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Case Report

Unusual Metastatic Thyroid Carcinoma to the Liver and the Kidneys: A Case Report

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Abstract

Papillary Thyroid Carcinoma is the most common differentiated type of thyroid malignancy. Fortunately, distant hematogenous metastases are extremely rare, including primarily lungs and bones. We report a rare case of papillary thyroid carcinoma with kidney and liver metastases, as imaged by the postoperative whole body iodine scan.

Keywords: Renal metastasis; Liver metastasis; Thyroid papillary cancer; SPECT/CT; Iodine scan

Introduction

Papillary Thyroid Carcinoma (PTC) is the most common differentiated histological entity of thyroid cancer occurring for approximately 80% of all primary thyroid cancers [1]. In the majority of cases, PTC is a localized disease confined to neck with a high spread of regional cervical lymph nodes involvement [2]. Hematogenous distant metastases from PTC are rare, occurring in less than 10% and primarily include lungs and bones [3].

Renal involvement from primary thyroid cancer is very unusual, with a prevalence of less than 6% [4-6] in autopsy series [7]. However, the detection of these metastases during life is very rare [4,8]. By the year 2019, less than 30 cases of renal metastases from thyroid cancer were reported in the English-language literature, with most of the subjects being female and over 45 years of age [6-8]. Seven patients had conventional PTC, 6 had a follicular variant of PTC, and 11 had FTC (5). Kidney involvement often occurs in the setting of multifocal metastases throughout the body and can develop several years after removal of the primary thyroid cancer, occasionally decades later [8].

Regarding compromise of the liver metastasis from thyroid cancer is a very rare event with a reported frequency of less than 0.5% [8]. A review of literature revealed that metastatic liver disease from both follicular and papillary thyroid cancer, is always multiple or diffuse and usually associated with other hematogenous metastases at the lungs, bones and the brain [9-17]. To the best of our knowledge, only few cases of all liver metastases from DTC have been documented, with a rate of 0.5% or less, including ten patients (three men and seven women), aged from 32 to 85 years, with average age about 63 years. Histologically, for the majority of patients, the primary tumor was identified as follicular (five patients), followed by papillary (four patients), and Hürthle cell thyroid cancer (one patient) [3,8].

What makes our presented case an interesting one is the fact that thyroid cancer metastases to liver are rare, and even more so is associated with other very rare hematogenous metastases to the bilateral kidneys from papillary thyroid cancer, as imaged by the postoperative whole body iodine scan.

Case Presentation

A 65-year-old lady presented to us after total thyroidectomy and bilateral radical neck dissection with the histopathological diagnosis of papillary carcinoma thyroid. The post operative serum thyroglobulin level was at 790 ng/ml. A post therapy whole body Iodine scan was performed 7 days post oral administration of 3.7 GBq of Iodine 131. The planar images showed intense iodine uptake in bilateral thyroid bed, bilateral lung, multiple bone metastases, as well as large uptake within the liver and bilateral side of abdomen (Figure 1).

By precisely localizing 131I uptake, 131I Single Photon Emission Computed Tomography/Computed Tomography (131I-SPECT/CT) images of the neck, chest and abdomen were performed and they showed intense Iodine uptake in bilateral thyroid bed, bilaterally, bilateral lung, large uptake within the liver, the osseous structures which are noted in the right scapula, left temporal bone, right posterior acetabular wall, anterior aspect of right iliac bone, right femur, most of them are destructive lytic lesions and bilateral side of abdomen in keeping with bilateral renal metastases and (Figure 2).

The low dose (CT) scan showed two iso-hyperdense solid exophytic mass in left kidney, largest one at inferior pole measuring approximately 4.2 cm × 3.8 cm and another one at interpolar region measuring approximately 2.5 cm × 2.9 cm. Right kidney also shows similar iso-hyperdense lesion measuring 1.8 cm × 1.7 cm in the interpolar area (Figure 3).

There are also subtle hypodense lesions are seen in left lobe of the liver measuring approximately 1.1 cm × 1.1 cm, and another lesion is seen in segment VI, worrisome of liver metastases (Figure 4).

In view of extensive metastases, the patient was treated with second radio-iodine ablation. The post therapy whole body iodine scan performed 7 days post oral administration of 5.55 GBq of Iodine 131 showed worsening uptake within the bilateral thyroid lobes, which have not significant change in size compared to prior scan, with progressive

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uptake within the known lesions involving the liver and the kidneys. There is also interval development of new bone lesions involving the right scapula, left temporal bone, right posterior acetabular wall, anterior aspect of right iliac bone, right femur, most of them are destructive lytic lesions. In addition to progression in size, number of the bilateral metastatic pulmonary lesions that majorly o not express I131 uptake (Figure 5).

The currently, the serum thyroglobulin is still high at 700 ng/ml. We are planning to go for further high dose radioiodine treatment and we recommend 18F-fluorodeoxyglucose positron emission tomography/computed tomography (18F-FDG-PET/CT) for evaluation.

Discussion

Renal involvement from primary thyroid cancer is very unusual, with a prevalence of less than 6% in autopsy series [4,5], with an extremely rare detection during life [4,7]. As already stated above, by the year 2019, less than 30 cases had been published in medical literature [6,7].

Metastatic renal tumors are, in general, multiple and accompanied by metastatic disease elsewhere [18]. Usually there is a long period of time (3 to 37 years) between diagnosis of thyroid cancer and the presence of kidney metastases [8,18]. According to Wood et al. [19], the 5-year survival period of well DTC with resectable metastatic lesions is 67%. Although most of the case reports show a unilateral kidney lesion, Kand et al. [20], reported 4 cases with bilateral involvement.

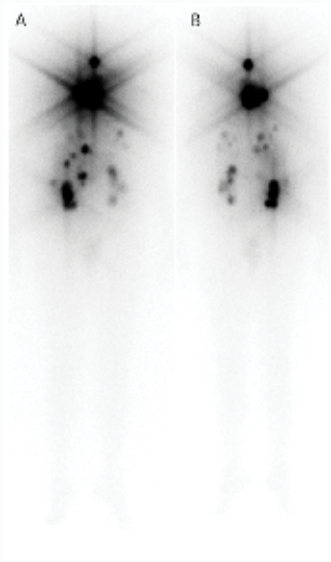

Figure 1: Planar total body scan after the first I-131 treatment revealed intense radioiodine uptake at the thyroid bed, bilaterally, with star artifacts. There were foci of radioiodine uptake within the bilateral lung, multiple bone metastases, as well as large uptake within the liver and bilateral side of abdomen.

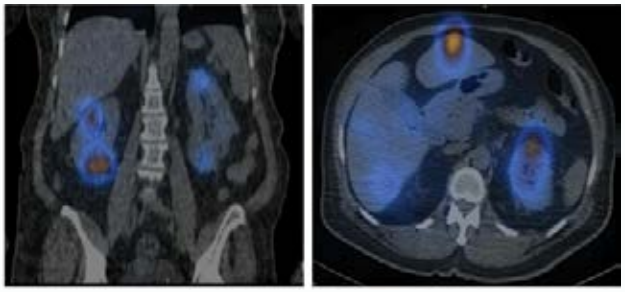

Figure 2: The SPECT-CT images of the abdomen showed intense iodine uptake in bilateral side of abdomen in keeping with bilateral renal metastases, as well as intense uptake within the left lobe of the liver, worrisome of liver metastasis.

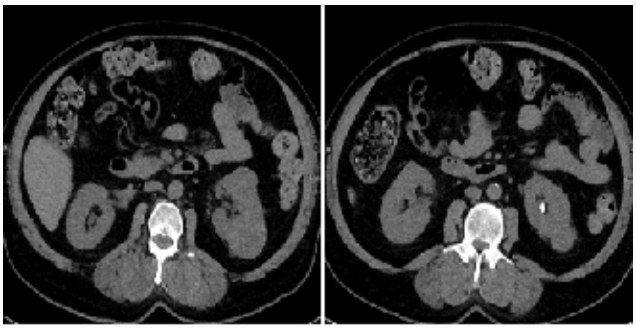

Figure 3: Unenhanced axial abdomen CT showing two iso-hyperdense solid exophytic mass in left kidney, largest one at inferior pole measuring approximately 4.2 cm × 3.8 cm and another one at interpolar region measuring approximately 2.5 cm × 2.9 cm. Right kidney also shows similar iso-hyperdense lesion measuring 1.8 cm × 1.7 cm in the interpolar area.

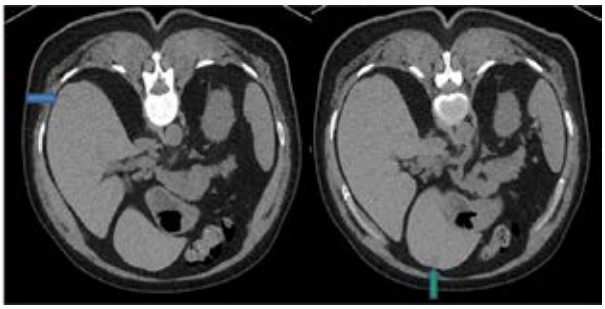

Figure 4: Unenhanced axial abdomen CT showing enhancing Suspicious subtle hypodense lesions are seen in left lobe of the liver measuring approximately 1.1 cm × 1.1 cm (green arrow), series 3 image 16 and another lesion is seen in segment VI, series 3 image 19 measuring approximately 1.6 cm (blue arrow).

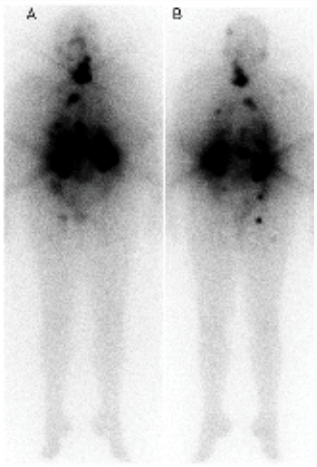

Figure 5: Planar follow-up total body scan after the second I-131 treatment revealed worsening uptake within the bilateral thyroid lobes, with progressive uptake within the known lesions involving the liver and the kidneys, as well as interval development of new bone lesions involving the right scapula, left temporal bone, right posterior acetabular wall, anterior aspect of right iliac bone, right femur.

Kumar et al. [4], state that some patients with DTC could have asymptomatic involvement of renal and/or adrenal glands, and in agreement with Song et al. [8], they also comment that this renal compromise could occur particularly in patients who have associated metastases to other organs. These patients require multimodality diagnostic, therapeutic, and monitoring approaches [7]. With patients in whom there is a high degree of clinical suspicion, the latest recommendations are to not only perform a serum Tg, antithyroid antibodies, and TSH, but also to perform a whole-body scan after radioiodine therapy.

Another important concept on this matter is the one postulated by Smallridge et al. [7]. They suggest that the variable expression (or loss of function) of the Sodium/Iodide Symporter (NIS) among different metastatic sites, may be the principal reason for which kidney metastases from thyroid carcinoma are only very rarely detected in life (and mainly at autopsy) [7].

Regarding compromise of the hepatic metastasis from both papillary and follicular thyroid cancer are extremely rare, with a reported frequency of 0.5% [8,21]. There is one study dated from 2012 by Song et al. [8] revealed ten patients documented in the literature, including seven females, with an average age of about 63 years. The primary tumor was identified as follicular in five patients, followed by papillary in four patients, and Hürthle cell thyroid cancer in one case.

Our patient, was 65 years old female, with primary papillary thyroid carcinoma. The metastatic disease was revealed by the post operative 131I whole-body scans.

In fact, radio-ablation by Iodine 131 has been used for treatment of distant DTC for over 60 years. The 131I whole-body scans (131I-WBS) have been performed to detect either residual (or recurrent) disease and distant metastases tracer avid after 131I treatment [22], like the case presented. However, the anatomical localization of foci with prominent 131I uptake is difficult on planar images because of the lack of anatomical landmarks. Single Photon Emission Computed Tomography/Computed Tomography (131I-SPECT/CT) might improve the diagnostic accuracy of 131I scanning, thus improving the early detection and the best management of diseases in patients [22,23].

In cases of negative 131I-WBS and elevated serum Tg, Scans based on 18F-FDG-PET/CT are well established for detecting recurring or metastatic DTC [24,25]. Moreover, the appropriate imaging modalities include also Ultrasonography (US), enhanced CT, and Magnetic Resonance Imaging (MRI), are useful for the detection of distant metastases (suspected according to clinical symptoms) in the follow-up of DTC.

Conclusion

We report this case because of its rarity and also to demonstrate the use of the SPECT/CT for the early diagnosis of such unusual diagnostic imaging findings of metastases involvement from PTC.

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