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Thyroid

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Characterization of Ultrasound and Cytological Features Identifying Thyroid Nodules with Aggressive Behavior: From Histology to Clinic

Francesco Latrofa, MD, Teresa Rago, MD, Ferruccio Santini, MD, Daniele Sgrò, MD, Giuseppe Greco, MD, Alessandro Brancatella, MD, Nicola Viola, MD, Mauro Casula, MD , and Liborio Torregrossa, MD

Fine-Needle Aspiration Biopsy (FNAB) guides surgical treatment of thyroid nodules which, according to the Italian classification, are classified as TIR 1/1C, TIR 2, TIR 3A, TIR3B, TIR4 or TIR5, which correspond to Thy I, Thy II, Thy III, Thy IV, Thy V and Thy VI categories of the Bethesda System. TIR 3 identifies the follicular pattern, which is typical of both benign and malignant lesions. Surgery is usually recommended for TIR 3B, TIR 4 and TIR 5 nodules. The latest histopathological classifications of thyroid cancers have introduced significant changes. While the follicular (FV-PTC) and classical variants (CV-PTC) of papillary thyroid carcinoma and the minimally invasive follicular thyroid carcinoma (FTC) are characterized by a good prognosis and require a less aggressive treatment, the poorly differentiated thyroid carcinoma (PDTC), the anaplastic thyroid carcinoma (ATC), the tall cell (TC-PTC) and the solid variants (SV-PTC) and other variants have a worse prognosis. In addition, thyroid ultrasound often identifies thyroid nodules <1 cm, which are usually characterized by an indolent behavior and active surveillance may be advised. We retrospectively analyzed consecutive histopathological records of 1117 patients (for a total of 1668 nodules, of which 650 malignant) who underwent surgery in 2017, and who had previously undergone FNAB and thyroid ultrasound (available for 390 nodules), in order to characterize echographic and cytological features useful to identified aggressive variants among TIR4-5 nodules and malignant lesions among TIR3B nodules. Of the 566 PTC, 18.7% were TIR3A, 20.7% TIR 3B and 51.6% TIR4-5, while of 50 FTC 42.0% were TIR3A, 42.0% TIR3B and 6.0% TIR4-5. Of the 11 PDTC 54.5% had been diagnosed as TIR 3B. Of the 249 classic variant of PTC, 0.8% had resulted TIR3A, 14.1% TIR3B and 79.9% TIR4-5. Among 49 tall cell variant, none had resulted TIR3A, 2% had been diagnosed as TIR3B and 95.9% as TIR4-5. Of the 219 follicular variant of PTC 42.0% had resulted TIR3A, 39.7% TIR3B and 12,3% TIR4-5. Among 34 SV-PTC, 32.4% had been diagnosed as TIR3A, 41.2% TIR3B and 0.6% TIR4-5. Blurred margins were the only feature associated with malignancy (p=0.034) in TIR3B nodules. The coexistence of hypoechogenicity and blurred margins in absence of microcalcifications were more common in tall cell variant (7/28) compared to classic variant (10/120) of PTC (p= 0.021). A significant number of PDTC and SV-PTC were diagnosed as TIR3. Among TIR3B nodules, irregular margins correlate with malignancy. Coexistence of irregular margins with a hypoechoic pattern in absence of microcalcifications is helpful in identifying TIR4/TIR5 nodule which turn out TC-PTC. In conclusion, among TIR3B, TIR4 and TIR5 nodules, ultrasound helps to identify aggressive variants and therefore to choose the extent of surgical treatment and, when <1 cm, to confidently advise active surveillance.

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