Identification of malignancy in thyroid nodule using contrast-enhanced ultrasound combined with 2017 American College of Radiology (ACR) Thyroid Imaging Reporting and Data System (TI-RADS) ultrasound lexicon

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Abstract

The study developed a modified TI-RADS score using gray-scale ultrasound, contrast-enhanced ultrasound (CEUS), and shear-wave elastography (SWE) images to predict malignancy of thyroid nodules and compared this modified score system with the subjective scoring criteria based on ACR TI-RADS (2017 edition). By using SWE and CEUS (enhanced pattern) to downgrade TI-RADS category 4 and 5 nodules, the malignancy rate for TI-RADS category 4 and 5 nodules increased from 47.6% with ACR TI-RADS assessment alone to 49.4% with ACR TI-RADS combined SWE and CEUS (enhanced pattern). Likewise, by using the modified TI-RADS to adjust TI-RADS category 3 nodules, the malignancy rate for TI-RADS category 4 or 5 nodules decreased from 31.0% or 75.4% with ACR TI-RADS assessment alone to 27.8% or 72.9% with ACR TI-RADS combined SWE and CEUS (enhanced pattern). The discriminating power for detection of malignancy of the variable score 2, with an AUC of 0.899 (95% CI, 0.861-0.936%), was higher than that of score 1, with an AUC of 0.862 (95% CI, 0.819-0.906%; P > 0.05). With a point 4.5 as the optimal cutoff value, a score of 1 (ACR TI-RADS) predicted malignancy with an accuracy of 75.6%, sensitivity of 85.0%, and specificity of 71.6%. However, with a point 5.5 as the optimal cutoff value, a score of 2 (ACR TI-RADS + SWE + CEUS) predicted malignancy with an accuracy of 84.9%, sensitivity of 81.0%, and specificity of 86.6%. The modified TI-RADS based on ACR TI-RADS + SWE + CEUS (enhanced pattern) could contribute to reducing the number of biopsies performed on benign nodules and to implementing consistent follow-up in clinical practice.

Speaker Publications:
3. “Color Doppler Ultrasound in Diagnosis and Assessment of Carotid Body Tumors: Comparison with Computed Tomography Angiography”, June 2016, Ultrasound in medicine & biology 42, DOI: 10.1016/j.ultrasmedbio.2016.04.007

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