

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case report

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

Mahdi Haghigatafshar, MD^{a,*}, Fatemeh Shekoohi-Shooli, PHD^b^a Nuclear Medicine and Molecular Imaging Research Center, Namazi Teaching Hospital, Shiraz University of Medical Sciences, Shiraz, Iran^b Institute for Advanced Biomedical Technologies, Via Luigi Polacchi, 11, 66100 Chieti, Italy

ARTICLE INFO

Article history:

Received 22 May 2018

Revised 13 June 2018

Accepted 8 July 2018

Available online 3 August 2018

Keywords:

Radioiodine

Adrenocortical adenoma

Thyroid carcinoma

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.

This is an open access article under the CC BY-NC-ND license.

[\(http://creativecommons.org/licenses/by-nc-nd/4.0/\)](http://creativecommons.org/licenses/by-nc-nd/4.0/)

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

Acknowledgment: There are no financial or commercial conflicts of interest concerning this study. We thank the Namazi teaching hospital nuclear medicine technicians.

* Corresponding author.

E-mail address: afsharm@sums.ac.ir (M. Haghigatafshar).<https://doi.org/10.1016/j.radcr.2018.07.015>1930-0433/© 2018 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license. (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

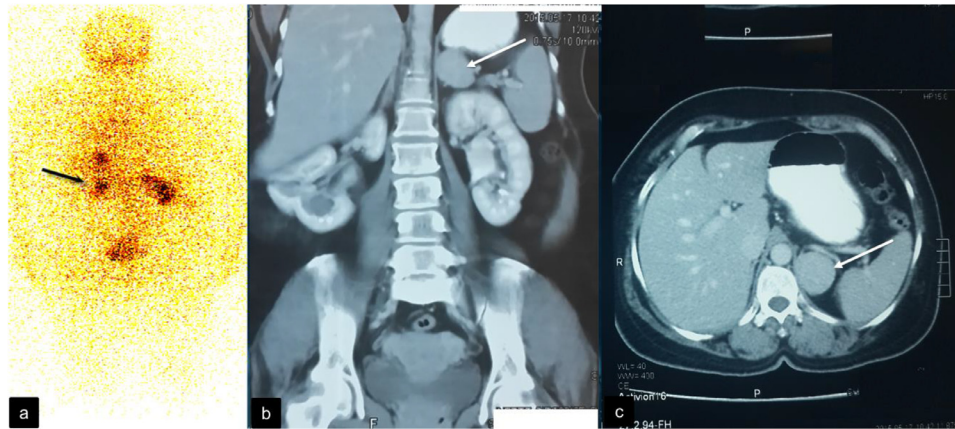


Fig. 1 – a) Posterior view of ^{131}I whole body scintigraphy showed a focal uptake at the left upper quadrant (arrow), suspected to be a metastatic lesion. b and c) Coronal and transverse views (respectively) of spiral abdominal and pelvic CT scan showed a solid mass about 40×35 mm in superior aspect 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}I 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 radioiodine 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}I 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 nonthyroidal 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}I scintigraphy is important to avoid additional costly investigations and unnecessary surgery or exposure to further radiation from repeated therapeutic doses of ^{131}I . 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.

REFERENCES

- [1] Vini L, Harmer C. Radioiodine treatment for differentiated thyroid cancer. *Clin Oncol (R Coll Radiol (Great Br))* 2000;12(6):365.
- [2] Biyi A, Oufroukhi Y, Doudouh A. False-positive whole-body I-131 scan in thyroid carcinoma caused by gastroesophageal reflux disease. *Internet J Nucl Med* 2007;5(1).
- [3] Haghghatafshar M, Farhoudi F. Incidentally visualization of the thymus on whole-body iodine scintigraphy: report of 2 cases and review of the latest insights. *Medicine* 2015;94(26):1–3.
- [4] Haghghatafshar M, Khajehrahimi F. Hiatal hernia uptake of iodine-131 mimicking mediastinal metastasis of papillary thyroid carcinoma. *Ind J Nucl Med: IJNM: Off J Soc Nucl Med, India* 2015;30(4):347.
- [5] Eftekhari M, Fard-Esfahani A, Haghghatafshar M, Keyvan A, Beiki D, Aghahosseini F, et al. Bone scan with incidental visualization of the entire colon. *Iran J Nucl Med* 2010;18(2):56–9.
- [6] Sisson TATAToRS CJ, Freitas J, McDougall IR, Dauer LT, Hurley JR, et al. Radiation safety in the treatment of patients with thyroid diseases by radioiodine 131I: practice recommendations of the American thyroid association. *Thyroid* 2011;21(4):335–46.
- [7] Shapiro B, Rufini V, Jarwan A, Geatti O, Kearfott K, LM F. Artifacts, anatomical and physiological variants, and unrelated diseases that might cause false-positive whole-body 131-I scans in patients with thyroid cancer. *Semin Nucl Med* 2000;30(2):115–32.
- [8] Oh J, Ahn B. False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. *Am J Nucl Med Mol Imaging* 2012;2(3):362–85.
- [9] You DL, Tzen Ky Fau - Chen JF, Chen Jf Fau - Kao PF, Kao Pf Fau - Tsai MF, Tsai MF. False-positive whole-body iodine-131 scan due to intrahepatic duct dilatation. 19980205 DCOM-19980205(0161-5505 (Print)). eng.
- [10] Giuffrida D, Garofalo Mr Fau - Cacciaguerra G, Cacciaguerra G Fau - Freni V, Freni V Fau - Ippolito A, Ippolito A Fau - Regalbuto C, Regalbuto C Fau - Santonocito MG, et al. False positive 131I total body scan due to an ectasia of the common carotidis. 19930720 DCOM- 19930720(0391-4097 (Print)). eng.
- [11] Husmann L, Scheffel H Fau - Stumpe K, Stumpe K Fau - Schmid S, Schmid S Fau - Alkadhi H, Alkadhi H Fau - Goerres GW, Goerres GW. Pyelocaliceal diverticulum as a rare pitfall in I-131 post-therapy scanning. 20100518 DCOM-20100813(1536-0229 (Electronic)). eng.
- [12] Ahn B-C. Physiologic and false positive pathologic uptakes on radioiodine whole body scan. 12 Chapters on Nuclear Medicine. InTech; 2011.
- [13] Mitchell G, Pratt B, Vini L, McCready V, Harmer C. False positive 131I whole body scans in thyroid cancer. *Br J Radiol* 2000;73(870):627–35.