**99mTc-Methoxy-Isobutyl-Isonitrile (MIBI) Scintigraphy is an Useful and Cost-Effective Tool for Assessing the Risk of Malignancy in Thyroid Nodules with Indeterminate Fine Needle Cytology (FNAC)**

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**BACKGROUND-AIM**

Nodular thyroid disease is a common clinical problem. The diagnostic algorithm include laboratory test, thyroid ultrasound, thyroid scintigraphy and ultrasound-guided fine needle aspiration cytology (usFNAC), if the nodule is cold. Not rarely, the results of usFNAC are non-diagnostic (Thyr 1) or unconclusive (Thyr 3). This is a very important problem in the management of patients because the risk of under or over-treatment is high.

The aim of our work was to verify if 99mTc-methosci-isobutil-isonitrile (99mTc-MIBI) scan can be employed in Thyr1-Thyr3 patients how diagnostic test to differentiate benign from malignant thyroid nodules by qualitative and quantitative analysis.

**METHODS**

This prospective study was conducted on 62 patients (F=46, M=16; mean age 50.1 ± 13.8 years) with cold thyroid nodules at 99mTc-pertechnetate scintigraphy, greater than 1.5 cm in diameter (mean size: 27.7 mm; range 15-45). The patients had underwent FNAC, with indeterminate results: Thyr1, n=5 and Thyr3, n=57. sestaMIBI scintigraphy was acquired 20 and 40 minutes after tracer administration (370 MBq) by static images of the thyroid.

MIBI uptake in thyroid nodules was evaluated both qualitatively (compared with that in controlateral thyroid lobe) and quantitatively, by using region of interest that were created around nodule and outside the thyroid (background activity subtraction). All patients underwent total-thyroidectomy.

**RESULTS**

All the cold nodules were MIBI-positive, with different intensity of MIBI uptake at qualitative analysis: low (n=13 patients), moderate (n=23 patients) and high (n=26 patients). By quantitative analysis, the patients were arbitrarily subdivided in three groups: A (n=13) with a wash-out index (woi) ≥ -40%; Group B, (n=23): woi between -20 and -40%; Group C (n=26): woi ≤ -20%. We assumed that a woi ≤ -20% was suspicious for malignancy, while a woi ≥ -40% was predictive of a benign lesion. Compared to hystopathology, all patients of the group A were negative for thyroid cancer [sensitivity and negative predictive value: 100%]. In Group B were included all except seven patients affected by benign adenomas (sensitivity: 76.6%). Finally, 19 out of 26 patients of the Group C had a papillary thyroid carcinoma [specificity and positive predictive value: 73.1%]. All false positive patients were affected by adenoma with oxyphil cell.

**CONCLUSION**

We suggest the use of MIBI-scan (by using quantitative analysis) in the work-up of cold nodule with indeterminate cytology to better stratify the risk patients to have a malignant lesion, so reducing the number of patients refereed to surgery.