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Renal Cell Carcinoma Metastasis to Thyroid Gland Associated with Papillary Thyroid Carcinoma: A Case Report and Review of the Literature

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Abstract

Metastatic thyroid gland tumor is an uncommon finding in clinical practice. We report a case of metastatic renal cell carcinoma (RCC) to the thyroid gland, associated with a Papillary Thyroid Carcinoma (PTC), in a patient who had undergone left nephrectomy for RCC 6 years earlier and operated on in our Institution for a multinodular goiter disease. Immunohistochemistry can be helpful for the differential diagnosis. Metastatic cells of RCC were positive for CD10 and vimentin and negative for thyroglobulin, calcitonin, and TTF-1. Papillary carcinoma cells were positive for Cytokeratin 19, galectin-3, CD56 and Hector Battifora Mesothelial cell monoclonal antibody-1. The association between papillary thyroid carcinoma and RCC is a rare condition and maybe must not be considered a fortuitous development of 2 different neoplasms.

Keywords: Renal cell carcinoma; Papillary thyroid carcinoma; Total thyroidectomy; Immunohistochemistry

Introduction

Metastatic thyroid gland tumor is an uncommon finding in clinical practice. Common sites of primary tumors that can metastasize to the thyroid gland are kidney, lung, skin, colorectal, breast and head and neck [1-3]. Of the clinically recognized metastases to the thyroid, more than 50% of the time the primary cancer is renal cell carcinoma (RCC) [4]. RCC represents 3% of all adult malignancies [5]. The presentation and behavior of thyroid metastases from renal cancer are variable [6]. Here, we report a case of metastatic RCC to the thyroid gland, associated with a papillary thyroid carcinoma, in a patient who had undergone left nephrectomy for RCC 6 years earlier. This kind of association is, in our opinion, unreported until now in English literature.

Case Report

A 78-year-old man with a 2-year history of non-toxic multinodular goiter presented to our hospital for surgical treatment. He had no associated symptoms such as dysphagia, dyspnea, or dysphonia. Six years earlier, the patient had undergone a left nephrectomy for RCC. A preoperative neck ultrasound examination showed an enlarged thyroid gland. The whole left lobe was occupied by a macronodule with a III pattern of vascularization. A preoperative scintigraphy showed an eumetabolic (normal FT3, FT4, TSH values) diffuse nodular hyperplasia. A total thyroidectomy was performed in the Department of Surgical Sciences of our University in November 2014. Upon macroscopic examination, thyroid was enlarged and multinodular. The right lobe, which was larger than the left one, was occupied by two solid nodules measuring 5 mm and 3 mm; the left lobe appears diffusely nodular. A microscopic examination of the gland revealed that the right lobe nodule measuring 5 mm and the left lobe nodules was surrounded by an incomplete fibrous capsule and was characterized by a proliferation of large cells with clear cytoplasm and small nuclei with eosinophilic nucleolus. Neoplastic cells were immunonegative for thyroid transcription factor-1 (TTF-1), thyroglobuline and calcitonin, whereas cytokeratin AE1/AE3, vimentin and CD10 were positive. With these findings, a diagnosis of metastasis of renal cell carcinoma in the thyroid gland was made.

In addition, the right lobe nodule measuring 3 mm showed histological characters of papillary thyroid carcinoma. Two others submillimetrical foci was found in the right lobe. All neoplastic cells were positive for Cytokeratin 19, galectin-3, CD56 and Hector Battifora Mesothelial cell monoclonal antibody-1. At the one year oncological follow-up, the patient appears disease free from both renal and thyroid cancers and his written informed consent was obtained to publish his clinical history.

Discussion

RCC represents 3 to 4% of all adult malignancies and is the third most frequent urologic cancer [7,8]. RCC constitutes approximately 85% of all primary renal tumors; its incidence increases with age [7,8]. Nowadays, approximately 40% of kidney neoplasms are diagnosed incidentally due to the widespread use of imaging technologies. Data from the US Surveillance, Epidemiology, and End Results study show that 17% of the patients have metastatic disease at diagnosis. The most frequent sites of metastasis are lung, bone, liver, adrenal gland, contralateral kidney, retroperitoneum, brain, and skin; head and neck metastasis are less frequent, and the thyroid is the site most commonly affected. RCC recurrence after nephrectomy is highly variable, presenting with metastasis ranging from a few months to several years after the initial diagnosis [7,8].

Metastatic tumors represent 2% to 3% of all thyroid malignancies [1-3]; the most common primary tumors are skin, breast, lung, kidney, and head and neck. The higher rate of secondary thyroid gland tumors found in autopsy studies, ranging from 5 to 24% [3], suggests that metastatic thyroid lesions are often occult. Metastatic thyroid tumors can represent a first finding of unknown primary tumor (occult primary neoplasm) or a synchronous or metachronous manifestation of known primary tumors.

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Some authors have suggested that the thyroid is a common site of metastasis because of its rich blood supply; they proposed that the thyroid gland would be more susceptible to metastatic growth when affected by goiter, neoplasms, or thyroiditis due to metabolic changes that consist of decrements in the oxygen and iodine content [9]. By contrast, other authors have reported that there is no difference in frequency of metastasis in altered thyroid glands versus normal thyroid glands [9]. RCC metastases to the thyroid gland account for 12 to 34% of all secondary thyroid tumors [1,2,4]. Metastatic thyroid tumors may represent the first manifestation of RCC or a synchronous or metachronous metastasis of a known RCC. Metastases usually appear as metachronous lesions, often several years after nephrectomy. Metastatic RCC may first be misinterpreted as a primary thyroid tumor.

In our case, a secondary thyroid tumor was the first metastatic site during follow-up for RCC that had been diagnosed 6 years earlier.

Although RCC metastasis to the thyroid gland can be suspected in patients with a history of renal tumors, preoperative diagnosis of primary versus secondary tumor is difficult. Radiological findings are similar in both cases, with the nodule being a hypoechoic, non-homogeneous, and vascularized mass upon ultrasound examination and "cold" on radioiodine uptake studies. Fine needle aspiration cytology of the lesion can be useful in preoperative diagnosis, suggesting a secondary neoplasm; nevertheless, cytological findings are common in primary and secondary neoplasms, and a metastatic tumor can be easily misinterpreted as a primary tumor [10]. As most authors, we do not perform a core biopsy when cytological results are uncertain. Hence, diagnosis of metastatic RCC is made with histopathological examination after thyroidectomy. Clinical history of prior malignancies, multifocal growth pattern, sinusoidal pattern of vascularization, and clear cell appearance of the cytoplasm should suggest a secondary thyroid tumor to the pathologist [9,10].

Immunohistochemistry can be helpful for the differential diagnosis, with metastatic cells of RCC positive for CD10 and vimentin and negative for thyroglobulin, calcitonin, and TTF-1 [11].

Thyroidectomy should be performed in patients with no other metastases; prognosis is good in this group. By contrast, patients with disseminated disease have a poor prognosis and should undergo thyroidectomy only for palliative care of compressive symptoms [12,13].

Papillary thyroid carcinomas have been associated with a variety of endocrine and nonendocrine neoplasms from different anatomical sites, but expecially with medullary thyroid carcinoma [14]. What makes our case particular, is the coexistence of thyroid metastases from kidney cancer with papillary thyroid cancer. In the English letterature very few are the case reports of such kind of neoplastic association [15,16], hypothesizing that the combination of these unusual neoplasms in the same patient most likely represents a new sporadic neoplastic syndrome and not a fortuitous development of 2 different neoplasms.

Conclusion

Thyroid metastasis should be considered in patients with a thyroid nodule and positive history for RCC. Preoperative distinction between primary and secondary tumors is difficult to achieve. Immunohistochemistry is a useful method for evaluation of patients with suspected nodules, metastatic cells being negative for thyroglobulin, calcitonin, TTF-1 and positive for CD10 and vimentin. If the thyroid gland is the only site of metastasis, a thyroidectomy must be performed.

The association between papillary thyroid carcinoma and RCC is a rare condition and maybe must not be considered a fortuitous development of 2 different neoplasms.

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