Case Report

I-131-Avid Renal Metastasis from Hurthle Cell Follicular Carcinoma: A Case Report with Literature Review

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Renal metastasis from thyroid cancer is uncommon, and computed tomography and magnetic resonance imaging findings cannot clearly differentiate renal metastases from renal cell carcinoma. However, I-131 total body scans almost always reveal radioiodine avidity in metastatic renal lesions from thyroid cancer but not in renal cell carcinoma. Hence, I-131 total body scans can be used for diagnosis and treatment planning in this rare patient population. These findings were reported mostly from the follicular variant of papillary thyroid cancer and follicular thyroid cancer. This report presents a case of renal metastasis from Hurthle cell follicular carcinoma with a literature review. The previous report on treatment options in well-differentiated renal thyroid cancer metastases included nephrectomy and radioiodine treatment. Patients with renal metastases typically also had other distant metastases and thus had poor prognoses and treatment outcomes.

Keywords: Renal metastasis, Hurthle cell carcinoma, Follicular carcinoma, Thyroid cancer, Total body scan, MRI, CT

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Thyroid cancer with renal metastasis is an uncommon condition and has been reported in a small number of cases. The epidemiology of the cases, histopathology of thyroid cancer, and treatment strategies are different among the reports[2-5].

Case Report

A 64-year-old woman living in the Bangkok vicinity presented with a palpable neck mass that had gradually increased in size over the past 40 years. A computed tomography [CT] scan of the neck revealed a large mass in the right lobe of the thyroid gland abutting the trachea but without sign of tracheal invasion. No cervical lymphadenopathy was detected, and vocal cord movement was intact. Fine-needle aspiration showed hypocellularity with monolayer sheets of thyroid cells. The head and neck specialist decided to observe and follow-up.

Six months later, the patient was sent to an emergency room with signs of upper airway obstruction. Total thyroidectomy was performed with tracheal injury during the operation. Pathology revealed an 8-cm wide invasive Hurthle cell follicular thyroid carcinoma confined to the right thyroid lobe with lymphovascular and capsular invasion. No evidence of tracheal invasion was observed.

The endotracheal tube was removed approximately 1 month after surgery, followed by radionuclide treatment with 150 mCi of I-131. The patient's ECOG performance status was 0 to 1. A total body scan with radioiodine revealed I-131 avid lesions at residual disease in the right thyroid bed, multiple lymph nodes metastases at right lower cervical, supraclavicular, superior mediastinum and prevascular nodes, multiple bilateral lung metastasis, bone metastases at T10, the left frontal bone and the left orbital apex and focal uptake at the upper pole of the right kidney (Figure 1 and Figure 2). The stimulated thyroglobulin (Tg) level was 1,833 ng/mL. A CT scan of

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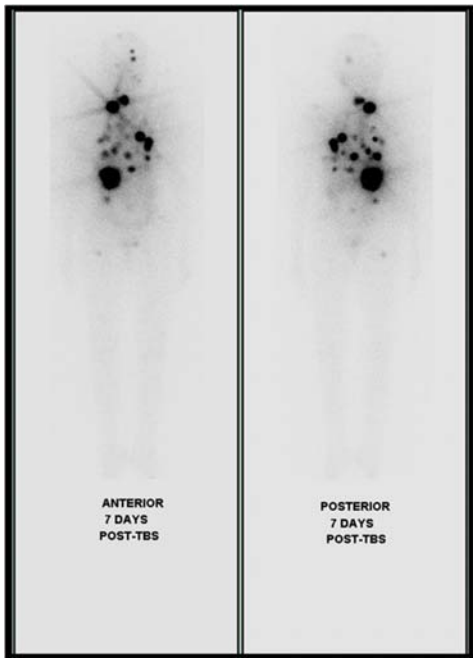

Figure 1. Post-treatment radioiodine total body scan revealed multiple abnormal foci of increased radioiodine uptake in the skull, thyroid bed, cervical lymph nodes, both lungs, spine, right femur and upper right abdomen.

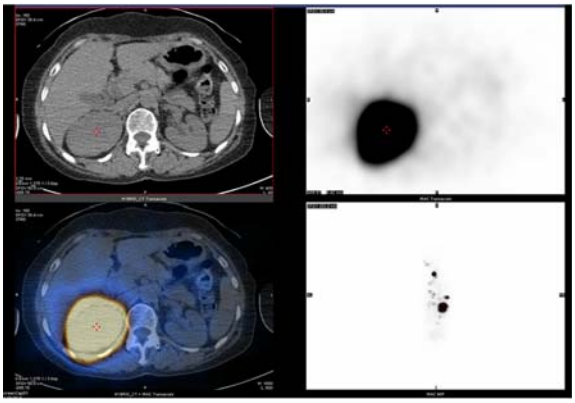

Figure 2. Single-photon emission CT revealed that focal uptake in the right upper abdomen was an abnormal mass in the upper pole of the right kidney.

the whole abdomen revealed a 7-cm arterial enhancing mass in the upper pole of the right kidney (Figure 3). Magnetic resonance imaging [MRI] demonstrated a 7-cm heterogeneously enhancing hyposignal T1/ hypersignal T2 with a restricted diffusion mass arising

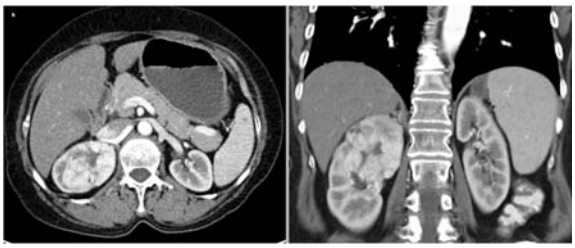

Figure 3. Contrast enhanced CT of the upper abdomen revealed a 7-cm arterial-enhancing lobulated mass arising from the upper pole of the right kidney.

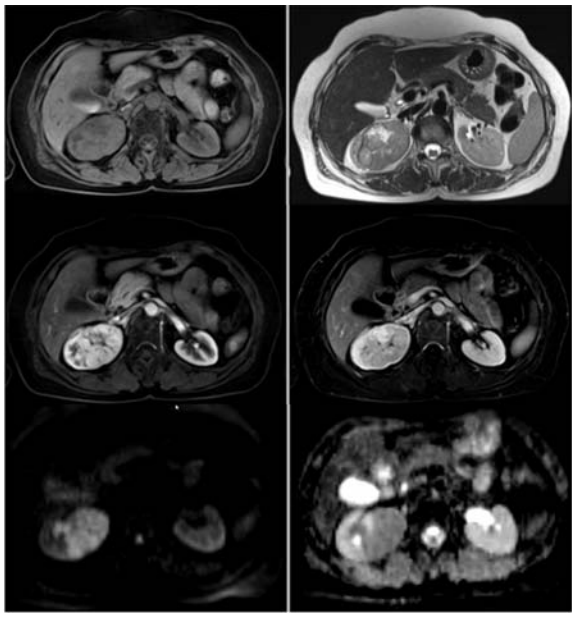

Figure 4. Axial MRI of the upper abdomen demonstrated a 7-cm heterogeneous enhancing hyposignal T1/ hypersignal T2 with restricted diffusion mass arising from the upper pole of the right kidney.

from the upper pole of the right kidney (Figure 4). CT and MRI findings could not differentiate between renal metastases and renal cell carcinoma. The patient refused to do a renal biopsy. Based on the radioiodine avidity and clinical history, it was most likely renal metastasis from thyroid cancer.

The patient only had symptoms of fatigue and did not have headache, abnormal vision or respiration, airway disease, abdominal or bone pain. She had normal renal function with creatinine of 0.66 mg/dL and a calculated glomerular filtration rateof 86.5 mL/min. Stimulated thyroglobulin levels decreased from 1833

ng/mL to 556 ng/mL 6 months after the first radioiodine treatment, indicating disease response. The 2nd and 3rd radioiodine treatments were given at 6-months intervals with a cumulative dose of 600 mCi. However, the last post-treatment total body scan found progression of the bone and lung metastases and the stimulated Tg level increased to 1,650 ng/mL, indicating radioiodine-refractory disease. The patient developed symptoms of bone pain, which could be controlled by tramadol 100 to 150 mg/day. Targeted chemotherapy and radiation therapy were offered, but were refused by the patient. One year after the last radioiodine treatment, the patient did not return for a follow-up.

Discussion

The most frequent sites of metastatic thyroid cancer dissemination are lymph node, lung and bone, respectively; renal metastases are rare. In a study of 161 autopsy cases of metastatic thyroid cancer, 6.1% of well-differentiated thyroid cancers metastasized to the kidney[1]. We reviewed previous English reports in PUBMED using the keywords "thyroid cancer", "thyroid carcinoma" and "renal metastasis", "kidney metastasis", "nephrectomy", "metastasis to kidney" and identified 26 case reports. A detailed summary is as follows: the ages of the patients were >45 years with the most frequent age being 60 to 80 years, except one report in a 37-year-old male[2]. The gender of the patients was roughly equal. There were five cases from two reports that had bilateral renal metastasis[3,4].

The occurrence of follicular thyroid cancer is approximately the same as that of the follicular variant of papillary thyroid cancer, while papillary thyroid cancer is the rarest. This is in accordance with the nature of follicular thyroid cancer, which tends to be a bit more aggressive than papillary thyroid cancer and hence more likely to metastasize. There is only one case report of renal metastasis from Hurthle cell carcinoma in a 75-year-old man[5]. In that case, the patient presented with abnormal Tg level (1,164 ng/ml) suspicious of recurrent disease. Fluorodeoxyglucose positron emission tomography/CT revealed a hypermetabolic right renal mass with MRI showing renal vein invasion and thrombosis, implying primary renal cancer. However, right radical nephrectomy proved the lesion to be a metastasis from Hurthle cell carcinoma. The authors did not mention about I-131 imaging of renal metastases in that case. Our case showed renal metastasis from follicular Hurthle cell thyroid carcinoma in a 64-year-old woman with positive I-131 imaging. In general, anatomical imaging with MRI and CT cannot differentiate between primary renal cell carcinoma and renal metastasis from thyroid cancer, but in most cases, I-131 imaging can. False positive I-131 imaging was found in renal hamartomas[6] and renal cysts[7]. Some non-thyroidal tumors also had I-131 uptake[8], but there has been no report of uptake in primary renal cell carcinoma. There are two reports of non-radioiodine-avid renal metastasis from necrosis and tumor de-differentiation[3,4].

The clinical manifestations of the patients from previous case reports were palpable abdominal masses, abdominal pain, back/flank pain or hematuria with few reporting no symptoms aside from rising Tg levels. Both our case and the other case of Hurthle cell carcinoma had no symptoms of renal metastasis. Normal urinary analysis, including blood urea nitrogen, and creatinine were seen in our patient.

Most patients with renal metastases also had other distant metastases (e.g. lung and bone), similar to our case. According to its low incidence, a treatment guideline for renal metastasis from thyroid cancer has not been established. Nephrectomy or radioiodine treatment or both are the options reported in the literature without conclusive outcomes. There has also been no data about outcomes of the targeted tyrosine kinase inhibitors (Sorafinib and lenvatinib), which are proven to be effective for radioiodine-refractory metastatic thyroid cancer[9,10].

Conclusion

Thyroid cancer with renal metastasis is uncommon with a very small number of case reports. While anatomical imaging cannot differentiate renal metastasis from primary renal cell carcinoma, radioiodine imaging can help in diagnosis and treatment. Nephrectomy and/or radioiodine are the only previously reported treatments. However, patients matching these criteria usually have other distant metastases, and therefore, had poor prognoses and treatment outcomes.

What is already known on this topic?

Renal metastasis from well-differentiated thyroid cancer is an unusual manifestation; fewer than 30 cases have been reported. CT and MRI findings cannot clearly differentiate renal metastases from renal cell carcinoma.

What this study adds?

We present a rare case of renal metastasis from Hurthle cell follicular carcinoma with a different

diagnostic approach and treatment from previously reported cases.

Acknowledgements

This research was reviewed and approved by the Ethics Committee for Human Research, Chulabhorn Research Institute (EC No. 006/2560).

Potential conflicts of interest

The authors declare no conflict of interest.

References

1. Heitz P, Moser H, Staub JJ. Thyroid cancer: a study of 573 thyroid tumors and 161 autopsy cases observed over a thirty-year period. Cancer 1976;37:2329-37.
2. Abe K, Hasegawa T, Onodera S, Oishi Y, Suzuki M. Renal metastasis of thyroid carcinoma. Int J Urol 2002;9:656-8.
3. Kand P, Basu S. Clinicoradiological characteristics of patients with differentiated thyroid carcinoma and renal metastasis: case series with follow up. J Laryngol Otol 2014;128:203-8.
4. Lubana SS, Singh N, Tuli SS, Bashir T, Sachmechi I, Kemeny MM. Follicular variant of papillary thyroid cancer with bilateral renal metastases discovered incidentally during work-up of primary endometrial cancer: A rare occurrence. Am J Case Rep 2015;16:459-68.
5. Djekidel M, Gordon M, Shah RB, Gross MD, Avram A. Renal metastasis from Hurthle cell thyroid carcinoma and its evaluation with hybrid imaging. Thyroid 2010;20:429-33.
6. Shen G, Qi Z, Huang R, Liu B, Kuang A. False-positive uptake of radioiodine in renal hamartoma in a patient with differentiated thyroid cancer. Clin Nucl Med 2017;42:709-10.
7. Campenni A, Ruggeri RM, Giovinazzo S, Sindoni A, Santoro D, Baldari S. Radioiodine uptake in a renal cyst mimicking a metastasis in a patient affected by differentiated thyroid cancer: case report and review of the literature. Ann Nucl Med 2014;28:472-6.
8. Oh JR, Ahn BC. False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. Am J Nucl Med Mol Imaging 2012;2:362-85.
9. Schlumberger M, Tahara M, Wirth LJ, Robinson B, Brose MS, Elisei R, et al. Lenvatinib versus placebo in radioiodine-refractory thyroid cancer. N Engl J Med 2015;372:621-30.
10. Brose MS, Nutting CM, Jarzab B, Elisei R, Siena S, Bastholt L, et al. Sorafenib in radioactive iodine-refractory, locally advanced or metastatic differentiated thyroid cancer: a randomised, double-blind, phase 3 trial. Lancet 2014;384:319-28.