



False-Positive Radioactive Iodine Uptake in Uterine Fibroids

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Abstract

A 46 year old female underwent radioiodine therapy for bilateral multifocal papillary thyroid carcinoma. Post-therapy scan with SPECT-CT showed increased uptake in the pelvis that corresponded to uterine fibroids, as previously characterized by MRI and US exams.

Keywords

Radioiodine, Uterine leiomyoma, Thyroid cancer

Introduction

Whole body imaging is the current standard of care for patients receiving postoperative radioiodine ablation after resection of differentiated thyroid carcinoma. The interpretation of images may determine if the patient may need further therapies. Therefore, an interpreter should be aware of physiologic distribution of activity, benign etiologies that may demonstrate increase uptake and residual or metastatic sites which conjugate radioactive iodine activity [1]. Herein, we report a case of false positive radioiodine uptake in uterine leiomyomas (Figure 1, Figure 2 and Figure 3).

Case Report

A premenopausal Chinese female in her forties had recently undergone thyroidectomy for multinodular goiter which she suffered for decades and failed conservative treatments. On pathology specimens, multifocal subcentimeter papillary thyroid carcinoma was detected with the largest lesion measures 3.7 cm. On the histopathology report, there was no metastatic lymph nodes, neurovascular or lymphovascular invasion identified. As part of the clinical staging process, patient was given a small dose of 123-Iodine to evaluate for gross macroscopic disease. The small dose and short half-life of 123-Iodine is to avoid stunning. After completion of a thorough and informative patient-doctor discussion, the patient consented for radioactive ablation therapy. The final clinical staging was T30M0, given the size of the tumor and patient's age. A 124.5 millicuries of 131-Iodine was administered and a whole body image was obtained 5 days post-therapy.

Discussion

Sodium iodide symporters (NIS) located at the basal membrane can increase cellular uptake via passive diffusion of radioactive

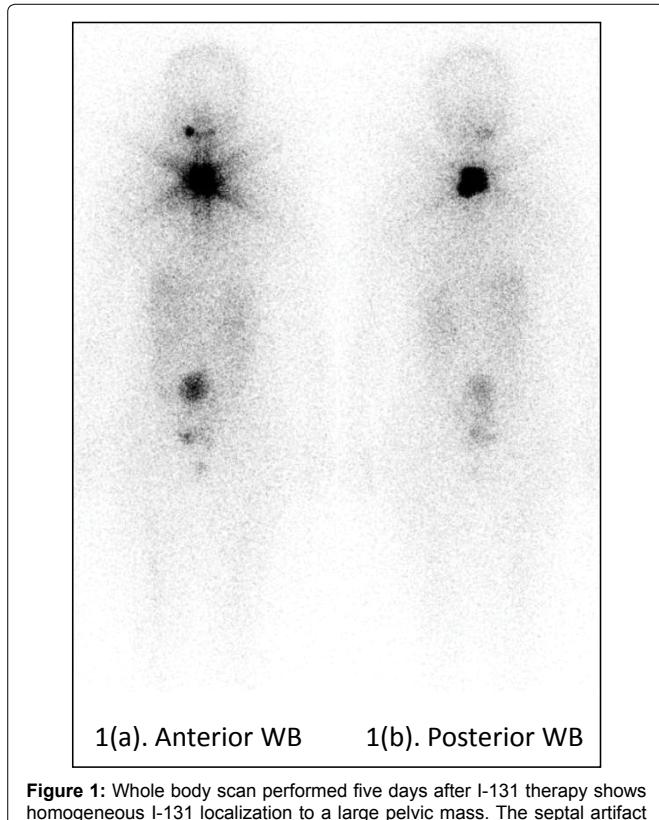


Figure 1: Whole body scan performed five days after I-131 therapy shows homogeneous I-131 localization to a large pelvic mass. The septal artifact from the intense localization of the 131-Iodine to the thyroid beds and physiologic distribution of the activity to the salivary glands and bladder are seen.

iodine [2]. Several benign ovarian tumors expressing NIS include struma ovarii, mucinous cystadenoma, and serous cystadenofibroma [3,4]. Postulations as to why simple cyst concentrate radiotracers focus on inflammation-induced cross membrane exchanges of water and chemicals [5,6]. The mechanism of tracer concentration in uterine leiomyomas will include expression of NIS, and interactions between the surrounding tissues to induce aquaporin expressions or increase cell membrane permeability with osmolality changes.

Non-thyroid-related disease may accumulate radioiodine due

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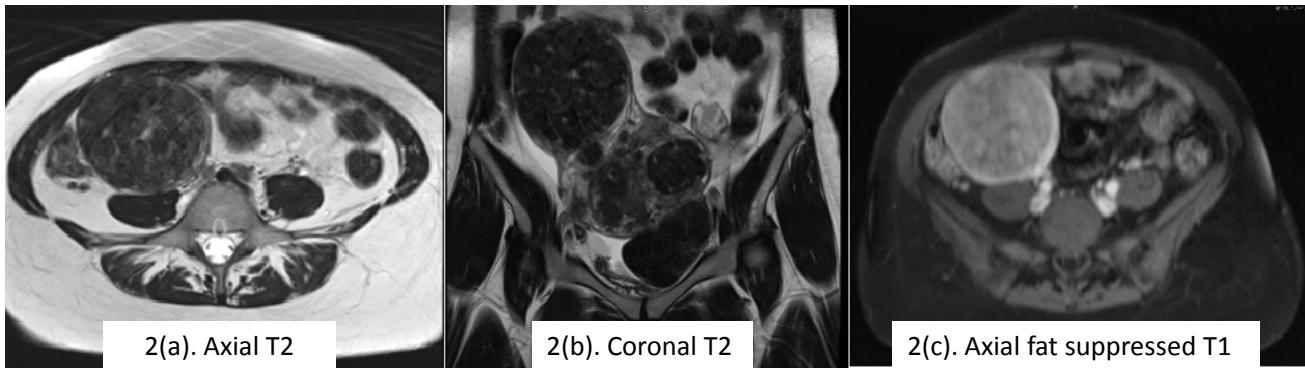


Figure 2: MRI images acquired 3 years earlier; (A) coronal T2 weighted, (B) axial T2 weighted, (C) axial fat suppressed T1 weighted after Multihance® IV contrast. Subserosal fibroid at the right anterior uterine fundus demonstrates hypointensity on T2-weighted imaging (A and B) and moderate heterogeneous enhancement (C).

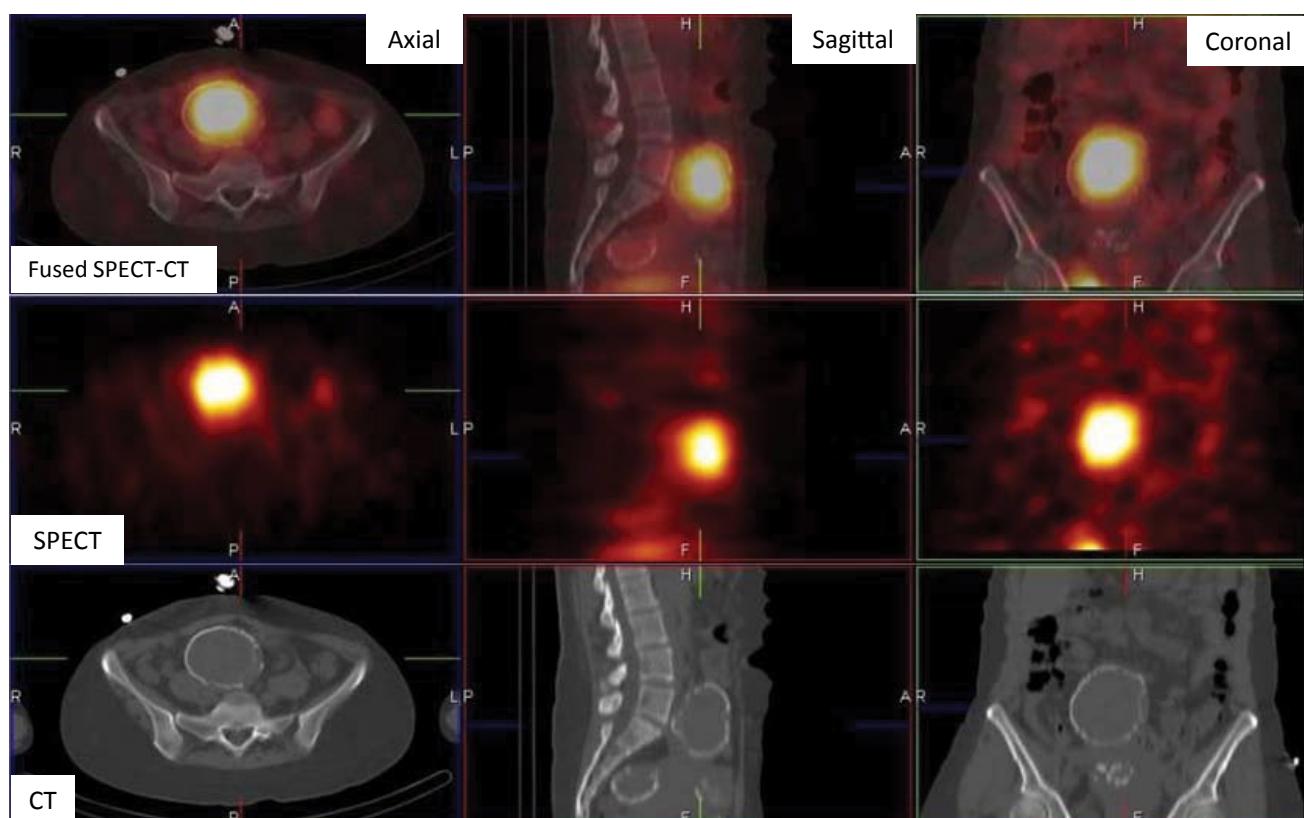


Figure 3: Pelvic SPECT-CT images are acquired concurrently, show diffuse radioiodine uptake within a peripherally calcified uterine fibroid mass.

to increased expression of sodium iodide symporters, hyperemia, or inflammation [7]. However, the actual mechanism of radioiodine uptake in this case of uteri leiomyomas remains unclear [8].

Instrumentation

The Single Photon Emission Computed Tomography (SPECT) – Computed Tomography (CT) utilized is a Siemens Symbia T2 and the default set up for 131-iodine images acquisition is as 128 x 128 matrix with 1.23 zoom for a total of 90 views. The camera has 2 heads and set to acquire 45 views each at 40 per view. As for the CT component, the parameters are set at 70 mAs and 130 Kv.

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