Iran J Nucl Med. 2026;34(1):52-55 [Serial No. 66]

Homepage: https://irjnm.tums.ac.ir/

CASE REPORT

Uterine myoma may serve as a false positive source of radioiodine uptake in whole body scintigraphy

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ARTICLE INFO

Article History:
Received: 04 January 2025
Revised: 01 October 2025
Accepted: 15 October 2025
Published Online: 28 December 2025

Keyword:
Differentiated thyroid carcinoma
Radioactive iodine
SPECT/CT scan
Uterine myoma

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ABSTRACT

Understanding the occurrence of false positive results for radioactive iodine absorption in whole body scans is crucial for differentiating these cases from actual metastases. The implementation of SPECT/CT technology has significantly facilitated this process for medical professionals. This study presents a case involving a 46-year-old female patient who underwent a total thyroidectomy as a treatment for thyroid cancer (papillary thyroid carcinoma), followed by radioactive iodine therapy. The post-treatment whole body scan revealed the presence of a diffuse radioiodine-avid lesion in the pelvic region, which was later identified as multiple uterine myomas through additional investigations utilizing SPECT/low-dose CT scan and MRI findings.

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How to cite this article: Haghighatafshar M, Dehghani M. Uterine myoma may serve as a false positive source of radioiodine uptake in whole body scintigraphy. Iran J Nucl Med. 2026;34(1):52-55.

https://doi.org/10.22034/irjnm.2025.129972.1673

CASE PRESENTATION

A 46-year-old female patient (gravid 0, para 0) with a history of total thyroidectomy was referred to our department for radioiodine therapy. The histopathological evaluation revealed the presence of both classic and follicular variant papillary thyroid carcinoma, with tumor dimensions measuring 2 cm × 2 cm × 1 cm on the right side and 0.7 cm × 0.5 cm × 0.5 cm on the left side, accompanied by capsular invasion. The tumor classification is T1b Nx Mx, indicating at least stage 1. Approximately three months post-surgery, she received an initial dose of 4625 MBq (125 mCi) of I-131 for ablation purposes. The post-treatment scan revealed the presence of thyroid remnants and a diffuse radioiodine-avid lesion in the pelvic region (Figure 1).

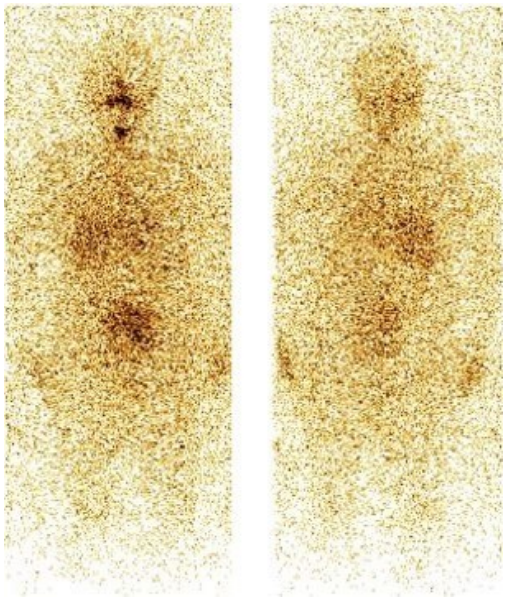

Figure 1. Anterior and posterior views of whole-body scans conducted 8 days after administering 125 mCi (4625 MBq) of I-131 revealed thyroid remnants and a diffuse radioiodine-avid lesion in the pelvic region

A follow-up evaluation employing SPECT/low-dose CT imaging revealed significant soft tissue demonstrating radioiodine uptake (Figure 2). Additionally, MRI of the pelvis, both with and without gadolinium contrast, indicated the presence of multiple hypointense masses on T2-weighted images, which are suggestive of mural and subserosal myomas consistent with myomatosis, measuring 30×24 mm, 98×65 mm, and 32×27 mm. Furthermore, several small myomas, measuring up to 1 cm, were observed within the myometrium.

This case report has been granted approval by the Ethics Committee (IR.SUMS.MED.REC.1403.626) and the Institutional Review Board of Shiraz University of Medical Sciences (No.31826).

DISCUSSION

Differentiated thyroid carcinoma (DTC) represents the most common form of thyroid cancer, originating from the follicular cells of the thyroid gland. It encompasses three distinct subtypes: papillary thyroid carcinoma (PTC), follicular thyroid carcinoma (FTC), and Hurthle cell carcinoma (HTC) [1]. The administration of radioactive iodine (RAI) is typically employed following total thyroidectomy (TT) as an adjunctive treatment for remnant ablation or in cases of known disease [2]. Postoperatively, patients are monitored through serum thyroglobulin (Tg) levels, neck ultrasonography, and molecular imaging utilizing various radiotracers, including I-123, I-124, and I-131 [3]. The theranostic application of I-131 in the management of DTC has been well-established for many years [4]. The use of I-131 post-thyroidectomy plays a significant role in patient management, aiding in the diagnosis of residual thyroid tissue, lymph node involvement, and distant metastases [5]. Furthermore, postoperative radioiodine treatment has been shown to decrease the risk of recurrence and mortality, resulting in an overall favorable prognosis when treatment adheres to established guidelines [6, 7]. Thyroid cells uptake I-131 via the sodium iodide symporter (NIS), a mechanism not present in most other organs. While thyroid tissue actively absorbs iodine through the NIS, certain extrathyroidal tissues, such as gastric mucosa, salivary glands, lactating mammary glands, choroid plexus, and the ciliary body of the eye, can also absorb iodine [8, 9].

Radioiodine uptake is typically observed in various anatomical regions, including the gastrointestinal tract, salivary glands, oropharynx, lactating breast, and urinary bladder. Notably, liver uptake is significant in the context of thyroid tissue remnants. Various pathophysiological conditions in the abdomen and pelvis may exhibit radioiodine avidity on whole-body scans, potentially mimicking metastasis in planar imaging. These conditions include duodenal diverticulum, renal cyst, polycystic kidney, renal follicular cyst, ovarian cyst, ovarian adenocarcinoma, uterine menstruation, dermoid cyst, pelvic endometriosis, and renal hamartoma [10-13]. The I-131 scan serves as a sensitive and specific diagnostic tool for identifying metastasis in differentiated thyroid cancer (DTC); therefore, it is crucial to recognize false positive results to enhance patient management and improve image interpretation [10]. The utilization of SPECT/CT imaging, in conjunction with clinical

correlation (such as thyroglobulin levels), aids physicians in identifying false positive results, thereby reducing the risk of over staging and unnecessary radioiodine treatment [11-13].

Uterine myomas, which are benign tumors originating from smooth muscle, are commonly found in women of reproductive age. The growth of these masses is significantly influenced by estrogen, and they typically regress following menopause [14]. Previously Saber Tanha, et al have reported a large uterine fibroid that trapped radioiodine in the post-treatment whole-body iodine scan [15].

Considering the widespread occurrence of uterine fibroids in women of reproductive age, it is plausible that multiple factors influence iodine uptake within fibroid tissues. Variables such as lesion size, the presence or absence of necrosis, and the number of previous radioiodine (RAI) treatment cycles may significantly affect iodine absorption dynamics. Further investigations are needed to clarify these relationships and improve understanding of iodine kinetics in relation to fibroid pathology.

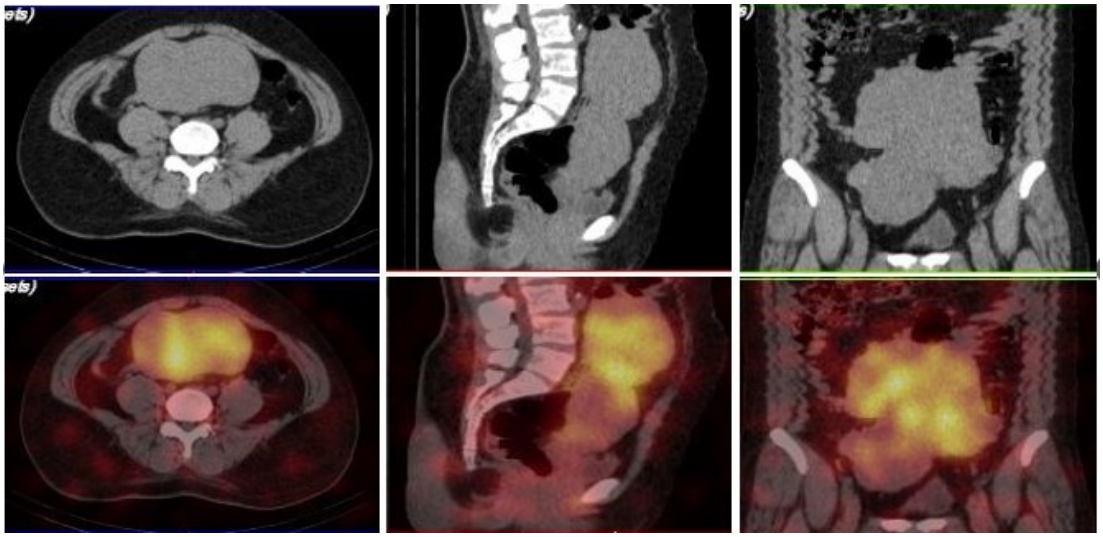

Figure 2. SPECT/CT scan was performed to evaluate the radioiodine uptake in the pelvis. Transaxial, sagittal, and coronal slices of the CT scan (upper row) and the corresponding I-131 SPECT/CT fusion images (lower row) are presented. The SPECT/CT scan revealed that the I-131 uptake was associated with multiple uterine myomas compatible with MRI findings

CONCLUSION

It is essential to understand the instances of false positive results for radioactive iodine uptake observed in whole-body scans utilizing radioiodine, and to differentiate these from genuine metastatic lesions. The application of SPECT/CT technology plays a significant role in this differentiation. This study identifies myoma as an additional factor contributing to false positive cases of radioactive iodine absorption.

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