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Case Report

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Report of A Case of Papillary Thyroid Carcinoma Following Intracranial Germinoma

Mahdokht Parsirad[1], Soghra Rabizadeh[2], Alireza Esteghamati[3], Armin Rajab[4] and Manouchehr Nakhjavani[5*]

[1]*Internist, Endocrinology and Metabolism Research Center (EMRC), Vali-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[2]*Assistant professor of endocrinology, Endocrinology and Metabolism Research Center (EMRC), Vali-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[3]*Professor of endocrinology, Endocrinology and Metabolism Research Center (EMRC), Vali-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[4]*Medical doctor, Endocrinology and Metabolism Research Center (EMRC), Vali-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran*

[5]*Professor of endocrinology, Endocrinology and Metabolism Research Center (EMRC), Vali-Asr Hospital, Tehran University of Medical Sciences, Tehran, Iran*

***Corresponding author:**
Manouchehr Nakhjavani, Keshavarz Blvd, Gharib St, Endocrinology and Metabolism Research Center (EMRC), Vali-Asr Hospital, Tehran, Iran

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Abstract

Introduction

The occurrence of second primary thyroid malignancy should be noticed in survivors of brain germinoma treated by irradiation.

Case Report

A patient with a history of intracranial germinoma who underwent chemoradiotherapy was referred to our endocrine clinic due to impotency and infertility. The patient received replacement therapy due to hypopituitarism.

*He returned to us 11 years after brain radiation with enlargement of the thyroid gland. Thyroid ultrasonography showed enlargement with a dominant 62*37 mm solid hypoechoic nodule in the right thyroid lobe. Several lymph nodes at both sides of the neck were seen. Total thyroidectomy revealed PTC with regional metastasis.*

Conclusion

Endocrine disruption must be considered in adult cancer survivors and the importance of long-term follow-up should be emphasized in these patients.

Keywords: Thyroid Cancer, Papillary, Germinoma, Chemoradiotherapy, Second Primary Neoplasm, Hypopituitarism

Introduction

Papillary thyroid carcinoma (PTC) accounts for 80% of thyroid cancers and its prevalence is increasing [1]. Most PTC patients have a good prognosis but lymph node involvement and advanced disease occur in 10%–15% of patients at the time of primary diagnosis [2]. PTC is the most common thyroid cancer that occurs after radiation. Its risk increases in females, younger age, and higher radiation dose [3]. Here we describe a patient with PTC who had a history of intracranial germinoma.

Case Report

A 38–year- old man with a history of intracranial germinoma was

referred to the endocrine clinic with impotency and infertility in 2011. He had diplopia and disturbed upward gaze in 2004 when he was 21years old. He had scattered lesions in the midbrain in brain MRI. The initial diagnosis was astrocytoma or metastatic lesion (Fig1). A brain biopsy from the periventricular right frontal area was suggestive of germinoma. He was treated by chemoradiation and received a total dose of 5500 cGy.

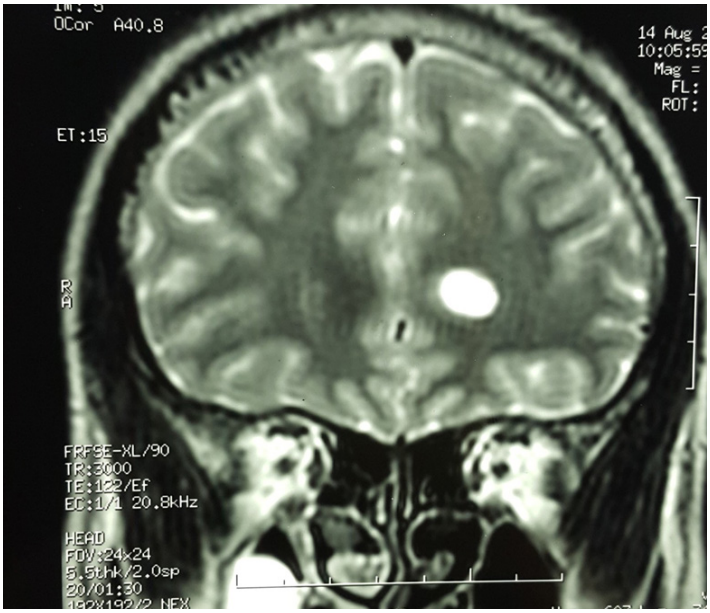

Figure 1: Brain MRI Demonstrating Intracranial Germinoma

Laboratory tests were compatible with hypopituitarism. FT4 was7.9 pmol/L(reference range,9-19), TSH:5.7mIU/L, cortisol 8 am:10.3mcg/dl (6.2-19.4), ACTH:42pg/mL(7.2-63 pg/mL), LH:1.4 mIU/mL(0.57-12), FSH:2.8 mIU/mL(0.95-11.9), Prolactin:16.3 ng/mL(3.46-19.4), testosterone:0.67 ng/mL (2-9.8) , IGF-1:108ng/mL(113-202). He received replacement therapy with levothyroxine, hydrocortisone and testosterone, and DDAVP for diabetes insipidus. The patient returned to us in 2015 with a chief complaint of cough and thyroid enlargement. Physical examination revealed a hard mass in the right thyroid lobe. Thyroid ultrasonography showed a dominant 62*37 mm solid hypoechoic nodule in the right lobe. Several lymph nodes up to 15*6 mm were seen at both sides of the neck. Contrasted spiral computed tomography (CT) of the neck showed a pressure effect on the trachea (Fig2).

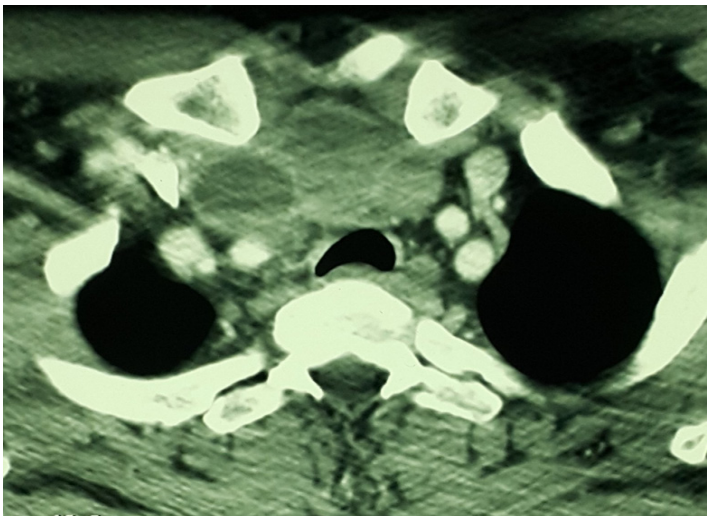

Figure 2: Hypodense Mass Lesion Within the Thyroid Gland Arising from The Right Thyroid Lobe in The Neck CT

Invasion to surrounding tissues was not seen. Fine needle aspiration biopsy of thyroid nodules showed atypia of undetermined significance. A decision for thyroidectomy was made. An intraoperative frozen section of the thyroid gland was compatible with severe fibrosis with old hemorrhage suggesting Riedel thyroiditis. After surgery, the patient did not return for follow-up. He came back 3 years later with progressive thyroid gland enlargement. A total thyroidectomy was performed. The pathological report was compatible with multifocal papillary thyroid carcinoma, a classic variant in the right lobe of the thyroid and isthmus. Lymphovascular invasion was present, perineural invasion and extra thyroid extension were not seen. Resection of the surgical bed of the left thyroid lobe showed fibroconnective tissue infiltrated by papillary thyroid carcinoma. Five out of seventeen right cervical lymph nodes and three out of six left cervical lymph nodes were involved by tumor. After surgery, the patient received a total dose of 400 mCi of iodine-131 on two occasions. Post-therapeutic scan demonstrated bilateral cervical lymph node involvement without any evidence of distant metastasis. He received suppressive therapy with 200 mcg levothyroxine after surgery. In a recent laboratory test off levothyroxine, the patient had TSH: 89.2mIU/L, FT4: 6.80 pmol/L(reference range,9-19), FT3: 0.52 pmol/L(reference range,0.92-2.79),Tg :> 1500 ng/mL (reference range, 3.5-77), Anti

Tg: 44.28 IU/mL (reference range, <115). On a color doppler sonography of the neck, no abnormal flow pattern was seen in the bed of the surgery. Metastatic lymph nodes were seen in the left cervical zone 3 and 4, the left side of the suprasternal notch and the left medial supraclavicular space. The FDG-PET Ct Scan showed hypermetabolic metastatic bilateral cervical, supraclavicular, and left axillary lymphadenopathies (SUVmax up to 24). A 21mm soft tissue density nodule in subcutaneous fat of anterior lower portion of neck (SUVmax = 22.6) and 25×16mm soft tissue density nodule in the posterior aspect of the left arm (SUVmax = 2.38) suggestive of tumoral involvement. There was no evidence of local recurrence (Fig3). Cytopathology report of left supraclavicular lymph node FNA was suspicious of malignancy with features of PTC (Hurthle cell variant)

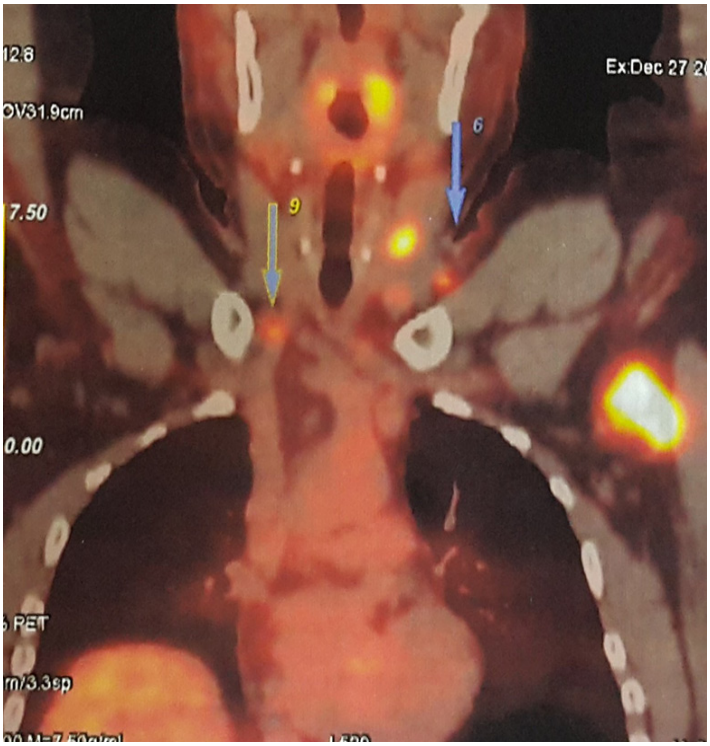

Figure 3: FDG-PET Ct Scan Demonstrating Hypermetabolic Soft Tissue Density in The Anterior Lower Portion of The Neck and Posterior Aspect of The Arm

Discussion

Here we describe a case of PTC in a patient with a history of intracranial germinoma, who was treated with chemoradiation. He was followed as a case of hypopituitarism after treatment for brain germinoma. Although his primary tumor was cured he developed an invasive papillary thyroid carcinoma 11 years later. Intracranial germinoma is rare, constitutes approximately 0.5 to 2.0% of primary intracranial tumors, and is sensitive to radiotherapy [4]. Radiotherapy-induced thyroid tumor incidence has been reported to be 0.35% with a latency period of 1.5-25 years [5]. Two-thirds of these tumors are benign and one-third are malignant which PTC consists of 70-95% of cases [6]. The behavior of radiation-induced thyroid carcinoma does not differ from non-radiation thyroid cancers but the present case had an aggressive course of diseases [7]. The risk of PTC recurrence in tumor size >4cm is 8–10%, and 20% if more than 5 lymph nodes were involved [8]. Hong et al. investigated the long-term outcome of chemoradiation in 127 patients with central nervous system germ cell tumors retrospectively [9]. The median age was 11.9 years. Seven patients developed SPN, 2 of them had thyroid carcinoma. Acharya et al. study reported cumulative incidence of second primary neoplasm (SPN) to be 6.1% (95% CI, 2.2–12.5) at 25 years in survivors of germinomatous germ cell tumors. They did not report thyroid cancer cases in their patients with SPN [10]. Mazonakis et al. study showed that the excess relative risk for thyroid cancer in patients who received radiotherapy for brain malignancy is 0.1-1.1. The excess relative risk for thyroid cancer resulting from brain radiotherapy in adult patients with brain malignancy depends on the field size used and thyroid distance from the treatment field [11]. Reports of thyroid disorders in brain cancer survivors have included thyrotoxicosis, primary and central hypothyroidism [12, 13]. In a Jensen et al study endocrine disorders in brain cancer survivors were pituitary diseases, thyrotoxicosis, and all types of diabetes [12]. In Koh et al., study among 102 patients who developed SPN after childhood cancer treatment with chemoradiation, 15 patients (14.7%) developed thyroid carcinoma, the most common subtypes of second thyroid cancer were papillary carcinoma (n=9) [13]. Moreover, 4 patients had a follicular type, 1 with poorly differentiated and 1patient had undiffer¬entiated carcinoma, irrespective of primary cancer.

The occurrence of second primary thyroid malignancy should be noticed in survivors of brain germinoma treated by irradiation. Our patient still struggles with advanced papillary thyroid cancer 17 years after the primary cancer cure. He is a candidate for further surgery and treatment with an iodine-131. This case highlights the importance of careful monitoring of patients treated with radiotherapy for germinoma in terms of complications, especially in the thyroid gland.

Conclusion

Endocrine disruption must be considered in adult cancer survivors and the importance of long-term follow-up should be emphasized in these patients.

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