Thoracic Vertebra Metastasis Mimicking Thyroid Nodule

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Abstract
A patient with previously known bone metastases was referred to bone scintigraphy, however, compared to his initial scintigraphy a focally increased uptake of radioactivity in anterior neck region was newly observed. We would like to present focal uptake of a skeletal metastasis, mimicking a thyroid nodule in bone scintigraphy.

Keywords: Bone scintigraphy; Thyroid nodule; Vertebra metastasis

Introduction
Tc-99m Methylene Diphosphonate (MDP) bone scintigraphy is a highly sensitive imaging method that has been used to diagnose osteoblastic metastases in patients with cancer [1]. However, bone scintigraphy may show unusual uptake of radiotracer in other regions apart from the skeletal system due to pathophysiological changes. Regarding that differential diagnosis should include the extra-osseous presences adjacent to bone structures that may mimic as skeletal metastatic lesions.

Case Report
A 50-year-old man with prostate adenocarcinoma with previously known bone metastases underwent bone scintigraphy for re-evaluation due to rising of prostate-specific antigen level. In his history, his preoperative Tc-99m MDP bone scintigraphy, 10 months ago, showed multiple areas of osteoblastic uptake, markedly in the left iliac region, suggestive of multiple skeletal metastases and after that the radiotherapy was performed at the left iliac region, zoledronic acid and goserelin was administrated before his TUR-P operation. In the comparative evaluation with preoperative bone scintigraphy; a significant regression was observed in the number and intensity of the radioactivity accumulation areas except a focal increased uptake of Tc-99m-MDP prominent in the anterior neck region which was newly observed on the recent whole-body bone scintigraphy (Figure 1). However, the oblique images could not distinguish whether radioactivity uptake belongs to the thyroid tissue or the vertebra metastasis. Meanwhile, his TSH level was suppressed 0.01 IU/ml (reference value 0.30 IU/ml to 5.5 IU/ml) and thyroid Ultrasonography (USG) has shown a nodule in the left lobe, 15 mm × 10 mm in size with multiple internal calcification, dominantly with microcalcifications. Nevertheless, the appearance did not correlate with bone scintigraphy uptake and the patient was referred to the Magnetic Resonance (MRI). MRI demonstrated hypo-intense sclerotic lesions in the left T2 vertebra corpus and T4 vertebra without any contrast uptake. Thereafter the Ga-68-PSMA (Gallium-68-Prostate Specific Antigen) PET/CT (Positron Emission Tomography/Computed...
Tomography) confirmed the metastasis consistent with MRI and bone scintigraphy in the anterior part of left T2 vertebra corpus (Figure 2).

**Discussion**

Generally, Tc-99m MDP binds to hydroxyapatite crystals and calcium salts causing the skeletal accumulation and uptake in the other of calcium deposition in the body [2]. Prostate cancer usually metastases to bones by hematogenous or lymphatic spread. However, other than malignant conditions, bone scintigraphy may demonstrate soft-tissue uptake in benign conditions such as thyroid nodules including calcification areas, tumoral calcinosis, myositis ossificans that might mimic as metastasis due to increased Tc-99m MDP uptake [3,4].

The increased radiotracer uptake in the soft tissues should be taken into account and should be evaluated further for the differential diagnosis. In our patient Ga-68 PSMA PET/CT and MRI revealed the differential diagnosis that the focal radioactivity accumulated in the anterior neck region in the bone scintigraphy is originally the shine through of the vertebra metastasis which is concordant with true-positivity of the bone scintigraphy rather than false positivity.

**References**