which increased in the following months to 2138

ng/mL. A left cervical LN recurrence was detected (Fig. 1) and he was submitted to a left neck dissection in August 2018. Pathology confirmed 4 LN metastases of PTC.

Three months after surgery (November 2018) he showed no evidence of disease, with an undetectable level of Tg and negative anti-Tg antibodies, which were maintained for the next 26 months, with normal neck imaging by ultrasound.

In January 2021, serum Tg increased from undetectable to 1758 ng/mL. In this context, an FDG (2-[18F] fluoro-2-deoxy-D-glucose) — PET (positron emission tomography) — CT (computed tomography) scan was requested, which showed abnormal uptake in the left adrenal gland (Fig. 2).

Left adrenalectomy was performed (March 2021) and a completely excised 100 × 80 × 50 mm AM of poorly differentiated thyroid carcinoma, with solid and insular pattern [stained positive for thyroid transcription factor 1 (TTF1) and Tg] was confirmed upon pathological examination (Fig. 3).

One month after surgery, the serum Tg level dropped to 24 ng/mL (TSH < 0.02 μ UI/mL).



Figure 1. FDG/PET-CT (May/2018): Left supraclavicular lymph node with 40 mm high FDG uptake (SUVmax 10.5)

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Figure 2. FDG/PET-CT (February/2021): left adrenal lesion with high FDG uptake (SUVmax 15.4). No anomalous uptake in other sites

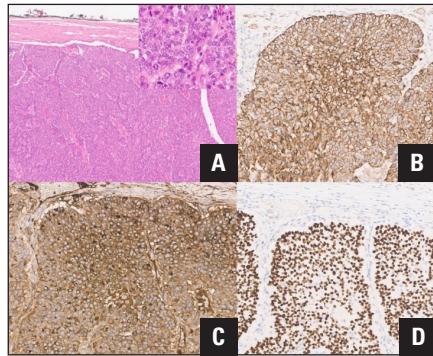


Figure 3. A. Haematoxylin and eosin staining of the adrenal metastasis with the characteristic nuclear features of PTC (inset); B. Cytokeratin AE1/3; C. Thyroglobulin; D. TTF1

The patient underwent a third RAI treatment with 5.5 GBq (150 mCi) under rhTSH in June 2021. The post-therapy WBS showed no evidence of avid iodine disease. However, the FDG-PET-CT scan performed simultaneously with the RAI treatment showed a suspicious uptake in the right adrenal with SUVmax of 6.4. Stimulated Tg was 177 ng/mL.

A thoracoabdominal-pelvic CT confirmed a right adrenal lesion of 18 × 18 × 13 mm with no evidence of disease at the left adrenalectomy bed (Fig. 4). Right adrenalectomy was then performed (August 2021), and pathology confirmed an AM of poorly differentiated thyroid carcinoma, TTF1+, and Tg+ with a similar pattern of the left AM.

Fifteen days after this surgery serum Tg dropped to 12.5 ng/mL (TSH 0.11 μ UI/mL, negative anti-Tg antibodies). The patient is now under active surveillance.

AMs account for approximately 1.7% of DTC distant metastases and are mostly associated with the presence of other distant metastases [3]. To our knowledge there were only 4 reported cases of isolated AMs from PTC [1, 2, 4, 5]. Our case is unique because AMs occurred after a significant period of complete remission. The increase in serum Tg was the initial clue to the diagnosis and the FDG uptake raised the suspicion of the lesions. Interestingly, serum Tg increased despite the poorly differentiated pattern of the AM.



Figure 4. Abdominal-CT (July/2021): Right adrenal lesion of 18 × 13 × 18 mm, with absolute washout of 45.5% and relative washout of 20% (indeterminate lesion)

This case underlines the importance of a close and prolonged surveillance of patients with high-risk thyroid cancer. The early diagnosis of distant metastasis can have a significant prognostic impact, making surveillance either with tumour markers or imaging procedures mandatory.

Conflict of interests

The authors have no conflicts of interest to disclose

Statement of ethics

The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. Data were collected retrospectively.

Competing interests

None declared.

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