Quantification of Cancer Risk of Each Clinical and Ultrasonographic Suspicious Feature of Thyroid Nodules: A Systematic Review and Meta-Analysis

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Objectives: In order to quantify the risk of malignancy of clinical and ultrasonographic features of TN, we did a systematic review and meta-analysis of published studies.

Methods: We did a literature search in MEDLINE for studies published from January 1, 1989 until December 31, 2012. Studies were considered eligible if they investigated the association between at least one clinical/ultrasonographic feature and the risk of malignancy, did not have exclusion criteria for the detected nodules, had histologically confirmed diagnoses of malignancy, and had a univariable analysis available. Two reviewers independently extracted data on study characteristics and outcomes.

Results: The meta-analysis included 41 studies, for a total of 29678 TN. A higher risk of malignancy expressed in odds ratio (OR) was found for: shape nodule height greater than width (OR:10.15), absent halo sign (OR:7.14), microcalcifications (OR:6.76), irregular margins (OR:6.12), hypoechogenicity (OR:5.07), solid nodule structure (OR:4.69), intranodular vascularization (OR:3.76), family history of thyroid carcinoma (OR:2.29), nodule size ≥4 cm (OR:1.63), single nodule (OR:1.43), history of head/neck irradiation (OR:1.29) and male gender (OR:1.22). INTERESTINGLY, META-REGRESSION ANALYSIS SHOWED A HIGHER RISK OF MALIGNANCY FOR HYPOECHOIC NODULES IN IODINE-SUFFICIENT THAN IN IODINE-DEFICIENT GEOGRAPHICAL AREAS.

Conclusions: The current meta-analysis verified and weighed out each suspicious clinical and ultrasonographic TN feature. The highest risk was found for shape nodule height greater than width, absent halo sign and microcalcifications for ultrasonographic features and family history of thyroid carcinoma for clinical features. A meta-analysis-derived grading system of TN malignancy risk, validated on a large prospective cohort, could be a useful tool in TN diagnostic work-up.#