European Journal of Therapeutics

DOI: 10.5152/EurJTher.2018.289

Case Report

A Rare Cause of Uptake of Radioactive Iodine by Non-Lactating Breast Tissue in A Patient with Papillary Thyroid Carcinoma: Prolactinoma

Zeynel Abidin Sayıner[1], Umut Elboğa[2], Azer Abiyev[3], Mesut Özkaya[1], Ersin Akarsu[1]

[1]Division of Endocrinology and Metabolism, Gaziantep University, School of Medicine, Gaziantep, Turkey

[2]Department of Nuclear Medicine, Gaziantep University, School of Medicine, Gaziantep, Turkey

[3]Department of Internal Medicine, Gaziantep University, School of Medicine, Gaziantep, Turkey

ABSTRACT

We report a case of a post-menopausal woman who underwent total thyroidectomy due to papillary thyroid carcinoma followed by radioactive iodine therapy. After radioactive iodine therapy, total body scintigraphy (TBS) using radioactive iodine (I-131) was performed, and we observed uptake of I-131 by breast tissues. The scintigraphic and associated clinical characteristics of uptake of I-131 by breast tissues in a non-breastfeeding patient with thyroid cancer were unexpected findings. In this patient, elevated serum prolactin levels were documented at the time when the uptake of I-131 by the breast tissues was observed. We conducted hypophysis magnetic resonance imaging and detected a pituitary adenoma. Medical treatment with cabergoline was provided to this patient. When prolactin levels were normalized, uptake of I-131 by breast tissues was no longer evident on TBS.

Keywords: Papillar thyroid cancer, prolactinoma, uptake of radioactive iodine

INTRODUCTION

Total body scintigraphy (TBS) using radioactive iodine (I-131) has been a beneficial diagnostic procedure for evaluating the possible metastasis of differentiated thyroid cancer and the presence of residual thyroid bed remnants after surgery (1). Uptake of I-131 by normal non-lactating post-menopausal breast tissues is rarely observed. This finding may lead to misdiagnosis. It may appear to clinicians as a metastasis. We report a case of uptake of I-131 by the breast tissues in a patient with thyroid cancer who had hyperprolactinemia due to pituitary adenoma in the hypophysis.

CASE PRESENTATION

A 53-year-old female patient underwent total thyroidectomy and radioactive iodine ablation for papillary thyroid carcinoma (stage T2N0M0). Update of I-131 by breast tissues was observed on post-therapy TBS (Figure 1). She underwent mammography and breast sonography, and there was no lesion on the breast tissues. We found that the patient's prolactin level was 117 ng/mL (normal range, 5-20 ng/mL), but the patient had no symptom of hyperprolactinemia, such as galactorrhea. At this time, we found that the patient's thyroid stimulating hormone (TSH) level was 40 mU/L (normal range, 0-4 mU/L). We believed that the cause of the hyperprolactinemia was high the TSH level. We searched for other causes of hyperprolactinemia. But after TSH normalization with thyroid hormone replacement, we observed the persistence of prolactinemia. In euthyroid state, prolactin level was 143 ng/mL. There were no chronic diseases, such as chronic renal disease and liver cirrhosis. All laboratory studies returned to normal limits. She had not been using any drugs, especially antipsychotic drugs. When we investigated for hypothalamo-pituitary causes, we detected hypophysis adenoma via magnetic resonance imaging (Figure 2). We administered cabergoline (0.5 mg per week) to the patient. Her prolactin level improved to 12.6 mg/mL 3 months later. After prolactin level normalization, we performed TBS, and there were no update of I-131 by the breast tissues (Figure 3). Written informed consent was obtained from the patient.

DISCUSSION

The radioactive iodine treatment for differentiated thyroid carcinomas has its effect via sodium/iodide symporter (NIS). NIS is located in healthy and neoplastic thyroid cells and is stimulated by TSH (2, 3). This system has been shown in breast tissues during the lactation period and in some breast tumors. However, this system has not been shown in breast tissues that are not in the lactation period (4). The expression of NIS in breast tissues is under hormonal control. There are prolactin receptors on some breast tumors and in normal breast tissues during lactation (5). Therefore, recent

ORCID IDs of the authors: Z.A.S. 0000-0001-5105-0292; U.E. 0000-0002-3650-8258; A.A. 0000-0003-2962-6800; M.Ö. 0000-0003-2616-5885; E.A. 0000-0003-2786-6616

Corresponding Author: Zeynel Abidin Sayıner **E-mail:** zeynelasayiner@hotmail.com

Received: 13.12.2017 • **Accepted:** 02.04.2018

Figure 1. Diffuse mild uptake by breast tissues was observed in scanned images after TSH normalization
TSH: thyroid stimulating hormone

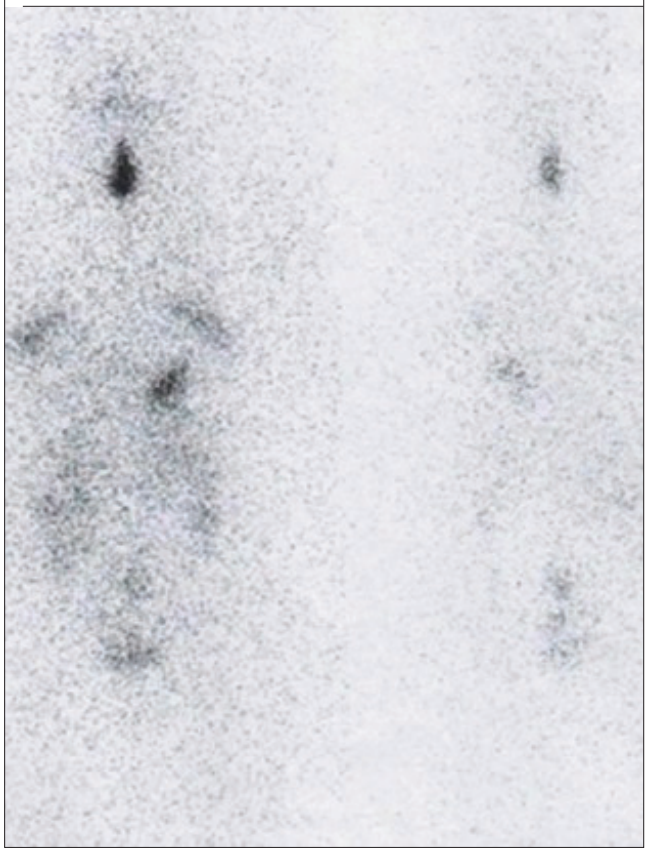
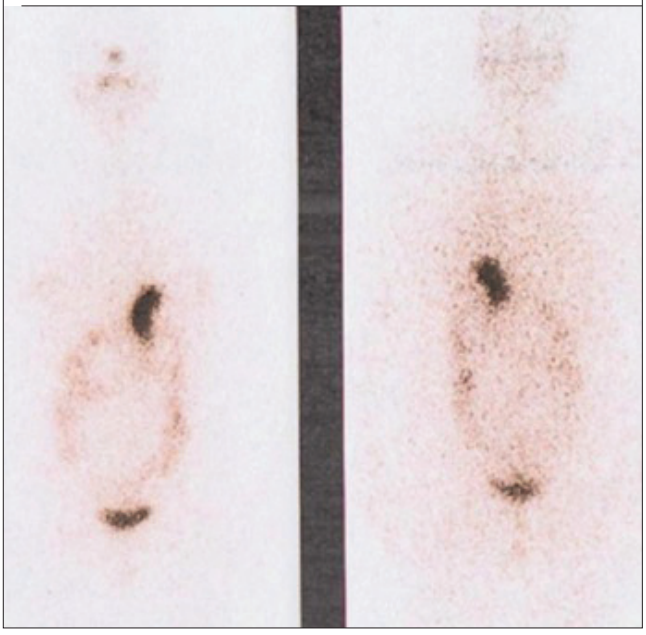


Figure 2. Typical MRI scan changes in pituitary adenoma. Coronal T1-weighted post-contrast MRI scan obtained for a 53-year-old woman who presented with pituitary adenoma and hyperprolactinemia
MRI: magnetic resonance imaging

Figure 3. When prolactin and TSH levels were normalized (by use of dopamine receptor agonist), uptake by breast tissues was no longer evident on TBS
TSH: thyroid stimulating hormone; TBS: total body scintigraphy



experimental animal studies have shown that prolactin can stimulate he uptake of iodine by normal breast tissues (6). Bruno et al (7) administered radioactive iodine ablation to 302 patients with papillary and folicular thyroid carcinoma. Later, when they performed I-131 TBS, they found that, only 4 patients showed evidence of uptake of I-131 by breast tissues; in further examinations, prolactin secreting pituitary microadenoma was detected in only 1 patient. Further, 2 of these 4 patients had been exposed to a psychological chronic stimulation of prolactin and 1 to some unknown kind of agent responsible for the galactorrhea.

In another study, uptake of I-131 was observed in 2 patients with papillary thyroid carcinoma during TBS. But interestingly both patients were in post-menopausal period like in our case. Their breast tissue did not have lactation function (2). But both cases had specific features. One of the patient had been using risperidone that was an antidopaminergic drug (8). The other patient had chronic renal failure, and she was undergoing hemodialysis. In blood tests, both patients showed hyperprolactinemia. It is well known that chronic renal failure and risperidone can cause hyperprolactinemia (9, 10). They were treated with cabergoline, and their prolactin levels became normalized. After that, TBS was performed and no uptake of I-131 by breast tissues was observed.

Ahn et al. (11) reported a case of a patient with thyroid malignancy who underwent radioactive iodine therapy, and uptake of radioactive iodine by breast tissues was detected on post-treatment TBS. The patient had prolactinemia due to amisulpride.

CONCLUSION

This case reports the positive correlation between prolactin level and uptake of I-131 by breast tissues regardless of patients'

menopausal state or presence or absence of lactation. It makes us believe that endogenous hyperprolactinemia can be a reason for the significant uptake of I-131 by the tissues of non-lactating breasts, and hypophysis adenoma should be considered as a confounding factor.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - U.E., M.Ö., E.A.; Design - Z.A.S.; Supervision - U.E., M.Ö., E.A., Z.A.S.; Materials - U.E., M.Ö., E.A., Z.A.S.; Data Collection and/or Processing - Z.A.S., A.A.; Analysis and/or Interpretation - Z.A.S.; Literature Search - Z.A.S., A.A.; Writing Manuscript - Z.A.S., A.A.; Critical Review - U.E., M.Ö., E.A.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

1. Allen T, Wiest P, Vela S, Hartshorne M, Crooks LA. I-131 uptake in the breast for thyroid cancer surveillance with biopsy-proven benign tissue. Clin Nucl Med 1998; 23: 585-7. [CrossRef]
2. Ronga G, Bruno R, Puxeddu E, Calcinaro F, Montesano T, Travascio L, et al. Radioiodineuptake in non lactating mammary glands: evidence for a causative role of hyperprolactinemia. Thyroid 2007; 17: 363-6. [CrossRef]
3. Arturi F, Russo D, Schlumberger M, du Villard JA, Caillou B, Vigneri P, et al. Iodide symporter gene expression in human thyroid tumors. J Clin Endocrinol Metab 1998; 83: 2493-6. [CrossRef]
4. Tazebay UH, Wapnir IL, Levy O, Dohan O, Zuckier LS, Zhao QH, et al. The mammary gland iodide transporter is expressed during lactation and in breast cancer. Nat Med 2000; 6: 871-8. [CrossRef]
5. Reynolds C, Montone KT, Powell CM, Tomaszewski JE, Clevenger CV. Expression of prolactin and its receptor in human breast carcinoma. Endocrinology 1997; 138: 5555 60. [CrossRef]
6. Rillema JA, Collins S, Williams CH. Prolactin stimulation of iodide uptake and incorporation into protein is polyamine-dependent in mouse mammary gland explants. Proc Soc Exp Biol Med 2000; 224: 41-4. [CrossRef]
7. Bruno R, Giannasio P, Ronga G, Baudin E, Travagli JP, Russo D, et al. Sodium iodide symporter expression and radioiodine distribution in extrathyroidal tissues. J Endocrinol Invest 2004; 27: 1010-4. [CrossRef]
8. David SR, Taylor CC, Kinon BJ, Breier A. The effects of olanzapine, risperidone, and haloperidol on plasma prolactin levels in patients with schizophrenia. Clin Ther 2000; 22: 1085-96. [CrossRef]
9. Cowden EA, Ratcliffe WA, Ratcliffe JG, Dobbie JW, Kennedy AC. Hyperprolactinaemia in renal disease. Clin Endocrinol (Oxf) 1978; 9: 241-8. [CrossRef]
10. Peces R, Casado S, Frutos M, Horcajada C, López-Novoa JM, Hernando L. Prolactin in chronic renal failure, haemodialysis, and transplant patients. Proc Eur Dial Transplant Assoc 1979; 16: 700-2.
11. Ahn JH, Kim SY, Kim YJ, Lee SY, Lee JH, Kang SH, et al. Hyperprolactinemia-Associated Breast Uptake of Radioiodine Following 131I Postablation Scan in Differentiated Thyroid Cancer. Endocrinol Metab 2011; 26: 345-7. [CrossRef]

How to cite:

Sayıner ZA, Elboğa U, Abiyev A, Özkaya M, Akarsu E. A Rare Cause of Uptake of Radioactive Iodine by Non–Lactating Breast Tissue in A Patient with Papillary Thyroid Carcinoma: Prolactinoma. Eur J Ther 2019; 25(1): 86–8.