Case report

Adrenocortical adenoma manifesting as false-positive iodine accumulation in a patient with history of thyroid carcinoma

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ABSTRACT

A 47-year-old female diagnosed with well-differentiated papillary thyroid carcinoma was referred to our center for a 131Iodine whole body scintigraphy as follow-up. The patient had been previously treated with total thyroidectomy and ablative dose of 175mCi 131I three years ago. Diagnostic 131I scan showed a zone of radioiodine uptake in posterior aspect of the left upper quadrant of the abdomen. Spiral abdominal and pelvic CT scan showed an enhancing solid mass in superior aspect of the left adrenal gland, which was in favor of metastasis to the lymph node or an adrenal tumor. A biopsy was performed from the lesion. Histological examination of the surgical specimen was consistent with adrenocortical adenoma. Even though rare, adrenocortical adenoma should be included in the potential causes of false-positive results of radioiodine scans. © 2018 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

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Introduction

Thyroid carcinoma is treated by near-total or total thyroidectomy followed by 131Iodine (131I) ablation of any remnant thyroid tissue [1]. 131Iodine whole body scan has been used for the follow-up of differentiated thyroid carcinoma for several decades [2]. Various physiological and pathological processes and anatomical variants can arise misleading artifacts or interpretation in nuclear scintigraphy [3–5]. We herein describe the case of a female who had been treated with near-total thyroidectomy and radioiodine ablative therapy for papillary thyroid cancer with a false positive uptake in simultaneous adrenocortical adenoma on diagnostic 131I.
Fig. 1 – a) Posterior view of $^{131}$I whole body scintigraphy showed a focal uptake at the left upper quadrant (arrow), suspected to be a metastatic lesion. b and c) Coronal and transverse views (respectively) of spiral abdominal and pelvic CT scan showed a solid mass about 40 × 35 mm in superior aspect of the left adrenal (arrow) which was in favor of metastasis to the lymph node or an adrenal tumor.

whole body scan. Considering potential false-positive $^{131}$I scintigraphy is critical to avoid the dispensable surgery or exposure to further radiation.

Case report

A 47-year-old female diagnosed with well-differentiated papillary thyroid carcinoma was referred to our center for a $^{131}$Iodine whole body scintigraphy as follow-up. The patient had been previously treated with total thyroidectomy and ablative dose of 175mCi I-131 three years ago. Forty-eight hours after the oral administration of 5 mCi $^{131}$I, whole body scan showed a zone of radioidine uptake in posterior aspect of the left upper quadrant (LUQ) of the abdomen (Fig. 1a). Further evaluation was done and spiral abdominal and pelvic CT scan showed an enhancing solid mass about 40 × 35 mm in superior aspect of the left adrenal gland, which was in favor of metastatic lymph node or adrenal tumor (Fig. 1b and c). This finding prompted the surgical resection of the lesion. Histological examination of the surgical specimen was consistent with adrenocortical adenoma. Because the scans of the patient were anonymous and no experimental intervention was done for the patients, ethical approval was not necessary.

Discussion

In patients diagnosed with differentiated thyroid carcinoma, the whole body $^{131}$Iodine scintigraphy is considered as an essential part of their follow-up [3,4]. The specificity of $^{131}$I whole body scan for detecting residual or recurrent differentiated thyroid carcinoma is reported to be greater than 90% [6]. However, there are many potential causes of false-positive $^{131}$I whole body scintigraphy findings [6–8]. Radioiodine uptake is not specific for thyroid tissue and could also be observed in healthy tissues, including thymus [4], liver, gastrointestinal tract, nasal activity, lactating breasts, Zenker’s diverticulum, and Meckel’s diverticulum or in benign diseases, such as hiatal hernia [3], inflammatory lung disease, sialoadenitis, cysts, and inflammation, or in a variety of benign and malignant nonthyroidal tumors, which could be mistaken for thyroid carcinoma [6–11].

The suggested mechanisms of iodine accumulation in variety of inflammatory and infectious disease are: increased blood flow that delivers increased levels of iodine to the site, and enhanced permeability of the capillary that increases diffusion of the iodine to the extracellular space [7,12].

The suggested mechanisms of iodine accumulation in non-thyroidal neoplasms are: tumor expression of the NIS, that actively accumulates the iodine and increased vascularity, and enhanced capillary permeability that may be secondary to the inflammatory process due to neoplasm [12,13].

Recognition of potential false-positive $^{131}$Iodine scintigraphy is important to avoid additional costly investigations and unnecessary surgery or exposure to further radiation from repeated therapeutic doses of $^{131}$Iodine. Also fused single-photon emission computed tomography/computed tomography images could be very useful in these situations. To the best of our knowledge, this is the first report in the literature of an adrenocortical adenoma as potential causes of false-positive results of radioiodine scans. Even though rare, adrenocortical adenoma should be included in the potential causes of false-positive results of radioiodine scans.

Conclusion

In this case, adrenocortical adenoma uptake of $^{131}$I, misled to unnecessary surgical resection of the lesion. Hence, it is highly important to consider adrenocortical adenoma as a differential diagnosis of upper abdominal uptake of $^{131}$I. Although rare, adrenocortical adenoma should be included among the potential causes of false-positive radioiodine scans.
Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2018.07.015.

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