Detection of solitary bone metastasis by $^{99m}$Tc-octreotide scintigraphy in a patient with Hurthle cell carcinoma: A case report

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ABSTRACT

A 75-year-old male patient with non-avid radioiodine Hurthle cell carcinoma was evaluated by $^{99m}$Tc-octreotide scintigraphy, in order to find possible metastatic lesions. A bony metastatic lesion was detected by this procedure which was confirmed by histopathology. $^{99m}$Tc-octreotide scintigraphy is a precise and cost-effective imaging modality for detection of non-iodine avid lesions in metastatic differentiated thyroid carcinomas.

Key words: Hurthle cell carcinoma; $^{99m}$Tc-octreotide scintigraphy; Negative whole body iodine scan; Thyroid cancer; Elevated Tg level

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CASE PRESENTATION

A 75-year-old male patient with a history of non-avid radioiodine Hurthle cell carcinoma and unexplained elevated thyroglobulin (Tg=14 ng/ml) was referred for investigation of possible metastatic involvement by $^{99m}$Tc-octreotide scintigraphy. Since the neck sonography and whole-body iodine scan were negative and the patient could not afford the cost of $^{18}$F-FDG PET/CT, $^{99m}$Tc-octreotide scintigraphy was an alternative option for investigating possible metastatic lesions.

Four hours after IV administration of 740 MBq (20 mCi) of $^{99m}$Tc-octreotide, whole body scan was performed using a dual-head E-CAM, SPECT camera equipped with low-energy and high-resolution collimator. Hybrid SPECT/CT acquisition was performed from the pelvic region, with SPECT parameters of 128x128 matrices, 64 projections over 360°, and 20 seconds per step, and CT parameters of 5.0-mm slice thickness with a 2.5-mm collimation for attenuation correction. Reconstruction of SPECT/CT images was done with iterative method (OSEM, number of iterations 8, subsets 4). The whole body delayed images after 4 hours in planar view revealed a focal zone of increased tracer uptake in the posterior portion of the pelvis (Figure 1), which was confined to the left iliac alla in SPECT/CT acquisition (Figure 2).

The radiologic correlation was recommended for further evaluation. Pelvic transaxial MRI also showed a low T1 weighted signal (Figure 3A) and high T2 weighted signal (Figure 3B) lesion in the left iliac alla next to the sacroiliac joint with adjacent bone marrow edema. Excisional biopsy of the sacroiliac joint was compatible with metastatic Hurthle cell carcinoma. The patient refused to perform the excisional surgery and is being followed by Tg level measurements and has been stable in this setting.

DISCUSSION

Some differentiated thyroid cancer (DTC) variants may fail to concentrate iodine [1-4], therefore accompanied by negative $^{131}$I-WBS [5]. Despite the high sensitivity of FDG PET/CT imaging in detecting residual malignant foci [4, 6], SPECT-imaging is more...
cost-effective, widely available, simpler procedure with lower radiation dose and acceptable accuracy [5]. The uptake of somatostatin analogs can be visualized in patients with DTC and elevated serum Tg levels, that was helpful for finding metastatic sites [7]. The expression of Somatostatin analogs is due to the presence of these receptors on follicular cells of the majority of DTC patients, as proved by Baudin et al [8]. It seems that the Somatostatin receptor (SSTR) imaging can play an important role in the management of DTC patients with evidence of non-iodine avid metastasis [5]. Czepczyński et al. revealed that despite of good sensitivity and specificity of SSTR imaging in DTC patients, it is not high enough to be recommended as a routine modality instead, should be considered as a complementary diagnostic imaging method [9]. Many iodine negative metastatic DTC lesions express SSTRs and octreotide therapy can change the biological activity of these kinds of lesions [10]. So, another major advantage of somatostatin receptor imaging in patients with multiple avid metastatic lesions would be patient selection for targeted therapy with radiolabeled somatostatin analogs.

In conclusion, although 99mTc-octreotide scintigraphy is not the first choice for evaluation of metastatic thyroid cancer, it is a sensitive and cost-effective complementary imaging modality for detection of non-iodine avid lesions in metastatic differentiated thyroid carcinomas.

REFERENCES