

Heterogeneous radioiodine uptake in breast fibroadenoma: A case report

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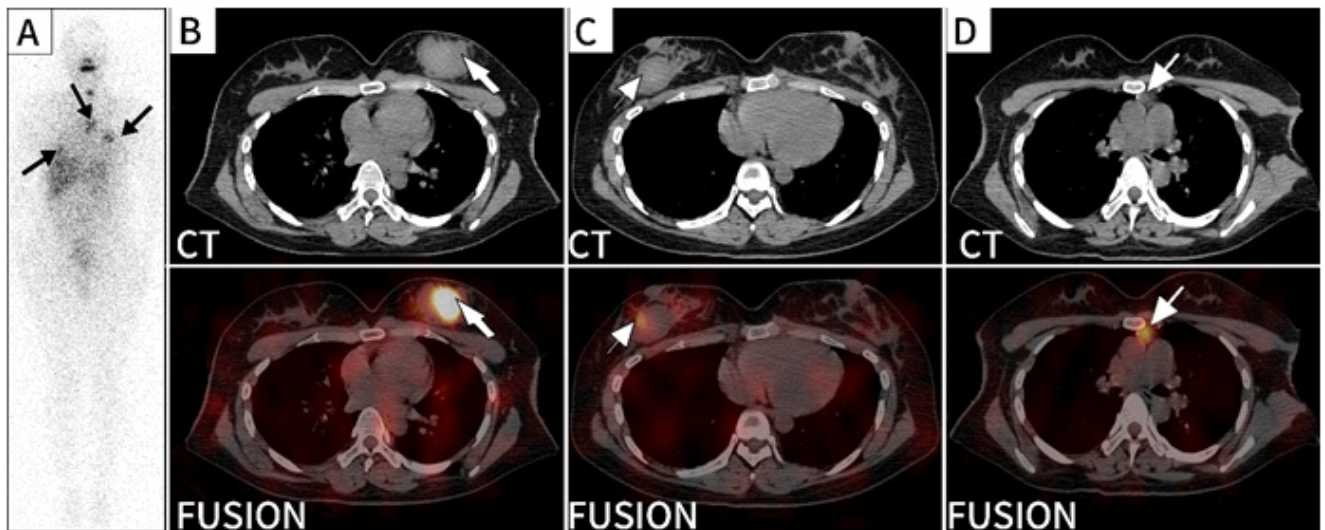


Figure 1. A 33-year-old woman underwent total thyroidectomy and neck lymph node dissection for papillary thyroid cancer. After thyroid hormone withdrawal, she received radiotherapy with iodine-131 (^{131}I) at a dose of 3.70GBq. The whole body scan obtained 7 days after ^{131}I administration revealed multifocal increased activity in the thyroid region and the chest (A, arrows). Subsequent single photon emission tomography/computed tomography (SPECT/CT) images of the chest were acquired to localize radioactivity. The axial images showed soft tissue masses (3.8cmx4.2cm in left breast, 3.5cmx3.0cm in right breast) in bilateral breasts with heterogeneous activity (B-C, arrows). The right mass had much higher activity comparing to the left mass. The axial image revealed elevated ^{131}I uptake in thymus, approximately 1.1cmx1.0cm in size, without any obvious mass lesion (D, arrows). Laboratory examination revealed TG 0.85ng/mL and TGA 14.16U/mL. However, lesions in bilateral breasts could not be excluded as metastases from thyroid cancer or primary breast tumors.

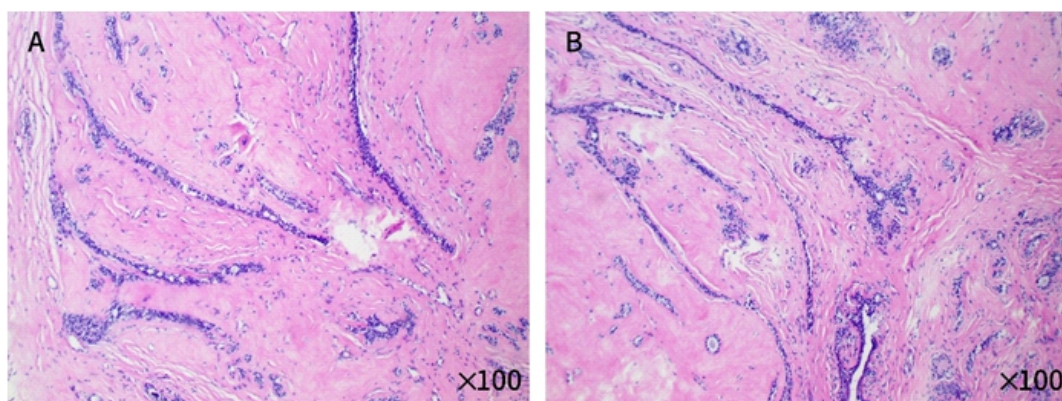


Figure 2. The soft tissue lesions in bilateral breasts subsequently resected. Pathological examination (A-B, hematoxylin-eosin stain, original magnification $\times 100$) demonstrated fibroadenoma.

Radioiodine breast uptake is common in lactation. However, abnormal radioiodine uptake within breast in non-lactation phase has been reported in literature. Numerous conditions might cause abnormal breast radioiodine uptake, such as hyperprolactinemia [1, 2], metastases from thyroid cancer [3, 4], fat necrosis [5, 6], benign disease [7], cyst [8], gynecomastia [9] and breast augmentation [10]. Many of their mechanisms remain to be elucidated, however, increased expression of sodium-iodide symporter (NIS) in breast tissue in the case of hyperprolactinemia has been proposed. The patterns of breast uptake could be focal,

full, crescentic and irregular, and uptake may be unilateral or bilateral [11]. The gender can be male [9] or female and the woman could be lactating and non-lactating [12, 13]. In this case, ^{131}I accumulated in bilateral breast fibroadenoma and the radioiodine distribution was heterogeneous. As stated in this case, radioiodine uptake in breast fibroadenoma may be a possible cause of false positive, which should be noted by nuclear and oncology physicians.

Radioiodine concentration by thymus also has been reported in literature [14-16]. Some studies might illustrate the mechanism of concentration. Kim et al. (2017) found that the expression of NIS was detected in the majority of normal human thymus samples [17]. Davidson et al. (2000) revealed functional NIS expressed in thymus and radioactive iodine concentrated in Hassall's bodies [18-20]. In the case, no obvious mass is observed in the thymus, therefore, we consider that this is incomplete involution of the thymus with physiological radioiodine uptake and we will follow up the patient.

The authors declare that they have no conflicts of interest

Bibliography

1. Kao PF, Chang HY, Tsai MF et al. Breast uptake of iodine-131 mimicking lung metastases in a thyroid cancer patient with a pituitary tumour. *Br J Radiol* 2001;74:378-81.
2. Ronga G, Bruno R, Puxeddu E et al. Radioiodine uptake in non-lactating mammary glands: evidence for a causative role of hyperprolactinemia. *Thyroid* 2007; 17(4): 363-6.
3. Loureiro MM, Leite VH, Boavida JM et al. An unusual case of papillary carcinoma of the thyroid with cutaneous and breast metastases only. *Eur J Endocrinol* 1997; 137: 267-9.
4. Kharroubi D, Richa C, Saie C et al. Solitary Breast Metastasis From Thyroid Papillary Carcinoma Revealed on Whole-Body Radioactive ^{131}I Scan. *Clin Nucl Med* 2020; 45(9): 687-8.
5. Itani M, Lewis DH. I-131 uptake in fat necrosis of the breast. *Radiol Case Rep* 2017; 12: 161-7.
6. Hoang JT, Weissenborn MR, Spigel JJ et al. I-131 uptake in the breast from fat necrosis. *Proc (Bayl Univ Med Cent)* 2019; 32: 140-2.
7. Allen T, Wiest P, Vela S et al. I-131 uptake in the breast for thyroid cancer surveillance with biopsy-proven benign tissue. *Clin Nucl Med* 1998; 23(9): 585-7.
8. Serafini A, Sfakianakis G, Georgiou M et al. Breast cyst simulating metastases on iodine-131 imaging in thyroid carcinoma. *J Nucl Med* 1998; 39(11): 1910-2.
9. Uslu L, Ozbayrak M, Vatankulu B et al. Bilateral breast uptake of radioiodine in a male patient with gynecomastia: A case report. *Indian J Nucl Med* 2015; 30(4): 345-6.
10. Lv J, Qu Y, Zhang M et al. Increased ^{131}I accumulation in the polyacrylamide hydrophilic gel used for breast augmentation. *Clin Nucl Med* 2014; 39(4): 415-6.
11. Bakheet SM, Hammami MM. Patterns of radioiodine uptake by the lactating breast. *Eur J Nucl Med* 1994; 21: 604-8.
12. Brzozowska M, Roach PJ. Timing and potential role of diagnostic I-123 scintigraphy in assessing radioiodine breast uptake before ablation in post-partum women with thyroid cancer: a case series. *Clin Nucl Med* 2006; 31: 683-7.
13. Hammami MM, Bakheet S. Radioiodine breast uptake in non breast feeding women: clinical and scintigraphic characteristics. *J Nucl Med* 1996; 37: 26-31.
14. Oh JR, Ahn BC. False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. *Am J Nucl Med Mol Imaging* 2012; 2(3): 362-85.
15. Abhyankar A, Basu S. Thymus uptake of ^{131}I in patients with differentiated thyroid carcinoma: Three different case scenarios and patterns of uptake and the importance of its recognition in thyroid cancer practice. *J Cancer Res Ther* 2015; 11(3): 648.
16. Haghatafshar M, Farhoudi F. Incidentally Visualization of the Thymus on Whole-Body Iodine Scintigraphy: Report of 2 Cases and Review of the Latest Insights. *Medicine (Baltimore)* 2015; 94(26): e1015.
17. Kim MJ, Oh SW, Youn H et al. Thyroid-Related Protein Expression in the Human Thymus. *Int J Endocrinol* 2017; 2017: 8159892.
18. Davidson J, McDougall IR. How frequently is the thymus seen on whole-body iodine-131 diagnostic and post-treatment scans? *Eur J Nucl Med* 2000; 27: 425-30.
19. Connolly LP, Connolly SA. Thymic uptake of radiopharmaceuticals. *Clin Nucl Med* 2003; 28: 648-51.
20. Lin EC. Iodine-131 uptake in thymic hyperplasia with atypical computed tomographic features. *Clin Nucl Med* 2000; 25: 375.

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