Role of SPECT-CT somatostatin-receptor scintigraphy in the management of medullary thyroid cancer (MTC)

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Background: The MTC arises from the parafollicular, calcitonin-secreting malignant transformed thyroid C-cells who express on the surface somatostatin SSTR receptors. The most of aggressive locally advanced/metastatic MTC tumors, found to be positive for RET proto-oncogene mutation, are treated with Vandetanib. SPECT-CT somatostatin-receptor scintigraphy with 99mTc-Tektrotidy should be considered for MTC imaging before and after therapy for exact staging and follow-up of the disease due to its highly sensitivity and specificity for detection of neuroendocrine tumors, expressed SSTR. The aim of this study was to evaluate clinical role of SPECT-CT scintigraphy with 99mTc-Tektrotidy in the management of patients with MTC.

Methods: 25 pts (7M:18F) with MTC were studied; whole body somatostatin scintigraphy followed by target SPECT-CT studies were performed 2-4 hrs post i.v.enj. of 740 MBq 99mTc-Tektrotidy (Polatom). SPECT-CT camera Symbia T2, Siemens was used. Three of them were studied for initial pre-operative N/M staging, 17 were follow-up after surgery. In 5 patients with metastatic disease SPECT-CT with 99mTc-Tektrotidy were performed before and after target therapy with Caprelsa (Vandetanib), 300mg/d orally.

Results: Initial pre-operative staging showed 3 positive results for the primary tumor and metastatic lymph nodes and 2 false negative imaging of small 1-4 mm lung metastases. True negative results were obtained in 5 cases after thyroidectomy. True positive results were obtained in 17 cases with local recurrence in the thyroid bed, lymphadenopathy, osteolytic bone metastases, lung and subcutaneous lesions. False positive result was in 1 case with benign ovary cyst. Plasma levels of calcitonin vary from 94 to 5496 pg/ml in all 17 patients with local recurrence and/or metastatic lesions. In 5/17 cases SPECT-CT studies were used to evaluate effect of target therapy, respectively: partial response – in 2 cases, stable disease – in 2 cases and progressive disease – in 1 cases.

Conclusions: SPECT-CT somatostatin-receptor scintigraphy with 99mTc-Tektrotidy is very useful functional imaging modality in patients with MTC in order to determine personalized therapeutic disease approach.

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