

Iodine-123 uptake in vertebral haemangiomas in a patient with papillary thyroid carcinoma

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Abstract

We present a case of a 58-year-old woman with papillary carcinoma of the thyroid and elevated thyroglobulin. Whole body ¹²³I scan with SPECT images demonstrated focal uptake in the thoracic spine, reported as bone metastases. Subsequent ¹⁸F-DG PET and ^{99m}Tc HDP bone were normal. MRI and CT scans confirmed the presence of vertebral haemangiomas corresponding to the uptake seen on the ¹²³I scan. False-positive uptake of ¹²³I in benign vertebral haemangiomas should be considered in the differential diagnosis of focal vertebral uptake.

Key words: papillary thyroid carcinoma, haemangioma, ¹²³Iodine scan

Case report

A 58-year-old woman who had undergone total thyroidectomy for metastatic papillary cell carcinoma of the thyroid presented with a new lump in the neck. Serum biochemistry revealed elevated thyroglobulin levels. As part of the diagnostic work-up, a whole body ¹²³I scan was undertaken (Figure 1). This demonstrated focal uptake in the upper thoracic spine, in keeping with metastases. The lesions in the thoracic spine were further evaluated with ^{99m}Tc-HDP bone scan (Figure 2). This showed normal tracer uptake

throughout the thoracic spine. ¹⁸F-DG PET scan also demonstrated normal uptake (Figure 3).

In order to evaluate further these vertebral lesions, magnetic resonance imaging (MRI) was performed (Figure 4). The lesions were noted to return high signals on T1- and T2-weighted images, in keeping with vertebral haemangiomas. Computed tomography (Figure 5) confirmed the typical appearances of haemangiomas correlating to the lesions seen on the initial ¹²³I scan.

Discussion

Thyroid carcinoma is rare among human malignancies (< 1%) but is the most frequent endocrine cancer, accounting for about 5% of all thyroid nodules [2]. The incidence of thyroid carcinoma is one of the most rapidly increasing human cancers, at least in the United States [3]. The disease requires a multidisciplinary approach, and nuclear medicine has an important role in diagnosis, staging, treatment and post-treatment follow up.

Whole-body radioiodine imaging assesses residual thyroid tissue and detects recurrent or metastatic thyroid carcinoma [4]. It is used in conjunction with TSH stimulation obtained by prolonged thyroid hormone withdrawal or recombinant-TSH injections. It is a specific diagnostic method; however, there are causes of false-positive study results. There are several reports in the literature which include infection, inflammatory or neoplastic processes, body secretions, ectopic kidneys, mucocele and cysts which can cause false-positive iodine uptake [5]. SPECT-CT imaging would increase the accuracy of anatomical localisation, in this case confirming the increased radioiodine uptake to be within the haemangiomas.

Vertebral haemangiomas are benign vascular tumours, which have been demonstrated in 11% of the general population on autopsy. They can occur throughout the skeletal system but are more common in the thoracic area. The vertebral body is most frequently affected and multi-level involvement may occur with multiple lesions [6]. The characteristic histopathological pattern is that of thin-walled, blood-filled vessels and sinuses lined by endothelium and interspersed among the longitudinally orientated trabeculae of bones [7].

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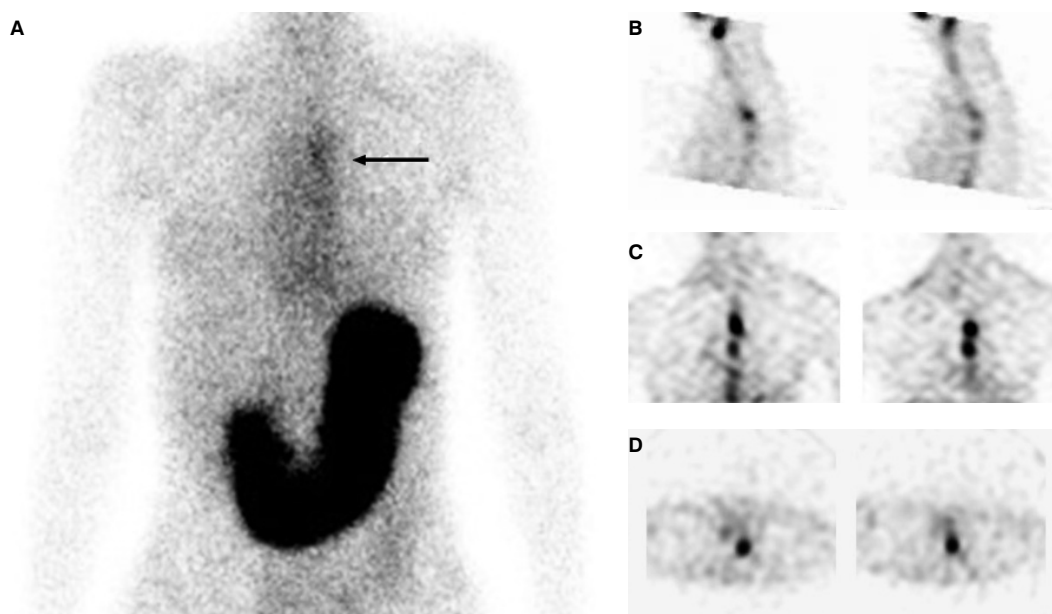


Figure 1. ^{123}I imaging. The planar image acquired 1-hour post injection (A) demonstrated increased tracer uptake in the midline of the thorax. On the 3-hour SPECT images [sagittal (B), coronal (C) and transverse (D)], this is shown to be within the upper thoracic vertebral bodies.

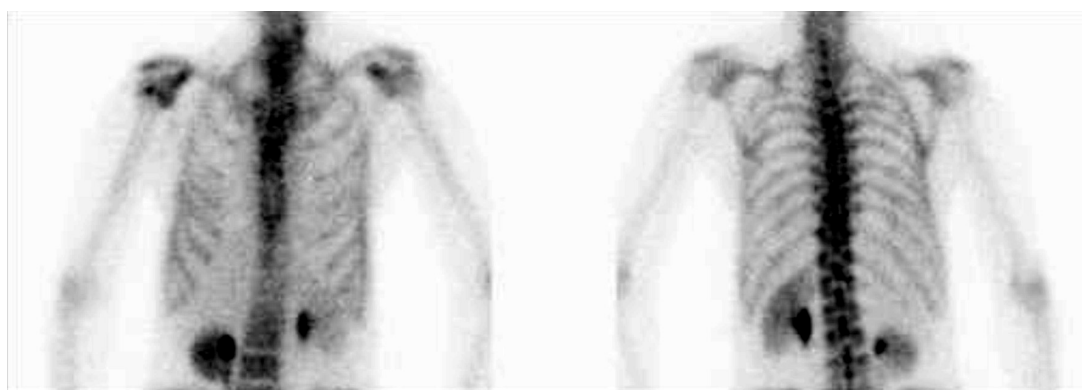


Figure 2. Whole body $^{99\text{m}}\text{Tc}$ HDP bone scan (anterior and posterior views) showing normal uptake in the thoracic spine.

Vertebral haemangiomas normally run a benign course and are often only incidental findings on a radiograph [8]. Occasionally they become symptomatic due to the pressure effect on surrounding structures or vertebral body destruction and fracture [9]. However, in these cases response to therapeutic intervention, such as radiotherapy, embolisation or surgery, is favourable [8].

Plain film radiograph and CT findings are adequate for a diagnosis of vertebral haemangioma. Findings consistent with a diagnosis of vertebral haemangioma on CT show a prominent thickened trabecular pattern [10]. On T1- and T2-weighted magnetic resonance (MR) images, the intraosseous portions of the vertebral haemangiomas exhibit characteristically mottled increased signal intensity. In our case, further radionuclide imaging with whole body $^{99\text{m}}\text{Tc}$ HDP bone scan demonstrated no abnormal uptake in the thoracic spine. This is consistent with vertebral haemangiomas, which may demonstrate normal or decreased activity [12, 13]. A whole body ^{18}F FDG-PET scan was normal. Haemangiomas may

cause focal photon-deficient areas on ^{18}F FDG-PET scans [14].

We present a case of a vertebral haemangioma mimicking a metastatic lesion in a whole body study with ^{123}I in a patient with papillary thyroid carcinoma. To our knowledge, this is the first reported case of a vertebral haemangioma mimicking a metastatic lesion in a whole body study with ^{123}I in a patient with well differentiated thyroid carcinoma. A vertebral haemangioma mimicking a metastatic lesion in a whole-body study with ^{131}I has previously been reported [10]. Most medical centres are using ^{123}I in preference to ^{131}I for whole-body imaging in the evaluation of thyroid carcinoma. The traditional use of ^{131}I is associated with stunning of thyroid tissue, so that uptake of a subsequent ablative dose of radioiodine is diminished [11].

This case report highlights the use of different imaging and nuclear medicine modalities, and the importance of accurate staging of well-differentiated thyroid carcinoma. The confirmed presence of metastatic bone disease can drastically alter the course

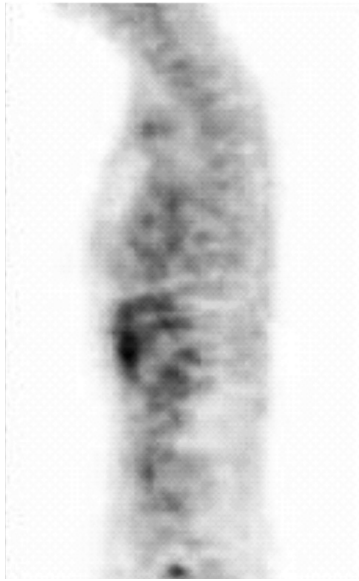


Figure 3. Subsequent whole body 18FDG-PET scan (sagittal reformat) was normal.



Figure 5. Sagittal CT images confirming the presence of haemangioma. This shows the typical prominent vertical trabeculae [1].



Figure 4. MRI of the spine was performed to clarify the above findings. T1 and T2 weighted sequences (Figures 4A and B respectively) show high signal on both sequences in several vertebrae, which is the typical appearance of vertebral haemangiomas [1].

and prognosis in carcinoma of the thyroid; it is therefore paramount that any suspect bony lesion is investigated fully before a therapeutic decision is made.

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