INTRODUCTION

Follicular thyroid carcinoma is common in regions with insufficient iodine diets and represents approximately 10-20% of all thyroid malignancies. The treatment of patients suffering from follicular thyroid carcinoma includes surgery and radioiodine therapy. Although after definitive therapy, the survival of these patients is good, these patients need to be followed for local recurrences and distant metastases. The main radionuclide methods that were used for the follow-up of these patients are; Tc-99m pertechnetate, Tc-99m sestamibi, I-131 scintigraphy and F-18-fluoro-2-deoxy-D-glucose (FDG) positron emission tomography (PET). These methods were found to be helpful in the identification of residual disease, but they have several non-specific uptake sites which may lead to false interpretation. Here we report a patient with false-positive findings in Tc-99m pertechnetate and Tc-99m sestamibi scintigraphy.

CASE REPORT

A 44-year-old female patient with a diagnosis of follicular thyroid neoplasia had undergone total thyroidectomy. Her pathology results were reported as 1.6 cm follicular thyroid carcinoma with vascular invasion. For the evaluation of the success of surgery, the patient underwent Tc-99m pertechnetate scintigraphy (TS). Images revealed accumulation in the thyroid bed compatible with residual thyroid tissue and another abnormal focal uptake in the mediastinum (fig. 1). For further verification of the uptake in mediastinum a tumor seeking Tc-99m sestamibi scintigraphy (TMS) was used. The whole body and spot views as well as SPECT imaging of the thorax showed a similar focal uptake of the radioactivity in the mediastinum as in TS (fig. 2). In order to evaluate the site of this abnormal uptake a consecutive MRI was performed, which revealed no abnormality other than some effusion (fig. 3). According to the tumor size and vascular invasion the patient received 100 mCi I-131 ablation therapy with no complication and the post-ablation scintigraphy revealed residual thyroid tissue, bilateral irregular increased breast uptake but no pathological uptake in mediastinum (fig. 4). In the 3 years follow-up, the patient had thyroglobulin levels < 0.2 ng/ml under routine thyroid hormone replacement therapy and clinicians accepted the pathological uptakes in TS and TMS as false-positive.

DISCUSSION

The recommended treatment for a 1.6 cm follicular thyroid carcinoma with vascular invasion is total...
thyroidectomy with radioiodine ablation\textsuperscript{13}. After definitive therapy, these patients were followed with serum thyroglobulin levels, ultrasonography and radionuclide methods. Among these radionuclide methods, TS is a useful method to evaluate residual thyroid tissue and helps in the decision of ablative radioiodine therapy without the risk of stunning. Tc-99m pertechnetate just like I-131 is transported into the thyroid cancer cells via NaI symporter. The main difference is that only I-131 organified and retained in thyroid cancer cell for a long time. Because of this property which leads to low tumor to background level, TS is not as sensitive as I-131 scintigraphy for thyroid cancer detection\textsuperscript{4}. Despite of that, as reported by Kiratli et al TS can demonstrate metastatic thyroid tumor in some patients\textsuperscript{5} and can be helpful in the follow-up. The main problem with Tc-99m pertechnetate is its low specificity which

Fig. 2.—A planar Tc-99m sestamibi whole body and spot views as well as SPECT imaging of the thorax which were performed at 20 minutes and 2 hours after the injection showed a similar focal uptake of the radioactivity in the mediastinum as in TS (black arrow).

Fig. 3.—MRI imaging showed no abnormality in mediastinum other than some effusion.
makes the anatomical verification of the abnormal uptakes outside the thyroid bed mandatory. For example one of the major pitfalls of TS in thyroid cancer metastasis diagnosis is the retention of the radioisotope in major vascular structures, leading to a false-positive diagnosis. TMS is also a useful tool for the diagnosis of metastatic thyroid cancer. It is widely used for tumoral imaging where FDG-PET is not available. Among the patient group with increased thyroglobulin levels but negative I-131 scintigraphy, Kucuk NO et al reported sensitivity, specificity, PPV and NPV of TMS as 83.3 %, 50 %, 96.2 %, and 16.7 % respectively. There are several causes that may lead to misinterpretation of TMS for thyroid carcinoma like central venous pacemaker wires and parathyroid adenomas, but our patient had normal parathyroid hormone and calcium levels and had no intravascular instrumentation. Her thoracic MRI was interpreted as normal in mediastinum, and showed no abnormal structure which may correspond to the uptake in TS and TMS. The corresponding structures for the radiotracer uptake in TS and TMS were the normal vascular structures of the mediastinum in MRI. The more specific, post-therapy I-131 images of the patient were normal, other than residual thyroid tissue and increased I-131 uptake in the breasts, which were thought to be as a result of increase in prolactin levels. In the 3 years follow-up, the patient had thyroglobulin levels < 0.2 ng/ml under routine thyroid hormone replacement therapy and received no further radioiodine therapy. The low thyroglobulin levels, negative I-131 scintigraphy and MRI has leaded to the clinical decision that the pathological uptakes in TS and TMS were false-positive findings, probably due to stagnant retention of the radioactivity in vascular structures. Due to the relatively non-specific properties of TS and TMS, as experienced with our report every abnormal uptake, especially outside the thyroid bed must be correlated by other imaging modalities and thyroglobulin levels.

REFERENCES
5. Kirati PO, Kura PP, Ergun EL, Gedikoglu G. Metastatic insular thyroid carcinoma: visualized on Tc-99m pertechnetate,

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