

# Aberrant Radioactive Iodine Uptake in Simple Ovarian Cyst: A Rare Finding

## Abstract

I-131 whole body scan and therapy play an important role in the follow-up of differentiated thyroid carcinoma patients for the detection of residual thyroid tissue and metastatic disease. However, various false-positive findings have been reported in the literature which can appear as metastases. Here, we present one such case, in which an I-131 posttherapy scan revealed false-positive radioactive iodine uptake which localized to a simple ovarian cyst.

**Keywords:** False-positive radioactive iodine uptake, I-131 whole body scan, simple ovarian cyst

## Introduction

I-131 whole body scan (WBS) and therapy play an important role in managing patients with differentiated thyroid carcinoma (DTC) posttotal thyroidectomy. I-131 WBS and serum thyroglobulin levels are used to detect residual thyroid tissue and metastatic disease.<sup>[1]</sup> However, knowing the causes of false-positive radioactive iodine (RAI), uptake is important to avoid unnecessary work-up. Here, we present a case of false-positive pelvic RAI uptake which localized to a simple ovarian cyst.

## Case Report

A 32-year-old female, known case of papillary thyroid carcinoma presented 1-month posttotal thyroidectomy for further management. On laboratory evaluation, the patient had S. TSH 49 microIU/ml, S. thyroglobulin 227 ng/ml, and S. antithyroglobulin antibodies 16.80 U/ml. I-131 WBS was done 48 h after oral administration of 1 mCi of I-131. I-131 WBS revealed a focal area of RAI uptake in the thyroid bed, suggesting thyroid remnant. The patient was then administered 30 mCi RAI orally for remnant ablation. A posttherapy scan done 5 days after remnant ablation revealed increased RAI uptake in the thyroid remnant and a focal area of increased uptake in the left side of the pelvis. To rule out metastatic disease in the pelvis, single-photon emission computed tomography (CT)-CT

was acquired which localized pelvic uptake to a thin-walled cystic lesion in the left adnexa, likely a simple ovarian cyst [Figure 1]. The diagnosis of a simple ovarian cyst was also confirmed with pelvic ultrasonography and normal level of CA 125 and serum AFP. As the S. thyroglobulin levels were raised, ultrasonography (USG) neck was done which revealed a prominent right level IV cervical lymph node ~1.3 cm in short axis diameter (SAD), final-needle aspiration cytology of which showed metastatic papillary Ca thyroid. The patient then underwent redoneck dissection. On postredoneck dissection follow-up, S. thyroglobulin levels fell to 0.64 ng/ml. Thus, attributing the raised Tg levels to neck nodal residual metastasis and confirming the benign nature of the pelvic cyst.

## Discussion

Radioactive isotopes of iodine, including I-131, are commonly used in the management of DTC. Posttotal thyroidectomy, patients are evaluated with an I-131 whole-body scan to look for the presence of thyroid remnant and metastasis. Posttherapy scans may show additional sites of RAI uptake as compared to the diagnostic WBS (6%–13% cases).<sup>[1]</sup> Physiological sites of RAI uptake include salivary glands, gastric mucosa, liver, intestines, kidney, and bladder.

Sodium–iodide symporter (NIS) located on the basolateral membrane of thyrocytes is a

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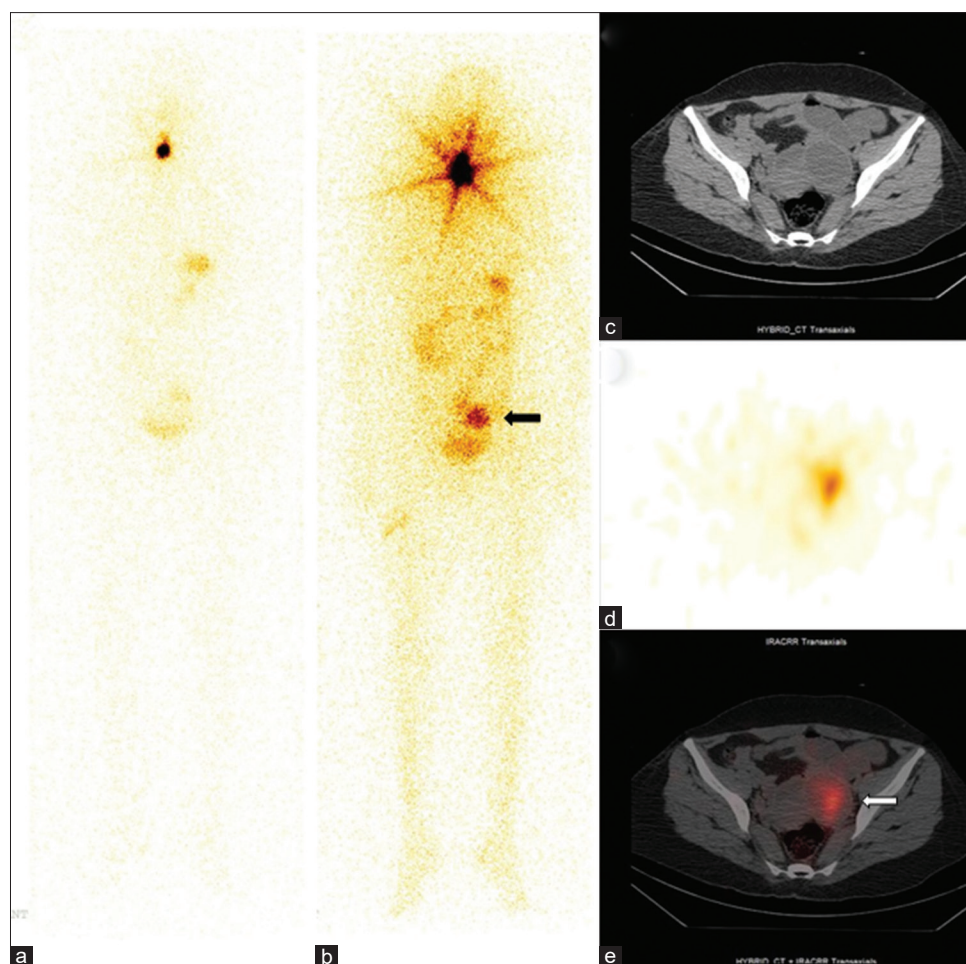
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**Figure 1:** (a) I-131 whole body scan anterior view images showing radioactive iodine uptake in the thyroid bed, suggestive of thyroid remnant. (b) I-131 posttherapy scan anterior image showing uptake in thyroid remnant and a focal area of increased uptake in the left side of the pelvis (black arrow). Axial cross-sectional slices (c) computed tomography, (d) single-photon emission computed tomography (SPECT) only, and (e) co-registered SPECT/computed tomography (white arrow) images showing I-131 uptake localizing to a cystic lesion in the left adnexa

potent transporter of iodine, including I-131 responsible for iodine concentration into the functional thyroid tissue.<sup>[2,3]</sup> NIS is also expressed in salivary glands and gastric mucosa, leading to RAI uptake at these sites. Iodine is excreted through the renal route, leading to physiological uptake in the kidneys and bladder.

Apart from these physiological sites, a few benign conditions may also show increased RAI avidity such as nasolacrimal duct obstruction, thymic cyst, Meckel's diverticula, hepatic cysts, renal cysts, vascular aneurysm, and nabothian cyst.<sup>[2]</sup> One such condition is ovarian cysts. Although rare, RAI uptake has been described in the literature in various types of ovarian cystic lesions such as endometrioid cysts,<sup>[4,5]</sup> mucinous ovarian cystadenomas,<sup>[6]</sup> dermoid cysts,<sup>[7]</sup> or simple ovarian cysts as in this case. This increased uptake can be attributed to NIS expression, inflammation, or retention of RAI-containing body fluids.<sup>[2]</sup>

It is of utmost importance to differentiate these benign conditions from metastases to avoid unnecessary

interventions. In the present case, focal RAI uptake in the cystic adnexal lesion was confirmed to be a simple ovarian cyst on pelvic ultrasonography, thus avoiding additional invasive procedures. Therefore, familiarization with benign pathologies which may show false-positive RAI uptake is crucial for better patient care and management.

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

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