

False-positive uptake of radioiodine WBS in a patient with papillary thyroid cancer due to a vertebral hemangioma

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Introduction:

Diagnostic and post-therapy radioiodine whole body scan (WBS) has traditionally been used as an integral diagnostic procedure in the follow-up of differentiated thyroid carcinoma (DTC) for the detection of local recurrence or remote metastasis (1). Regularly therapeutic decisions are based on radioiodine WBS results. Its utility relies on the ability of DTC cells to accumulate iodine through Na-I-symporter, exactly as normal thyroid cells capture iodine from the blood. Other tissues such as the salivary glands, nasopharynx, gastric mucosa or the mammary gland possess the same symporter. Hence, a rather faint visualization of these organs on radioiodine WBS is considered normal. However, there are several reports in the literature of false positive uptake of radioiodine WBS in patients with DTC due to physiologic or pathologic conditions unrelated to DTC. We report a case of a 37-year old female patient with papillary thyroid cancer who presented with an abnormal radioiodine uptake on eighth thoracic vertebrae due to an atypical vertebral hemangioma.



Case Report:

A 37-year-old female patient underwent subtotal thyroidectomy for multinodular goiter and histology revealed multifocal papillary thyroid carcinoma, of follicular type with three foci of major diameter 1.35 mm. Post-operative radioiodine uptake of 24 hours was 2.7% and thyroglobulin (Tg) levels were 35 ng/ml. Neck ultrasound was negative for pathologic lymph nodes and chest X-ray was unremarkable. An ablation dose of 70mCi radioiodine was administered and the post-therapy WBS demonstrated multiple thyroid remnants on the anterior cervical region, increased uptake on the anterior upper mediastinum and a third large focus in the middle of the chest most evident on the posterior views suggesting vertebral metastatic involvement (Figure 1). Chest CT scan, cervical and mediastinal MRI were negative. In the ⁹⁹Tc-bone scan a small focus of increased uptake was observed at the 8th thoracic vertebrae with no other pathologic findings of the skeleton. MRI of the spine showed a high intensity pathologic signal in the 8th thoracic vertebrae with a major frontal diameter of 14.6 mm, which is most likely attributed to an atypical hemangioma and not to metastatic disease, in line with the rather mild elevation of Tg levels. Bone metastases in DTC are known to cause higher Tg concentrations, usually >100 ng/ml.

Discussion:

Vertebral hemangiomas are common and autopsy studies report a prevalence of approximately 10% in the general population, with females affected more often (2). Histopathologically, vertebral hemangiomas are benign tumors with a predilection for the thoracic region of the spine. We believe that the radioiodine uptake at the 8th thoracic vertebra in our patient was due to a vertebral hemangioma and not to metastatic disease, in consent with the rather mild elevation of Tg levels. Bone metastasis in DTC are known to cause higher Tg concentrations, usually > 100 ng/ml. Radioiodine uptake by a vertebral hemangioma in a patient with DTC has been reported in the literature in very few cases (3,4). Assumptions regarding the functional-pathological mechanisms suggest pooling of the iodine-laden blood in the hemangioma vessels, an obvious mode, since other vessel dilating conditions may show radioiodine uptake (5). Further, hypothyroidism is associated with increased capillary permeability leading to transcapillary escape of iodine and interstitial retention. Finally, hemangioma vessels may have abnormal structure, facilitating exudation of radioiodine in the interstitial space. These false positive results may mislead the physician to the presence of distant metastasis and erroneously change the stage of the disease and the therapeutic approach.

References

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