

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

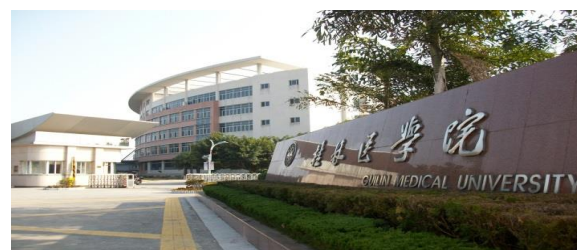
Zhan-Qiang Jin

Guilin Medical University, China



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 3 nodules increased from 13.9% to 20.0%. Interestingly, applying the modified TI-RADS to adjust TI-RADS category 4 or 5 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, 86.1%-93.6%), was higher than that of score 1, with an AUC of 0.862 (95% CI, 81.9%-90.6%; $P > 0.05$). 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 + SWV + 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:

1. "Clinical Study of the Prediction of Malignancy in Thyroid Nodules: Modified Score versus 2017 American College of Radiology's Thyroid Imaging Reporting and Data System Ultrasound Lexicon", *Ultrasound Med Biol* 2019 07 4;45(7):1627-1637. Epub 2019 May, <http://dx.doi.org/10.1016/j.ultrasmedbio.2019.03.014>
2. "Clinical application of ultrasound-guided percutaneous microwave ablation for benign breast lesions: a prospective study", *BMC Cancer* 2019 Apr 11;19(1):345. Epub 2019 Apr 11, <http://dx.doi.org/10.1186/s12885-019-5523-6>
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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Biography:

Jin has completed his MD at the age of 35 years from Capital Medical University. He is the director of Ultrasound Department of Guilin Medical University. He has published more than 30 papers in reputed journals and has been serving as an editorial board member