



## Papillary thyroid carcinoma after radioactive iodine treatment for toxic thyroid nodule: Case report

Toksik tiroit nodülü için radyoaktif iyot tedavisinden sonra gelişen tiroit papiller karsinomu:  
Olgu sunumu

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### ABSTRACT

Radioactive iodine (RAI) treatment is recommended as the first choice for toxic thyroid nodules by American Thyroid Association (ATA). Here, we present our second case of papillary thyroid carcinoma after RAI therapy. A fifty five-year-old woman received RAI therapy for toxic thyroid nodule in the right lobe in 2005. Pre-treatment fine needle aspiration biopsy (FNAB) revealed benign cytology. She was euthyroid after the therapy. However, 8 years after the treatment she had 15 mm thyroid nodule in the same location. This time, FNAB result was suspected for papillary thyroid carcinoma. The patient underwent bilateral total thyroidectomy and the histopathological evaluation revealed papillary thyroid carcinoma in the nodule.

This is the second case with papillary carcinoma after RAI therapy. Papillary carcinoma developed after the RAI therapy. In conclusion, all cases should be closely followed up after RAI therapy for carcinoma development.

**Keywords:** Papillary cancer, Toxic thyroid nodule, Radioactive iodine

### ÖZ

Amerikan Tiroit Derneği (ATA) toksik tiroit nodüllerinde ince iğne aspirasyon biyopsisi (İİAB) yapılmaksızın radyoaktif iyot (RAI) tedavisi önermektedir. Elli beş yaşında kadın hasta 2005 yılında tespit edilen tiroit sağ lobunda yerleşimli toksik nodül nedeniyle RAI tedavisi almış. Hastanın RAI öncesi yapılan İİAB sonucu benign tiroit nodülü olarak rapor edilmiş. Hastanın 8 yıl sonra yapılan kontrol ultrasonografisinde tiroit sağ lobda yerleşimli 15 mm çaplı solid nodül saptandı. Hastaya yapılan İİAB sonucu papiller karsinom açısından şüpheli olarak rapor edildi. Hastaya bilateral total tiroidektomi yapıldı. Histopatolojik incelemede nodülde papiller tiroit karsinomu tespit edildi.

Bu vaka RAI sonrası karşılaştığımız ikinci papiller karsinom vakasıdır. Bu yazıda sunduğumuz olgu, RAI öncesi hastanın karsinomunun olmadığı ve kanser gelişiminin RAI tedavisi sonrası olduğu İİAB ile gösterilmiştir. Sonuç olarak, RAI tedavisi alan hastalar uzun dönemde karsinom gelişimi açısından yakın takip edilmelidir.

**Anahtar Kelimeler:** Papiller Kanser, Toksik tiroit nodülü, Radyoaktif iyot

### Introduction

Radioactive iodine (RAI) therapy is recommended as the first choice for toxic adenoma by American Thyroid Association (ATA) without performing fine needle aspiration biopsy [1, 2]. RAI is an important radiopharmaceutical agent in nuclear medicine practice for the treatment of hyperthyroidism and differentiated thyroid cancer [3]. One of the long term side effects of ionizing radiation is the possibility of radiation induced malignancy. In the literature, there are some reports which show that thyroid cancer can develop after <sup>131</sup>I therapy for thyrotoxicosis [4-8]. As there is no reported cancer case that developed from hot nodule, routine fine needle aspiration biopsy (FNAB) is not recommended by ATA [2].

In this report, the second case with papillary thyroid cancer after RAI therapy for toxic thyroid nodule is presented.

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## Case Report

A fifty-five year old female patient was admitted to hospital for toxic adenoma in 2005. At the initial investigation, thyroid stimulating hormone (TSH), free T4 and free T3 levels were <0.03 µIU/mL (0.49-4.67 µIU/mL), 1.0 pmol/l (0.71 – 1.85 pmol/l) and 4.06 pmol/l (1.45 – 3.48 pmol/l), respectively. Thyroid ultrasonography (USG) revealed solid thyroid nodules 27 mm in diameter at the right lobe and 15 mm in diameter at the left lobe. The <sup>99m</sup>Tc thyroid scintigraphy showed a hot nodule at right thyroid lobe. In September 2005, the FNAB of the thyroid nodule at the right lobe revealed benign thyroid cytology. After the diagnosis, 15 mci <sup>131</sup>I treatment was administered orally, in September, 2005. After RAI therapy, the patient remained in euthyroid status.

In June 2013, at the control USG, a hyperechoic solid nodule, measuring 15x10 mm at the right thyroid lobe was detected. FNAB result was suspicious for papillary thyroid carcinoma. She underwent bilateral total thyroidectomy. After the operation the patient was discharged at the first postoperative day with no complications. The histopathological examination revealed papillary thyroid carcinoma (Hurtle Cell variant) at the right lobe measuring 0.8x0.6x0.6 cm.

## Discussion

This is our second case with papillary thyroid carcinoma after RAI therapy [9]. The first case was very similar, however, we did not perform FNAB before the RAI therapy. Yet, this case, before the RAI therapy, had benign FNAB result. Therefore, it was proven that the papillary carcinoma had developed after the RAI therapy.

In several autopsy surveys the incidence of thyroid nodules were found to be 35-57% [10, 11]. In non-surgical series thyroid malignancy was found in 4-6.5% of all thyroid nodules [12-15]. Moreover, nearly less than 10% of all thyroid nodules are toxic [16]. Initial evaluation of all thyroid nodules require FNAB, however, as the rate of malignancy in toxic nodule is low and benign hyperfunctioning nodules may be cytologically indistinguishable from nonfunctioning benign follicular neoplasms and follicular cancer, ATA does not recommend it for toxic ones [1]. It is reported that toxic nodules are almost never malignant and cold nodules are 5-8% malignant [2].

In the literature, there are few reports about thyroid cancer after RAI therapy for toxic nodular or diffused goiter. Staffurth et al. reported a follicular thyroid cancer following RAI therapy for Graves' disease [4]. In their case, follicular thyroid cancer was derived 17 years after the RAI therapy. Similarly, there are some reports of anaplastic thyroid cancer after RAI therapy for toxic goiter [5-8].

In the present case, FNAB was reported as benign before the first RAI therapy. We can conclude that the cancer developed after the RAI therapy. In our patient, papillary thyroid carcinoma developed eight years after the toxic thyroid nodule diagnosis.

Although, it is a rare finding, one should keep in mind that cancerous thyroid nodules may develop after RAI treatment and therefore a close follow-up should be encouraged.

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