Radio-Iodine Thymic Uptake in Thyroid Carcinoma Follow Up: Lesson to be Learned from a Case Report

Laila Ennazk[1,*], Ghizlane El Mghari[1], A. Matrane[2] and Nawal El Ansari[1]

[1]*Department of Endocrinology, Diabetology and Metabolic Diseases, King Mohammed VI University Hospital, PCIM Laboratory, Faculty of Medicine, Marrakesh, Morocco;* [2]*Department of Nuclear Medicine, King Mohammed VI University Hospital, Marrakesh, Morocco*

Abstract: Differentiated thyroid cancer is a relatively rare disease. It comprises papillar and follicular carcinoma which account for the major of thyroid malignancies. Its incidence is becoming increasingly prevalent because of the generalization of thyroid imaging explorations. Since differentiated carcinoma cell retains the normal thyroid features of concentrating and organifiying iodine, radioiodine therapy has been a powerful treatment modality and the whole body iodine scan an effective tool for both diagnosis and follow up. False-positive in whole body scan may be observed after radioiodine therapy. Thymus uptake is an uncommon cause of false-positive in this context. This fact must be known by practitioners in order to prevent unnecessary treatment.

Keywords: Thymus, radioiodine, thyroid neoplasm, whole body scan.

INTRODUCTION

Thyroid cancer is the most common endocrine malignancy after ovarian tumors. Differentiated thyroid carcinoma represents 98% of cases [1]. It has an excellent overall prognosis when early diagnosed and appropriately treated. The first line management is represented by radical surgery that permits complete removal of remaining thyroid tissue and accurate long-term surveillance [2]. Postoperative management includes radioiodine therapy that seeks to eliminate remnant thyroid cells or to treat distant metastases. It is indicated considering the patient's risk group category. Early detection of recurrent disease is possible by total body scan performed after radioiodine therapy that has been the gold standard imaging technique [3]. However, there are non-thyroidal conditions associated with iodine accumulation that may falsely be misinterpreted as metastasis. We are reporting a case report of a false positive thymic uptake.

CASE REPORT

A 19-year-old male was histopathologically diagnosed with papillary carcinoma of the thyroid that was infiltrating the capsula with gangliar metastases after a total thyroidectomy and bilateral neck dissection. He underwent a iodine 131 thyroid scintigraphy which revealed an uptake in the right paramedian cervical region and another in the left paramedian region. He received the first dose of 100mci after what the post therapy whole body scan showed 3 uptake regions (median, left and right paramedian). The ultrasonography and the cervicothoracic computed tomography revealed a left laterocervical mass where as the serum thyroglobulin was at 175.6 microg/l. The patient underwent a second dose of radioidine therapy. The whole body scan was positive in the anterior mediastinum and the thoracic computed tomography showed a thymic residue filling the mediastinal fat (Figure **1**). A new iodine whole body scan made four months later was negative (Figure **2**). The patient is at the moment in ambulatory control.

DISCUSSION

Radioactive iodine has been a valuable agent in developing tools for diagnosis and management of thyroid diseases. This has been possible because of the ability of thyroid and differentiated carcinoma to concentrate and organify iodine. Radioiodine therapy is given in postoperative differentiated thyroid carcinomas to destroy normal thyroid remnants, occult carcinomas and to increase the sensitivity of iodine total body scan [3]. However, false positive iodine uptake may occur.

Physiologic conditions associated with iodine accumulation are the uptake in the salivary glands, the bladder, the breast, hepatic and gastrointestinal tract. Some inflammation processes may also give an uptake in lungs, sinusoidal or dental areas [4]. Thymic uptake is possible in normal or hyperplasic thymus. Jackson was the first to describe two cases of thymic uptake out of forty-four patients with thyroid cancer with no evidence of thyroid cancer extension in histopathology [5]. Mechanisms of thymic radioiodine uptake are not yet clearly understood.

*Address correspondence to this author at the Department of Endocrinology, Diabetology and Metabolic Diseases, King Mohammed VI University Hospital, PCIM Laboratory, Faculty of Medicine, Marrakesh, Morocco;
Tel: +212660254050; E-mail: lennazk@gmail.com

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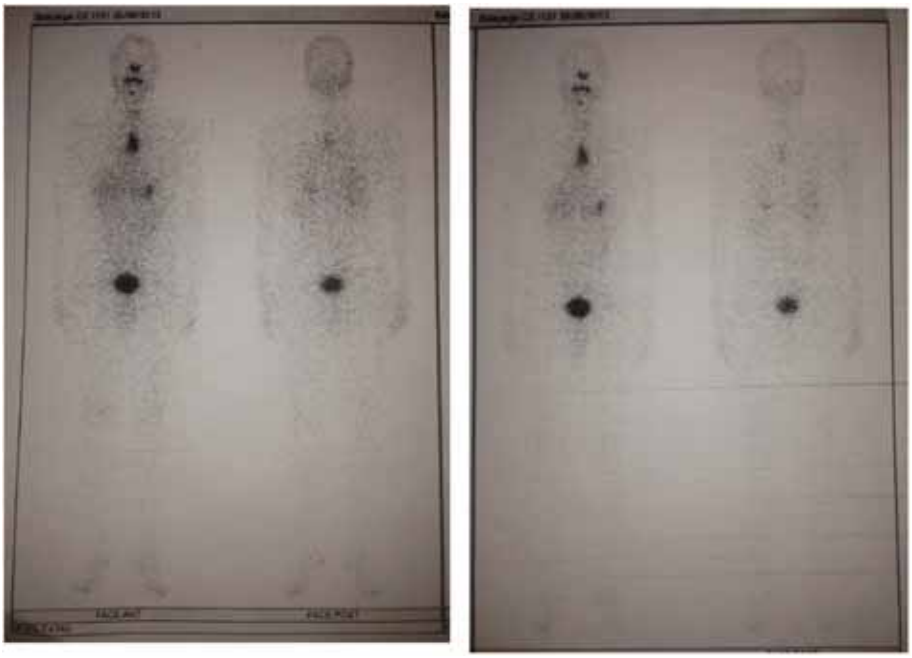

Figure 1: Post-therapy 131 radio-iodine whole body scan showing anterior mediastinal uptake.

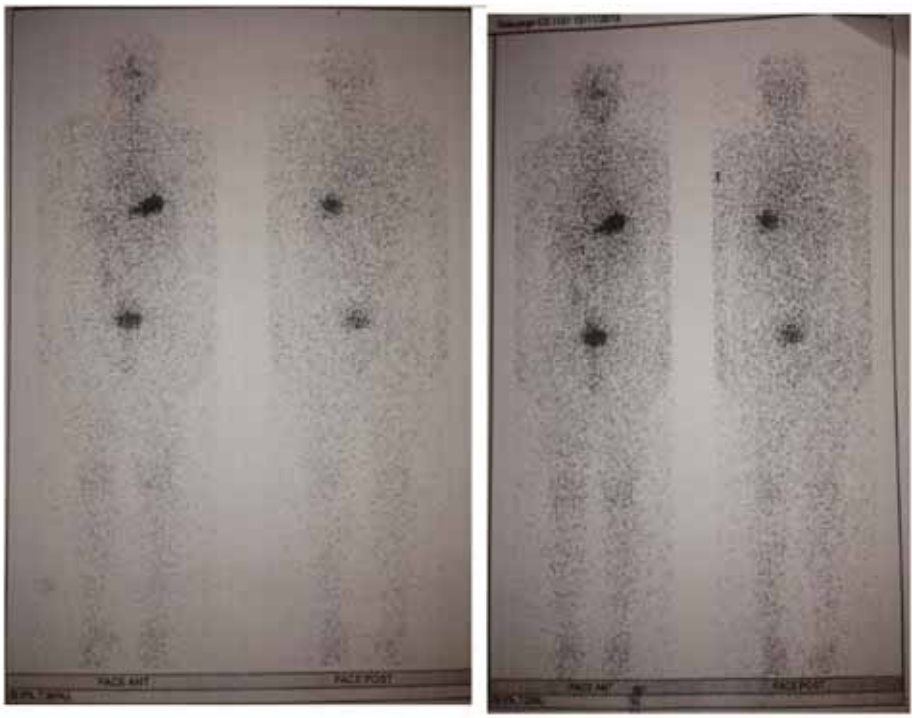

Figure 2: The last 131 iodine whole body scan showing only a physiologic uptake.

Thyroid and thymus glands have a common embryologic ridge which is the third and forth pharyngeal pouch before the thymus migrated in the mediastin [6]. At cellular level, the thymus includes Hassal's bodies that are follicule-like structures [7]. It is admitted that these cells are expressing the human Na+/I- symporter as do thyroidocytes but with a iodine transport and concentration fewer than that in the thyroid [8]. This is why thymic uptake is seen more commonly on post-therapy scans when large activities are administrated.

Thymic uptake in iodine scintigraphy maybe suggestive either of ectopic thyroidal tissu in the thymus or of metastases. It has been noticed that benign thymic uptake was seen in young, with high

doses of radioiodine, diffuse enlargement of the thymic gland without any other mediastinal images and finaly with undetectable serum thyroglobulin [9]. Increasingly, the physiological thymic uptake is clearly seen in the 7-day scan as was the case for our patient.

CONCLUSION

False-positive radioiodine uptake mimiking thyroid carcinoma metastases should be known to prevent additional investigations and unnecessary therapy for a good prognosis neoplasm.

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