

Radioactive Iodine Accumulation in a Mature Cystic Teratoma With Mucinous Cystadenoma: A Case Report With Literature Review

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Whole body scintigraphy with I-131 has a high sensitivity for detecting thyroid tissue. I-131 radioactive iodine accumulation has been reported in mature cystic teratoma (MCT) accompanied by struma ovarii, which contains thyroid tissue, and a teratoma has been reported to contain various tissue types. Here we present a rare case of positive radioactive iodine uptake in MCT with mucinous cystadenoma in a 50-year-old patient. I-131 radioactive iodine uptake is variable, and the correct diagnosis and appropriate management of patients should be ensured.

Keywords: scintigraphy, I-131, mature cystic teratoma, mucinous cystadenoma

INTRODUCTION

Whole body scintigraphy (WBS) with iodine-131 (I-131) radioactive iodine (RAI) is used for detecting thyroid tissue due to its high sensitivity, and this method is also used to detect differentiated thyroid cancers, including residual or metastatic diseases [1]. An accurate interpretation of test results is critical for the correct management of patients.

However, the use of WBS with RAI can be variable and unreliable, as false-positive images are often observed in a clinical setting. Here we present a clinical case of false-positive RAI uptake in mature cystic teratoma (MCT) with mucinous cystadenoma in a 50-year-old patient.

CASE REPORT

A 50-year-old woman with a history of stage pT-3N0M0 thyroid carcinoma after total thyroidectomy underwent cervical lymph node dissection.

About a year later, RAI ablation therapy with 30 mCi of I-131 underwent. A WBS with RAI for confirmation showed physiological uptake in the thyroid bed and the right side of the pelvis (Fig. 1). Attenuation correction computed tomography (CT) scans and magnetic resonance (MR) images showed a pelvic mass of 55 × 40 mm with multiple cystic regions, all of which corresponded to the uptake of I-131 and included fatty regions (Fig. 1, 2).

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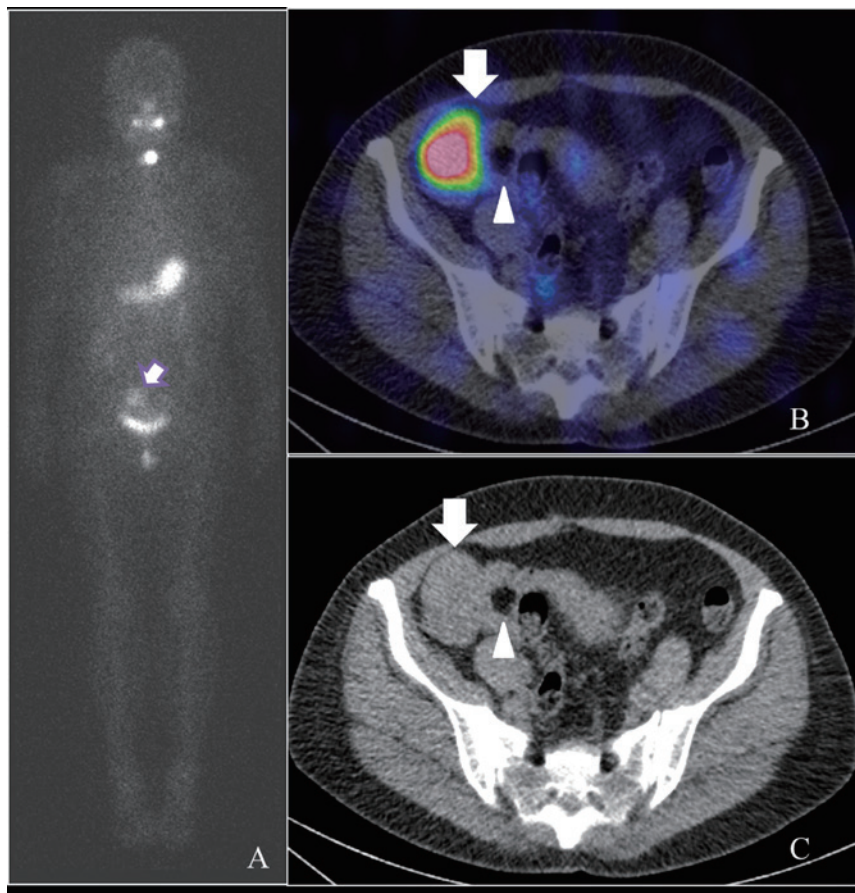


Fig. 1. The radioiodine WBS (A) and SPECT/CT scans (B, C)

The radioiodine WBS (A) showed physiologic uptake in the thyroid bed and the right side pelvis (arrow). SPECT (single photon emission computed tomography)/CT scans (B, C) showed a pelvic mass with slightly high density region where corresponded to the uptake of I-131 (arrow) and with fatty region (arrow head).

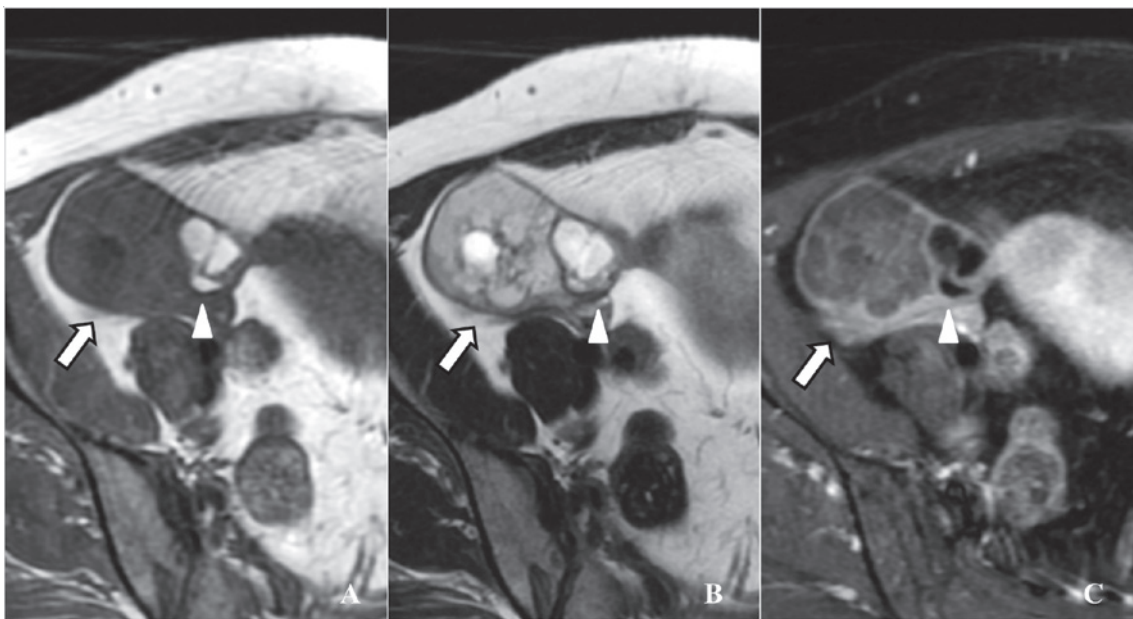


Fig. 2. MR images: Axial T1-weighted (A), T2-weighted (B) and fat-suppressed enhancement T1-weighted (C) MR images showed a multi-cystic pelvic mass (arrow) containing fat component (arrow head). The multi-cysts showed slightly high signal intensity on T1-weighted (A) and fat-suppressed enhancement T1-weighted (C) MR images, so included mucin was suspected.

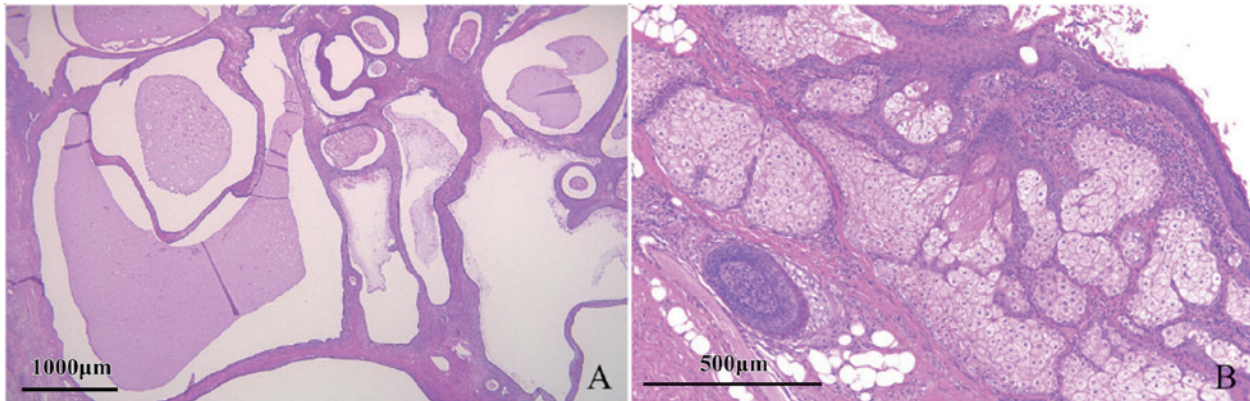


Fig. 3. Pathological images

It was a tumor consisting of a large number of small cysts that contain mucus. The cyst is an intestinal mucinous cystadenoma composed of gastric mucinous epithelium (A). Skin, skin appendages, and respiratory epithelium are found in the background, and mucinous adenoma derived from teratoma is suspected. Mainly mucinous adenoma, with mild teratoma components on the mucinous margin. No thyroid tissue is found (B).

These findings demonstrated that the ovarian mass was MCT, and the patient consequently underwent right oophorectomy. It was a tumor consisting of a large number of small cysts which is an intestinal mucinous cystadenoma, and skin, skin appendages, and respiratory epithelium are found in the background. Mainly mucinous adenoma, with mild teratoma components on the mucinous margin. No thyroid tissue is found. Therefore, the final pathological results were mucinous cystadenoma and MCT without thyroid tissue (Fig. 3).

DISCUSSION

The uptake of RAI by thyroid tissue is related to the expression of sodium iodide symporter (NIS), which presents on the basolateral membrane of follicular thyroid cells. In functioning thyroid tissue, the metabolism of I-131 is high compared to other tissues. Consequently, RAI has been advantageous in both diagnostic and therapeutic purposes in patients with thyroid cancer [1]. However, several cases of positive RAI accumulation in the pelvic mass have been reported for struma ovarii [2,3]. Interestingly, NIS is also expressed in several other differentiated tissues and diseased organs that are not regulated by thyroid stimulating hormones for example thymus, breast, liver, and gastrointestinal tract, or benign disease, such as cysts and inflammation, or a variety

of benign and malignant non-thyroidal tumors [4]. NIS may have contributed to some cases of false-positive findings on WBS with I-131. In previous studies, benign ovarian mucinous cystadenomas have also exhibited I-131 uptake [1,5].

Accumulation of RAI has been reported in MCT cases with struma ovarii, which contains thyroid tissue. A teratoma has been reported to contain a variety of different tissue types [1]. However, in this case study, the patient suffered mucinous cystadenoma and MCT without thyroid tissue. The biological mechanism for this remains unknown, although NIS is the most likely known mediator of this process. The presence of NIS in multiple other tissues (salivary and lacrimal glands, gastric mucosa, lactating mammary gland, and placenta) that actively accumulate iodide indicates that iodide transport in these tissues is conferred by the expression of functional NIS protein [6]. Therefore, even if high RAI uptake is detected in pelvic mass with a fatty component, the mass will not necessarily contain thyroid tissue. Whether the function of NIS is the underlying mechanism or not, the lesson remains the same: correct interpretation of the images and subsequent appropriate patient management rely on the correct knowledge of the normal, benign, and pathological biodistribution of I-131.

The findings of this case study indicated that clinicians interpreting the results of WBS with I-131

need to be aware that RAI uptake is variable. This awareness will enable clinicians to ensure correct diagnosis. And it finally provides appropriate pain management for patients.

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