

Ovarian Teratoma Mimicking Metastasis on I-131 Scan : A Case Report

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Received: 6 June 2012 / Revised: 19 August 2012 / Accepted: 21 August 2012 / Published online: 15 September 2012
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Abstract The whole body I-131 scan is routinely performed in the postoperative treatment of patients with well-differentiated thyroid cancer. Accurate interpretation of whole body I-131 scan after thyroidectomy is critical to appropriate management of patients with thyroid cancer, to prevent unnecessary surgical removal or exposure to radioiodine. Unfortunately, false-positive uptakes in several other organs and their associated disease processes have been reported. We report a case of false-positive iodine uptake in the pelvic region with incidentally diagnosed mature cystic teratoma.

Keywords Thyroid cancer · Whole body I-131 scan · Mature cystic teratoma

Introduction

Well-differentiated papillary and follicular thyroid carcinomas are the only cancers known that can be cured by radioisotope therapy, even when having metastases [1]. Radioiodine scintigraphy and therapy are based on sodium iodide symporter (NIS)-related uptake of iodine by the malignant tissue, resulting in sodium-dependent active transport, organification and retention of iodine [2].

Over time, there have been several reports of false-positive radioiodine uptake in other organs and their

associated diseases, as well as in other pathologic processes [3–6]. Here, we report a case of ovarian teratoma mimicking metastasis from thyroid cancer on whole body I-131 scan.

Case Report

A 43-year-old woman visited our hospital for evaluation of a left thyroid nodule discovered upon health screening. Ultrasonography-guided fine needle aspiration of the nodule suggested papillary carcinoma of the thyroid. She subsequently underwent total thyroidectomy with central and left selective lymph node dissection. The tumor grossly invaded the esophagus and left recurrent laryngeal nerve. Histopathology confirmed papillary carcinoma with extrathyroidal extension. Eight out of 27 removed lymph nodes were found to contain metastatic disease. She was treated with 4500 cGy of radiotherapy to the surgical bed because of a postoperative residual lesion, and 900 cGy of radiotherapy to regional metastatic lymph nodes. Serum thyroglobulin was elevated at 517.7 ng/ml 5 months after completion of external radiotherapy. Therefore, a diagnostic whole body scan was performed with 74 MBq (2 mCi) I-131 administered orally to evaluate the elevated thyroglobulin. The scan revealed faint cervical uptake representing residual thyroid tissue, and another uptake at the right pelvic region that was mistaken as urinary bladder due to excretion (Fig. 1). The post-therapy whole body scan, performed 2 days after the administration of 5550 MBq (150 mCi) I-131 for suspected residual tumor foci, showed the intense uptake at the right pelvic region, as well as the thyroid bed (Fig. 2). On abdominal and pelvic computed tomography (CT) scans, a 6.6 × 5.0 cm-sized, lobulated, well-defined and heterogeneously attenuated mass was seen in the right ovary, corresponding to radioiodine uptake (Fig. 3). The mass had intratumoral fat, calcification and fluid. Another 1.5 cm-sized, well-defined and

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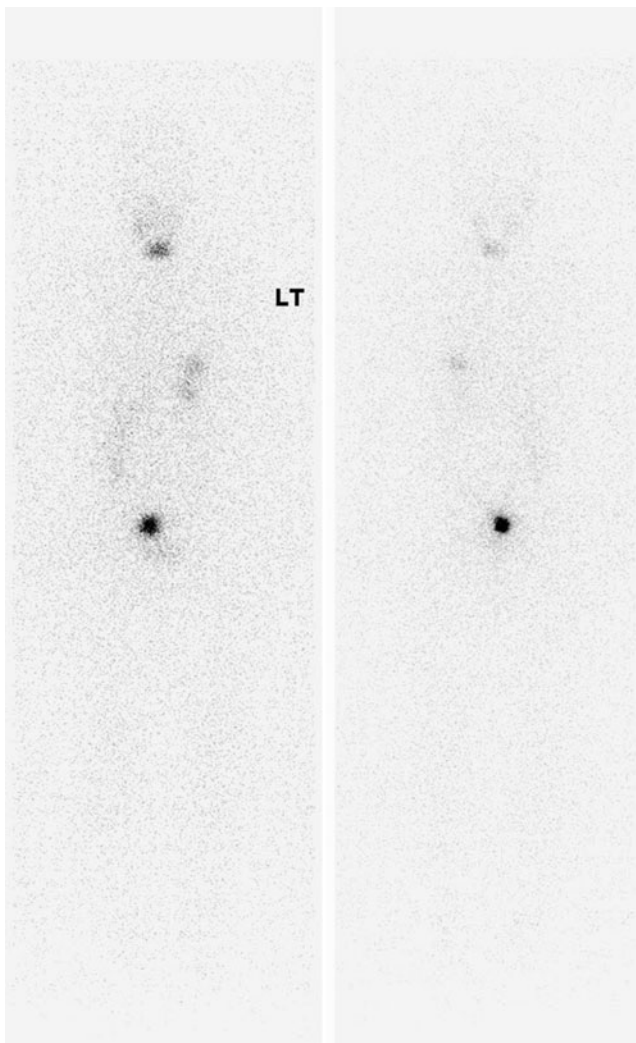


Fig. 1 The diagnostic whole body I-131 scan performed after the administration of 74 MBq (2 mCi) I-131 revealed faint cervical uptake, representing residual thyroid tissue and right pelvic uptake

oval-shaped cyst was also seen in the left ovary. Right salpingo-oophorectomy was performed and histopathology confirmed mature cystic teratoma of the right ovary with components of normal thyroid tissue (Fig. 4). Two months after surgery, serum thyroglobulin dropped to undetectable level (less than 1 ng/ml).

Discussion

The NIS in the basal membrane of thyroid follicular cells is involved in sodium-dependent active transport, organification and retention of iodine [2]. In addition, extrathyroidal tissues, such as stomach, salivary glands, and breast, are known to express NIS, and these organs are capable of physiologic uptake of iodine [4–7].

Ovarian radioiodine uptake at whole body I-131 scan may occur in benign conditions, such as benign struma ovarii [8],

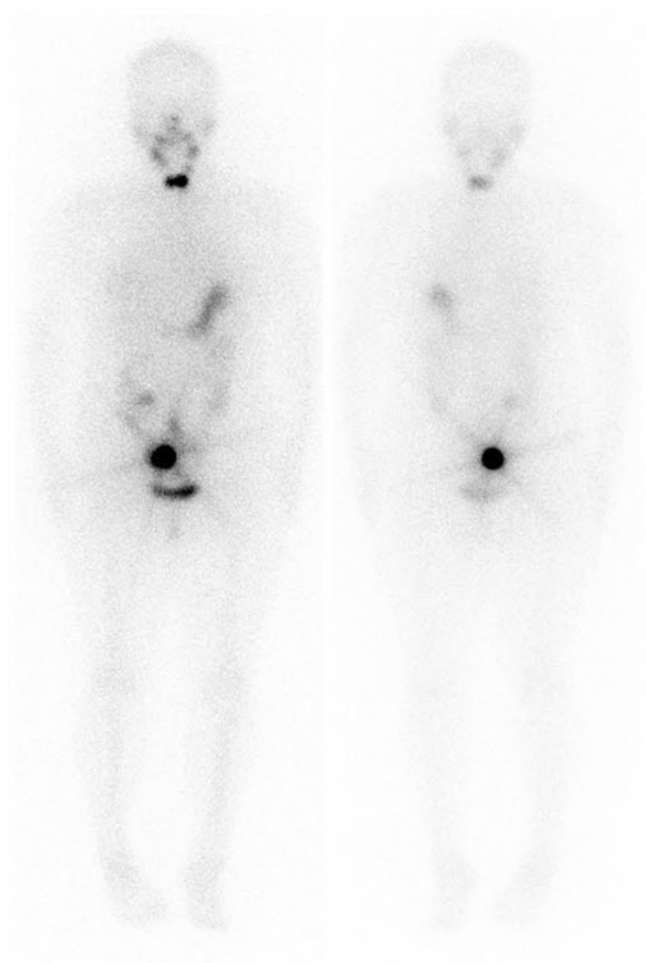


Fig. 2 The post-therapy whole body I-131 scan performed 2 days after the administration 5550 MBq (150 mCi) I-131 showed thyroid bed uptake due to remnants of normal thyroid; salivary gland and stomach uptake due to the NIS expression of glands; oral and nasal cavities due to saliva and nasal secretion; colon uptake due to transport of iodine into the intestine from the mesenteric circulation and biliary excretion of the metabolites of radioiodinated thyroglobulin or thyroid hormones; suprapubic area due to excreted urine in the bladder; and intense uptake (*arrow*) in right paramedian pelvic region of unknown origin

benign mucinous [9] or serous [10] ovarian cystadenoma and ovarian endometriosis cyst [11], or in malignant conditions, including metastases from thyroid carcinoma [12], thyroid carcinoma arising in struma ovarii [13], and malignant struma ovarii [14]. In the masses composed of thyroid tissue, the expression of NIS is the mechanism of ovarian radioiodine uptake. However, the mechanism by which ovarian neoplasms unrelated to thyroid tissue take up I-131 is still unclear. The suggested mechanisms of radioiodine uptake in the ovarian cystadenoma include increased vascularity and capillary permeability that might be secondary to inflammatory response associated with neoplasm [4, 5]. In the ovarian endometriosis cyst, the epithelium lining of the cyst may be permeable to passive diffusion [4–6].



Fig. 3 An axial slice of contrast-enhanced abdominal and pelvic CT scan showed a 6.6×5.0 cm-sized, lobulated, well-defined and heterogeneously attenuated mass (*arrow*) in the right ovary. The mass had intratumoral fat, calcification and fluid. Another 1.5 cm-sized, well-defined and oval-shaped cyst (*arrowhead*) was also seen in the left ovary

In our case, ovarian mature cystic teratoma with normal thyroid tissue was the cause of radioiodine uptake. Mature cystic teratomas account for approximately 20 % of all ovarian tumors, and approximately 5–15 % of them contain thyroid tissue [9, 13]. Such thyroid tissue can occur as a minor component of mature cystic teratomas, but in struma ovarii it is the predominant (> 50 %) or the sole tissue type. Struma ovarii accounts for approximately 3 % of all mature teratomas [15]. Our case can be preoperatively diagnosed due to typical imaging finding on CT scan, including fat attenuation in a cyst with calcification. However, pathologic examination is the only method that can differentiate the causes of ovarian radioiodine uptake cited above.

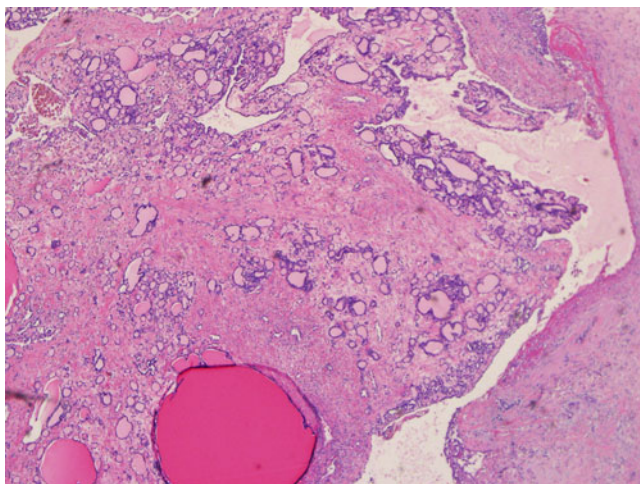


Fig. 4 Histologic section of the ovary with hematoxylin and eosin staining showed multiple benign thyroid follicles lined by monolayered cuboid epithelium and filled with colloid. No papillary formation or nuclear abnormalities of thyroid follicular cells were identified. (×12)

Conclusion

In conclusion, we report a surgically and pathologically confirmed mature cystic teratoma mimicking metastasis from papillary thyroid cancer on a whole body I-131 scan. At the presence of pelvic I-131 uptake in the women, other pathologic conditions related to gynecology, in addition to the metastasis of the thyroid carcinoma, should be considered.

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