Endocrine (2019) 66:693–694
https://doi.org/10.1007/s12020-019-02079-5

ENDOCRINE IMAGING

Check for updates

Unusual uptake of ^{131}iodine in bilateral ovarian endometriosis cysts in a patient with thyroid cancer

Huipan Liu[1,2] · Yue Chen[1,2] · Lin Liu[1,2]

Received: 1 August 2019 / Accepted: 29 August 2019 / Published online: 9 September 2019

A 22-year-old woman with a history of differentiated thyroid cancer (DTC) previously treated with total thyroidectomy 1 month ago (histological subtype: papillary thyroid carcinoma; tumor size 2.8 × 2.2 × 1.5 cm; $cT_2N_0M_0$, $pT_2N_{1b}M_0$, stage I, 8th Edition AJCC TNM Staging). The serum levels of thyroglobulin 1.57 ng/ml (reference range, 3.5-77) and T_3 1.70 pg/ml (1.8-3.8) were decreased while thyroid-stimulating hormone 3.309 mIU/l (0.38–5.57) and T_4 1.08 ng/dl (0.78–1.86) were in the normal range. The maximum percent uptake of ^{131}iodine (^{131}I) was 3%. Subsequently, the patient received 3.7 GBq activity of ^{131}I. We performed an ^{131}I whole-body scan for this patient 3 days after ablation therapy (Siemens; Symbia T16; 16-slice CT, 120 mA, 130 kV; 10 cm/min; 64 × 64 matrix). The images (Fig. 1) of ^{131}I whole-body scan showed a focal radioiodine accumulation in the region of right pelvic cavity, which corresponded to a cystic mass (~4.5 cm in size) with heterogeneous liquid density on the subsequent SPECT/CT images. In addition, there was a cystic mass (~8.5 cm in size) anterior to the uterus with homogeneous liquid density on the fusion images (the mean Hounsfield unit of 15), which had extremely mild ^{131}I activity. Detailed history asking revealed that she had dysmenorrhea for 8 years and aggravated for 1 year. Physical examination showed local abdominal tenderness. The findings were suggestive of bilateral ovarian endometriosis cysts. Surgery was performed and the lesions were resected. The pathological examination confirmed the lesions were in keeping with bilateral ovarian endometriosis cysts.

The probability of DTC tissue metastasis to the pelvic cavity is very low, and the false-positive imaging of the pelvic cavity ^{131}I uptake is mainly reflected in female patients. Although whole body scan is highly accurate in showing thyroid residues and metastases of DTC, false-positive results may lead to diagnostic errors and unnecessary treatment. Image fusion is a new technology developed in recent years and has been demonstrated to anatomically locate abnormalities detected on SPECT imaging. SPECT/CT is a very useful tool to help individualize the management of DTC patients, especially in cases of diagnostic uncertainty [1]. Ovarian endometriosis cyst causing false-positive ^{131}I uptake is rarely reported [2]. The mechanism of uptake is thought to be due to passive diffusion (or partially active transport) of water and chemical substance between the cyst and its surrounding tissue [3]. In our case, only one lesion showed significant uptake while the other lesion had extremely mild uptake, reflecting that the presence of bleeding or inflammation may be additional cause of increased ^{131}I uptake.

Although rare, it is also necessary to consider the possibility of ovarian endometriosis cyst, which can lead to false-positive results in ^{131}I whole-body scan, and hybrid SPECT/CT imaging contributes to the accurate diagnosis.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. For this type of study formal consent is not required.

Informed consent Informed consent was obtained from all individual participants included in the study.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

✉ Yue Chen
chenyue5523@126.com

[1] Department of Nuclear Medicine, The Affiliated Hospital of Southwest Medical University, Luzhou, PR China

[2] Nuclear Medicine and Molecular Imaging Key Laboratory of Sichuan Province, Luzhou, Sichuan, PR China

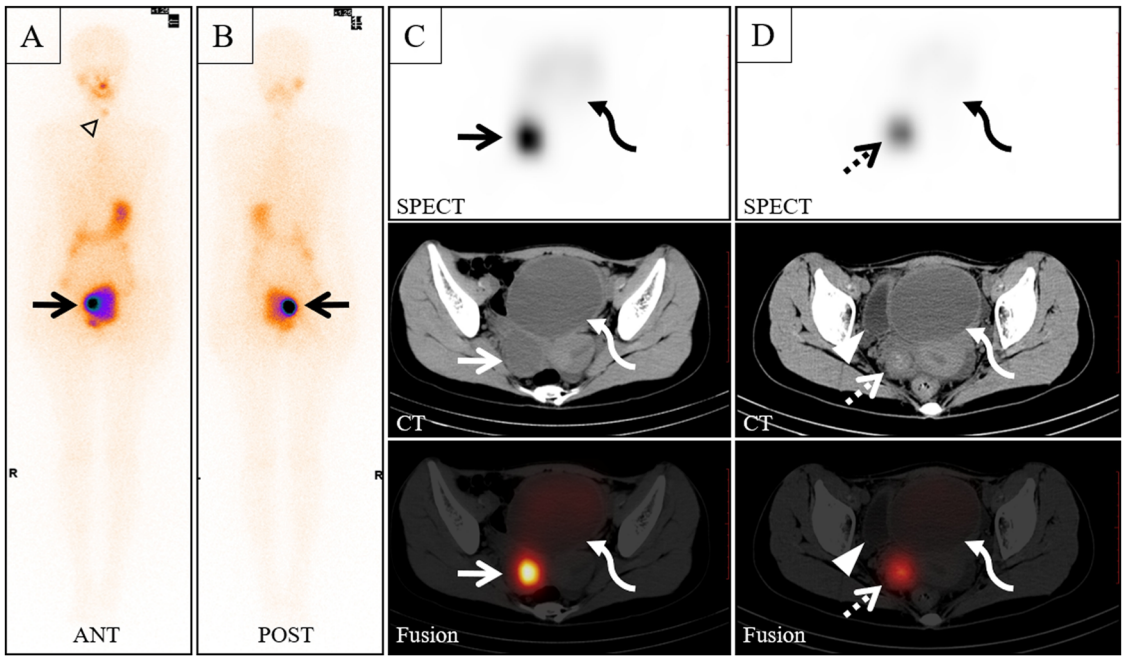

Fig. 1 The images of ^{131}I whole-body scan (**a**, **b**) showed residual lymph node uptake in the neck area (**a** hollow arrowhead), and a focal radioiodine accumulation in the region of right pelvic cavity (**a**, **b** solid arrows), which was revealed for further evaluation by subsequent SPECT/CT images (**c**, **d**). The right pelvic cavity activity corresponded to a cystic mass (~4.5 cm in size) with heterogeneous liquid density (**c** solid arrows; **d** dotted arrows) on the axial CT and fusion images (**d** dotted arrows indicated bleeding or inflammation). In addition, there was a cystic mass (~8.5 cm in size) anterior to the uterus with homogeneous liquid density on the axial CT and fusion images (**c**, **d** curved arrows and the mean Hounsfield unit of 15), which had extremely mild ^{131}I activity (**d** the arrowheads indicated bladder)

References

1. S. Kohlfuerst, I. Igerc, M. Lobnig, H.J. Gallowitsch, I. Gomez-Segovia, S. Matschnig, J. Mayr, P. Mikosch, M. Beheshti, P. Lind, Posttherapeutic (131)I SPECT-CT offers high diagnostic accuracy when the findings on conventional planar imaging are inconclusive and allows a tailored patient treatment regimen. Eur. J. Nucl. Med. Mol. Imaging **36**(6), 886–893 (2009). https://doi.org/10.1007/s00259-008-1044-2
2. M. Lungo, F. Tenenbaum, P. Chaumerliac, C. Vons, A. Mirat, F. Beuzen, J.P. Luton, B. Richard, Ovarian endometriosis cyst with iodine 131 uptake: first case of false positive in the follow up for differentiated thyroid carcinoma. Ann. Endocrinol. **61**(2), 147–150 (2000)
3. C. Utamakul, C. Sritara, A. Kositwattanarerk, T. Balachandra, C. Chotipanich, P. Chokesuwattanaskul, I-131 uptake in bilateral ovarian endometrial cysts. Clin. Nucl. Med. **34**(8), 537–538 (2009). https://doi.org/10.1097/RLU.0b013e3181abb637