

# Management of Thyroid Nodules as Secondary Involvement of Renal Cell Carcinoma: Case Report and Literature Review

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**Abstract.** *Literature reports intra-thyroid involvement of renal cell carcinoma (RCC) as a very rare and late event after kidney cancer diagnosis. Nevertheless, it must be investigated and differentiated from primary thyroid nodules. This is important in order to give the patient the best and earliest treatment. In fact the presence of thyroid metastasis of RCC is often the expression of a systemic disease and therefore the patient should have a complete total body examination in order to rule out any other organ involvement. In the case of a solitary metastasis, the therapeutic approach is thyroidectomy giving the patient a survival benefit. Here, a case report of a solitary RCC thyroid metastatic nodule associated with an omolateral internal jugular neoplastic thrombosis is presented together with a review of the literature on this matter.*

Renal cell carcinomas (RCC) are known to metastasize to all organs. These hypervascularized tumours are associated with multiple arteriovenous shunts where hemodynamic factors play a role in the seeding and subsequent growth of metastasis through the vascular route (1). Generally RCC diffuses in an unpredictable manner and can show a late recurrence as a notable feature. In 30% of cases metastasis are present at diagnosis. Late recurrence of RCC has been documented in the literature but not many studies address this topic. Differences are reported among the subtypes (clear cell, papillary and chromophobe renal carcinoma) that

involve mainly the lungs, bone, lymph nodes and liver as secondary sites, whether synchronous or metachronic (2, 3). Gastric or duodenal metastases from clear cell renal carcinoma are exceptional (0.2 and 0.7%) (4). Some of them can also metastasize to the brain and skin. Unusual sites are the ocular area, renal graft, suprarenal space and penis (5). The involvement of head and neck regions accounts for 8 to 14% of all secondaries (6, 7). Intrathyroid involvements are very rare, even though the thyroid is the second most vascularised organ following the adrenal gland. Cases of secondary thyroid cancer which require thyroid surgery are few (8). A clinical distinction of malignant thyroid tumors is often difficult. Solitary metastasis in this gland occurs about 100-120 months from the date of nephrectomy. There is a clear survival benefit in selected cases (single thyroid metastasis of RCC) if a surgical approach to the thyroid metastases is chosen, but generally patients have a poor prognosis, with 50% 5-year survival rates, since the presence of a thyroid metastasis is often the expression of a systemic disease. The knowledge of these atypical sites in patients with a past history of RCC allows an earlier diagnosis and treatment which could change the evolution of the illness.

## Case Report

An asymptomatic 73-year-old man presented with a thyroid nodule diagnosed five years after partial resection of the left kidney for clear RCC. It was localised in the lower pole of the left kidney, which was considered a site suitable for a partial resection. Histological diagnosis was an encapsulated RCC without invasion into surrounding tissue RCC (pT1b Nx Mo G2). Additional patient history included a hypertensive cardiopathy associated with parossistic atrial fibrillation managed with oral anticoagulant therapy, antiarrhythmic and antihypertensive drugs.

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*Key Words:* Renal cell carcinoma, metastasis, thyroid, thyroidectomy, neoplastic thrombus, jugular vein thrombosis.

During follow-up, on September 2006, a thyroid mass of the right lobe measuring 5 cm in the largest diameter was found. Ultrasound (US) revealed a round shaped mass of 5×3 cm suggestive of a neoplastic nodule in the right lobe with a congestive omolateral jugular vein. However, he was asymptomatic and in a state of euthyroidism. For this reason, the patient was managed by his general practitioner for two months before referring himself to the General Surgery Unit because he had observed a growth in size. In February 2007, he was submitted to a right hemithyroidectomy and isthmectomy (Figure 1). Final histological examination of the mass revealed a clear cell renal carcinoma metastasis partially invading the surrounding tissue. According to the pathological findings, the patient underwent further investigations such as bone scintigraphy and total body CT scanning to rule out a systemic disease. Bone scintigraphy provided information regarding a defined area of mild increased radionuclide uptake localized in the left frontoparietal cranial bone. Total body CT with and without contrast enhancement did not show any evidence of tumour spread in the lungs, liver or brain but showed a lymphatic enlargement of some right axillary lymph nodes whose maximum diameter was 2 cm. In the left thyroid lobe, CT did not reveal any heterogeneity but it confirmed a filling defect suggestive of a partially occlusive thrombosis of 2.6 cm of length in the internal right jugular vein (Figure 2). Immunotherapy was not recommended at that time because of patient co-morbidities. Fine-needle aspiration cytology of the vein thrombus was performed. Material from the vein bed was indicative of a thrombotic RCC metastasis. Therefore the patient underwent resection of the thrombotic tract of the internal right jugular vein (Figure 3). Pathological evaluation confirmed the presence of a thrombotic mass of clear RCC cells, probably extended into the internal right jugular vein from a median thyroid vein and an anonymous vein.

After 15 months, the patient was doing well and had not developed any additional metastasis. Currently he is being considered for possible adjuvant therapy.

## Discussion

Stage IV RCC disease is generally not considered curable but the unpredictable nature of this malignancy reflects the many long-term survivals. In fact a review of the literature reports that in cases of a solitary metastasis the patient can be offered surgical metastasectomy followed by surveillance.

The thyroid is a rare site of RCC secondary involvement. Generally, thyroid metastasis arises from breast, lung, skin and colon cancer. Usually they appear as a single mass but can be associated with other organ involvement in case of systemic diseases. RCC metastases to the thyroid are normally asymptomatic and do not affect thyroid function,

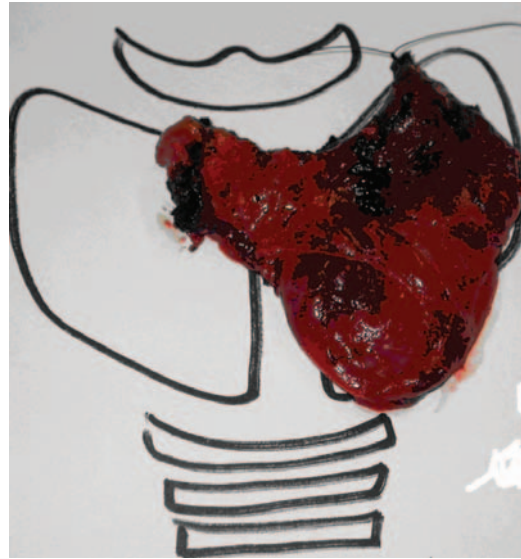


Figure 1. Right hemithyroidectomy and isthmectomy.

even if the literature reports cases of emergency treatments for acute respiratory compromises (9). Solitary RCC metastasis to the thyroid usually presents at latent intervals of up to 20 years after the first RCC diagnosis, especially in the case of low-grade primitive tumours (10-12). According to these reports, RCC appears to have an indolent behaviour, but the few cases described in the literature cannot support this theory. For this reason, a correct diagnosis is mandatory to give the patient appropriate and early treatment. Problems in clinical practice arise from the lack of clinical features and characteristic findings on imaging. In fact in most cases the disease is considered to be a primary thyroid neoplasia even if the patient has a past history of RCC. Metastases can also be resected as primary thyroid tumours before they are found to be a metastasis of an unknown RCC detected by a subsequent abdominal US or CT (13). Primary thyroid tumour cells can mutate and consequently lose their primitive characteristics, assuming the features of metastatic thyroid RCC cells (12). In these cases, fine-needle aspiration and thyroglobulin immunohistochemical stains are considered the most effective methods for diagnosis (14). In cases of diffuse RCC, the prognosis is poor and thyroid surgery is not recommend. Surgery is nevertheless mandatory in cases of tracheal compression (12). Cases presenting vascular thrombosis need to be treated surgically to avoid any further dissemination. At present, the literature data on the behaviour of metastatic RCC to these uncommon sites are not sufficient to be made enable consistent conclusions on prognosis and any suspicious thyroid nodule should be accurately evaluated during the follow-up of RCC patients.



Figure 2. Total body CT with and without contrast enhancement showing a filling defect suggestive of a partially occlusive thrombosis of 2.6 cm of length in the internal right jugular vein.



Figure 3. The resected thrombotic tract of the internal right jugular vein.

### Acknowledgements

We especially thank Dr. Maria Luisa Piegaia and Dr. Gialuca Fusconi and all technicians of the Radiology Department of the "G. Dossetti" Hospital for their important support in collecting images.

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*Received October 8, 2008*  
*Revised December 11, 2008*  
*Accepted December 15, 2008*