Incidental detection of skeletal metastases from thyroid cancer during myocardial perfusion imaging

To the Editor: The HJNM has published cases of various incidental findings on myocardium perfusion imaging (MPI) [1]. We report another incidental finding on MPI that may be important for the treatment schedule of the patients studied.

A 65 years old female patient with follicular thyroid cancer was subjected to stress MPI using technetium-99m tetrofosmin (^{99m}Tc-TF) in order to exclude coronary artery disease, as part of tests performed before anaesthesia and total thyroidectomy. She was hypertensive and diabetic and complained of symptoms equivalent to angina. Cardiac stress was given with dobutamine, starting with a dose of 10mcg/kg to a maximum of 40mcg/kg. ^{99m}Tc-TF was injected 1min before discontinuing the infusion of dobutamine. A second injection comprising 777MBq of the radiotracer was administered after 3hrs at rest.

Abnormal tracer accumulation was noted adjoining the myocardium, in both stress and rest images (Fig. 1A). A lateral image acquired in prone position with the breast hanging did not show any abnormal uptake in the breast tissue.

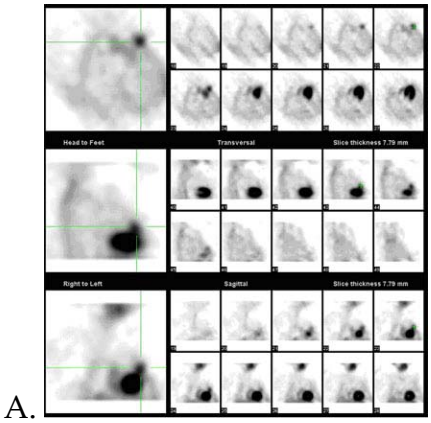

Figure 1. Myocardial perfusion imaging with ^{99m}Tc-tetrofosmin and subsequent additional images acquired to localize the abnormal focus. (A): SPET reconstruction of the raw images acquired during cardiac stress study shows a distinct focus of tracer uptake lying superolaterally to myocardial uptake (triangulation) (B): Lateral image acquired during rest study with the breast hanging down shows a hypermetabolic area in the skull corresponding to the clinically palpable swelling. No abnormal uptake is seen in the breast. (C): SPET/CT localized the hypermetabolic focus to the 4th left rib.

Another focus of abnormally increased tracer uptake, at the site of a palpable swelling, was noticed in the occipital region (Fig. 1B). Subsequent whole body imaging was performed using the already injected dose, of ^{99m}Tc-TF for rest MPI that showed one more focus of faint tracer uptake at the left pelvic region. Single photon emission tomography /computerized tomography (SPET/CT) examination of the thoracic region with ^{99m}Tc-TF injected for rest MPI localized the abnormal focus to be in the 4th left rib near the costochondral junction (Fig. 1C). No hybrid imaging was performed for the pelvic focus after the MPI

The patient was subjected to total thyroidectomy and metastasectomy of metastasis at the skull. A whole body iodine-131 (^{131}I) scan performed 48h after oral administra-tion of 55.5MBq of ^{131}I showed residual tracer uptake at the occipital region, a focal tracer uptake in the chest and another focus in the pelvis (Fig. 2A). Hybrid imaging localized the tracer uptake in the pelvis, at the acetabular margin (Fig. 2B).

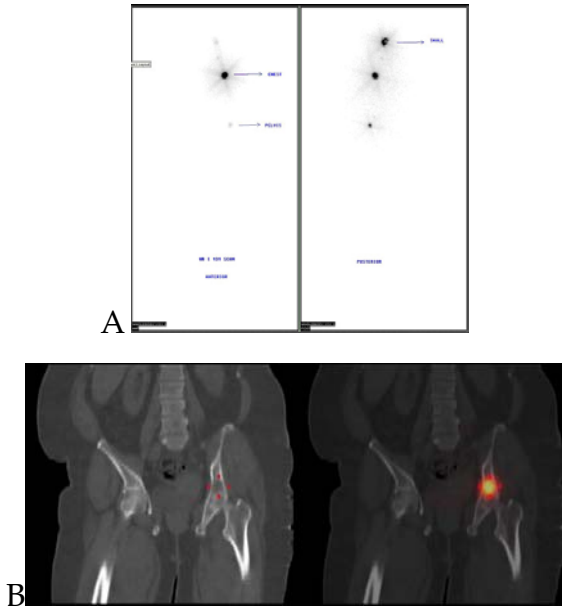

Figure 2. Post thyroidectomy ^{131}I imaging (A): Whole body ^{131}I scan obtained 48h after oral ^{131}I administration revealed ^{131}I avid tissues in the occiput, chest and the pelvis. (B): Hybrid SPET/CT imaging after ^{131}I whole body scan of the pelvis revealed an ^{131}I avid focus in the acetabular margin suggesting ^{131}I avid osseous metastasis.

Several case reports of incidental extracardiac uptake of the radiotracer have been reported in the literature [1-5]. Metastases from thyroid cancer to the skull are seen in approximately 2.5%-5.8% of these cases, while skeletal metastases are seen in approximately 10%-40% [6]. The patient was further treated with ^{131}I as all metastases were iodine avid. Due to the diagnosis of multiple skeletal metastases the ^{131}I dose was increased to 150mCi. The patient is on regular follow up and is doing well.

In conclusion, incidental findings in MPI performed by hybrid SPET/CT showed skeletal metastases of thyroid cancer and altered treatment procedure.

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Hell J Nucl Med 2010; 13(2): 169-170
Published on line: 22-6-2010