

Evaluation of Residual Thyroid Tissue with Tc-99m MIBI in Differential Thyroid Carcinoma Patients: A Case Report

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Abstract: Tc-99m pertechnetate thyroid scintigraphy is used in the routine for the evaluation of residual tissue after total thyroidectomy operations in differentiating thyroid carcinoma. Tc-99m methoxy isobutyl isonitrile (Tc99m MIBI) was first developed as a myocardial perfusion agent and is also used for tumor imaging. Tc-99m MIBI is taken up by the functioning thyroid tissue and washed-out fast. We present a case of differentiated thyroid carcinoma where uptake out the thyroid bed was not detectable by Tc-99m pertechnetate thyroid scintigraphy but with Tc-99m MIBI scintigraphy in the postoperative period.

Keywords: Total thyroidectomy, Residual tissue, Thyroid scintigraphy, Tc-99m pertechnetate, Tc-99m MIBI.

CASE REPORT

Thyroid scintigraphy was performed to a 43-year-old female patient who underwent total thyroidectomy with papillary carcinoma and follicular variant. Postoperative thyroglobulin (Tg) was detected >300 ng/mL. Tc-99m pertechnetate thyroid scintigraphy showed very low suspicious activity uptake located on the right lateral neighbourhood of the thyroid bed (Figure 1). On neck ultrasonography (USG), no residual tissue was observed. However, in the middle cervical area on the right side, located lateral to the carotid artery, a lesion of 16X16X25mm with conglomerate appearance, including rough calcification foci and another heterogeneous lesion 10x8x10 mm in size containing cystic areas. And then Tc-99m MIBI performed. On Tc-99m MIBI thyroid scintigraphy, Tc-99m MIBI uptake was detected corresponding to the lesion defined by USG (Figure 2). Right lateral neck dissection was performed to the patient. Metastatic lymph nodes in size 3x2.5x1.7 cm were excised.

DISCUSSION

Tc-99m MIBI is a cationic-lipophilic isonitrile compound developed as a myocardial perfusion agent, is also used for tumor imaging [1, 2]. In this case, residual tumor tissue was not visible by Tc-99m pertechnetate scan but with Tc-99m MIBI, a nonspecific tumor agent. In differentiated thyroid

carcinomas, total thyroidectomy is generally followed by radioiodine therapy. The common suitability criteria for radioiodine therapy are existence of no or very small residual thyroid tissue and negative thyroglobulin and antithyroglobulin levels. High Tg



Figure 1: Tc-99m pertechnetate thyroid scintigraphy showed very low suspicious activity uptake located on the right lateral neighbourhood of the thyroid bed.

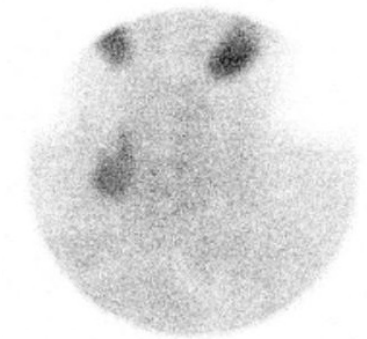


Figure 2: On Tc-99m MIBI thyroid scintigraphy, Tc-99m MIBI uptake was detected on the right lateral neighbourhood of the thyroid bed.

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values in patients with differentiated thyroid carcinoma in the postoperative period is known as a poor prognostic factor and should be certainly further evaluated before radioiodine therapy [3]. Neck USG is now the most commonly used imaging tool in detection of regional lymph node involvement. In suspect of distant metastasis, 18F-Fluorodeoxyglucose positron emission tomography / computed tomography (FDG PET/CT) is now recommended [4]. However, as this high technology equipment may not be available widely and may not be practical to apply, Tc-99m MIBI seems to be a simple and cheap alternative to 18F-FDG for metabolic imaging in routine clinical practice.

CONCLUSION

Although Tc-99m MIBI scintigraphy is not routinely used for imaging of the thyroid gland. It should be considered that patients with abnormal Tg elevation in the postoperative period may be helpful if there is no significant residual tissue on the thyroid scintigraphy.

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