Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Endocrinology

Lipoma: An Unusual Iodine-131 Uptake on Whole-Body Scanning: A Case Report

Mariam Hamaichat[1*], Mamadou Togo[2], Ali Halouache[2], Ahmed Anas Guerboub[2]

[1]Endocrinology Department of Souss Massa University Center, Agadir, Morocco
[2]Endocrinology Department of Mohamed V Military Training Hospital, Rabat, Morocco

DOI: https://doi.org/10.36347/sjmcr.2024.v12i09.024 | **Received:** 16.08.2024 | **Accepted:** 20.09.2024 | **Published:** 23.09.2024

***Corresponding author:** Mariam Hamaichat
Endocrinology Department of Souss Massa University Center, Agadir, Morocco

Abstract **Case Report**

Whole-body radioiodine scintigraphy plays a major role in detecting metastases or recurrence of differentiated thyroid cancers. However, radioactive iodine uptake is not specific to thyroid tissue, and many physiological and pathological variants can bind radioactive iodine, resulting in false positives that can compromise the correct interpretation of results. We report the case of a 73-year-old patient with papillary thyroid carcinoma who underwent surgery 2 years ago, and whose whole-body scan, performed in the face of rising thyroglobulin levels, revealed abnormal fixation on the thigh, and further investigations suggested a lipoma. Our aim in reporting this case is to contribute to the knowledge of new false positives linked to iodine-131 fixation, in order to avoid unusual diagnostic errors that can lead to the unnecessary administration of therapeutic doses of iodine-131 or to aberrant surgical interventions.

Keywords: Differentiated thyroid cancer, False positive, Lipoma, Iodine-131 fixation.

INTRODUCTION

Papillary thyroid carcinoma is a malignant thyroid tumour of follicular origin, accounting for approximately 85% of well-differentiated thyroid cancers [1]. It is associated with a more favourable prognosis [2]. The thyroid gland has the ability to concentrate iodine, making it the most specific radionuclide for imaging papillary thyroid carcinoma to diagnose metastatic disease [2]. However, a considerable number of cases of false-positive uptake of radioactive iodine 131 have been reported.

The objective of this article is to present a case of unexpected fixation of radioactive iodine by a lipoma in a patient undergoing treatment for papillary thyroid carcinoma.

CASE REPORT

This is a 73-year-old female patient who has been under the care of the otorhinolaryngology department for a multiheteronodular goitre, with a right isthmolobar nodule, classified as EUTIRADS 4A and measuring 14x8 mm. Cytopunction indicated a Bethesda V result.

The patient underwent a right Isthmolobectomy, followed by surgical totalisation without lymph node curage. The anatomopathological study revealed an intrathyroidal encapsulated papillary carcinoma measuring 1.5 cm in length. The tumour was classified T1b Nx Mx associated with a vesicular adenoma in the right lobe, with no sign of malignancy in the left lobe.

The patient's risk of recurrence was considered low, and the indication for isotopic totalization with iodine-131 iratherapy was not retained.

The patient was referred to our endocrinology department one month after surgery for a follow-up appointment. The initial thyroglobulin (TG) level was 1.23 ng/ml, anti-TG antibodies were negative, and ultrasound revealed an empty thyroid lodge with no adenopathy. The patient was initiated on a regimen of L-thyroxine at a dosage of 2.4 µg per kilogram of body weight per day. The initial target for the thyroid-stimulating hormone (TSH) was set at a range of 0.1 to 0.5.

Throughout the disease process, the patient's TG levels remained below 0.2 until the two-year postoperative follow-up, at which point an elevation in

TG levels was observed. A cervical ultrasound revealed an empty thyroid lodge with the presence of a few benign lymph nodes. A whole-body iodine-131 scintigraphy was recommended following the cessation of L-thyroxine administration for a four-week period. Thyrotropic axis stimulation was verified by a TSH assay of 58.49 IU/L. The defreating TG level was 6.62 ng/ml. The patient was administered an oral dose of 4 mCi of iodine-131. A whole-body scan was conducted at a speed of 12 cm/min after 48 hours of iodine administration, revealing two pathological foci of iodine fixation in the thyroid region and three nodular hyperfixing foci on the right leg (not consistent with contamination, as confirmed after removal of clothing and several washings), with no other fixation abnormalities on the rest of the body (Figure 1).

A clinical examination revealed a soft mass on the anterior aspect of the right thigh, which corresponded to the site of fixation. The ultrasound examination revealed a well-limited oval subcutaneous formation with regular contours, a hypoechoic echostructure containing hyperechoic trabeculae, measuring 19x35 cm. These findings initially suggested a lipoma, a benign tumour of adipose tissue. An additional soft tissue MRI scan confirmed the ultrasound findings. Following a consultation with the nuclear medicine department, a decision was made to administer a course of irratherapy at a therapeutic dose of 100 mCi, with the aim of improving the patient's subsequent follow-up.

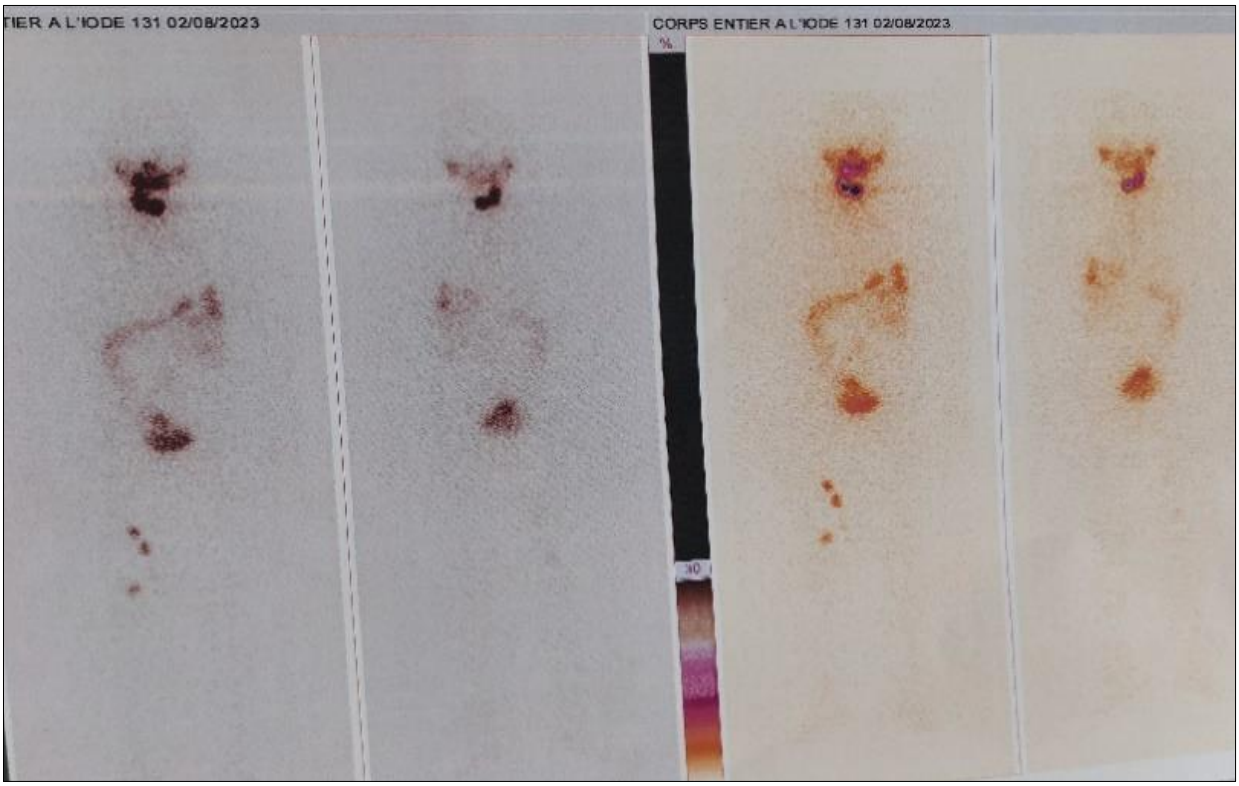

Figure 1: Whole-body radioiodine sintigraphy

DISCUSSION

It is estimated that differentiated thyroid cancer accounts for over 90% of all thyroid cancer cases [3]. In the majority of cases, the prevailing approach remains surgical intervention followed by radioactive iodine treatment.

As early as 1896, Baumann first demonstrated that the thyroid gland concentrates iodide by a factor of 20 to 40 times compared to plasma under physiological conditions. The iodine captured by the thyroid is oxidised and bound to tyrosine, forming iodotyrosines. The condensation of these leads to the synthesis of thyroid hormones [4]. This ability of the thyroid gland to bind iodide has served as the basis for the diagnosis and treatment of benign thyroid disease and thyroid cancer.

In 1996, the discovery of the sodium iodide symporter NIS enabled an explanation to be provided for the exclusive binding of radioactive iodine to the thyroid gland and a few other organs (salivary and lacrimal glands, stomach, choroid plexus, ciliary body of the eye, skin, placenta, lactating mammary gland and thymus) [5].

Despite this high specificity of radioiodine (131I) uptake, a number of false-positive results have been described with a variety of mechanisms: uptake by ectopic thyroid tissue, which may be located, for example, at the root of the tongue, in the thyroglossal

duct or in subdiaphragmatic organs; uptake by non-thyroid tissues that may express NIS [6]. Hepatic uptake is explained by metabolism of radioiodine-labelled thyroid hormones. Binding in the urinary tract is due to urinary excretion of the tracer. Iodide transport into the bloodstream is responsible for visualisation of the vascular compartment and haematoma. Other artefacts can also be explained by contamination by physiological fluids: saliva, urine, vomit, sweat, breast milk and nasal and pulmonary secretions [7].

Inflammation caused by infection, trauma or infarction can also lead to false-positive 131I fixation. This is due to increased blood flow and capillary permeability, leading to accumulation of cells in tissues and vessels and stasis of radioiodinated blood [8]. Our case of iodine fixation by a lipoma is not previously described, and can be explained by this inflammatory phenomenon. Other rare cases of false positives have been described in the literature: fixation at the level of a tubal ligation [9], fixation by a textileoma [7], fixation by an artificial oil [10], the pathophysiological mechanisms of which are not well understood.

CONCLUSION

Iodine-131 scintigraphy is an important tool in the diagnosis and follow-up of differentiated thyroid cancer. To the best of our knowledge, our case represents the first case of unexpected radioiodide uptake in a lipoma. With this observation, we add a new false positive that must be taken into account when interpreting the whole-body scan.

REFERENCES

1. Coca-Pelaz, A., Shah, J. P., Hernandez-Prera, J. C., Ghossein, R. A., Rodrigo, J. P., Hartl, D. M., ... & Ferlito, A. (2020). Papillary thyroid cancer—Aggressive variants and impact on management: A narrative review. *Advances in therapy*, *37*, 3112-3128.
2. Fathima Fijula, P. M., & Harleen, K. (2023). Radioactive Iodine for Thyroid Malignancies. University of Arkansas for Medical Sciences. *StatPearls Publishing LLC*.
3. Wu, K., Ozomaro, U., Flavell, R., Pampaloni, M., & Liu, C. (2021). Causes of false-positive radioactive iodine uptake in patients with differentiated thyroid cancer. *Current Radiology Reports*, *9*(6), 6.
4. Baumann, E. (1986). Uber den Jodgehalt der Schilddrusen von Menchen und tieren. *Hoppe Seylers Z Physiol Chem*, *22*, 1-17.
5. Riesco-Eizaguirre, G., & Santisteban, P. (2006). A perspective view of sodium iodide symporter research and its clinical implications. *European Journal of Endocrinology*, *155*(4), 495-512.
6. Han, N., Zhang, Y., Si, Z., & Wang, X. (2022). Unexpected false-positive uptake of 131I on the right eye in a patient with differentiated thyroid cancer: a case description. *Quantitative Imaging in Medicine and Surgery*, *12*(8), 4337.
7. Mouaden, A., Guerrouj, H., & Aouad, N. B. R. (2012). Fixation inhabituelle au balayage à l'iode-131: un textilome!. *Médecine Nucléaire*, *36*(10), 640-643.
8. Oh, J. R., & Ahn, B. C. (2012). False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. *American journal of nuclear medicine and molecular imaging*, *2*(3), 362.
9. Tong, J., Jin, Y., Liu, M., Lv, Z., & Chen, L. (2018). False-positive uptake of 131I due to tubal ligation in a patient with papillary thyroid cancer. *Clinical Nuclear Medicine*, *43*(5), 375-376.
10. Bakheet, S. M., & Hammami, M. M. (1994). False-positive radioiodine whole-body scan in thyroid cancer patients due to unrelated pathology. *Clinical nuclear medicine*, *19*(4), 325-329.