

CRITERIA FOR ULTRASOUND SUSPICION OF THYROID NODULE

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Summary:

A thyroid nodule is a formation well differentiated from the rest of the thyroid. It represents the most frequent thyroid pathology, and the majority of these nodules are benign. Assessment of patients with thyroid nodules includes history, clinical examination, TSH measurement and thyroid ultrasound.

In this article, we will detail the criteria for suspicion, including the place of ultrasound in the evaluation of thyroid nodules, based on the EU-TIRADS criteria.

Keywords: *Nodule, thyroid, malignancy, ultrasound, suspicion, EU-TIRADS.*

INTRODUCTION

The prevalence of thyroid nodules in the general population varies depending on the mode of screening. Clinical examination alone is not very sensitive, and detects less than 10% of thyroid nodules. Ultrasound is the examination of choice, both for the detection and characterization of these nodules.

The prevalence of thyroid nodules in ultrasound varies across studies and populations from 13.5% to 76%,^{[1][2]} with a clear female predominance with a sex ratio of 3 to 4). The prevalence of thyroid nodules is increasing, which may be due to the development of ultrasound scanners and their more frequent use.

Although more than 90% of the nodules detected are clinically insignificant benign lesions³, their evaluation is still important to rule out thyroid cancer which is present in about 4.0% to 7% of cases. ^[4]

Etiopathogenesis and histology:

Nodulogenesis is a physiological phenomenon of thyroid aging. Several factors can contribute to their appearance. Cervical irradiation remains the most reported extrinsic factor in the literature, and this is for benign and malignant nodules, other factors include smoking, obesity, alcohol, and metabolic syndrome. Thyroid nodules can be benign or malignant, and their course is indolent or aggressive.

Evaluation of a thyroid nodule:

Clinical and Laboratory Criteria of Suspicion:

The nodule can be seen as a swelling, palpable and mobile with swallowing.

Less commonly, it is responsible for cervical discomfort, pain, or compression signs.^{[5][6]}

The main clinical criteria for malignancy used in the literature are: male sex, extreme age: less than 15 years and over 60 years, and history of cervical irradiation, family history.

Dysphagia and dysphonia due to recurrent paralysis are more indicative of a loco-regional invasion, suggestive of malignancy.

On a biological level, the TSH test is the first test to be carried out in the presence of any thyroid nodule. A normal or elevated TSH argues in favor of a suspicious origin.

Based on clinical and biological data, certain pathologies can be evoked (see Figure 1)

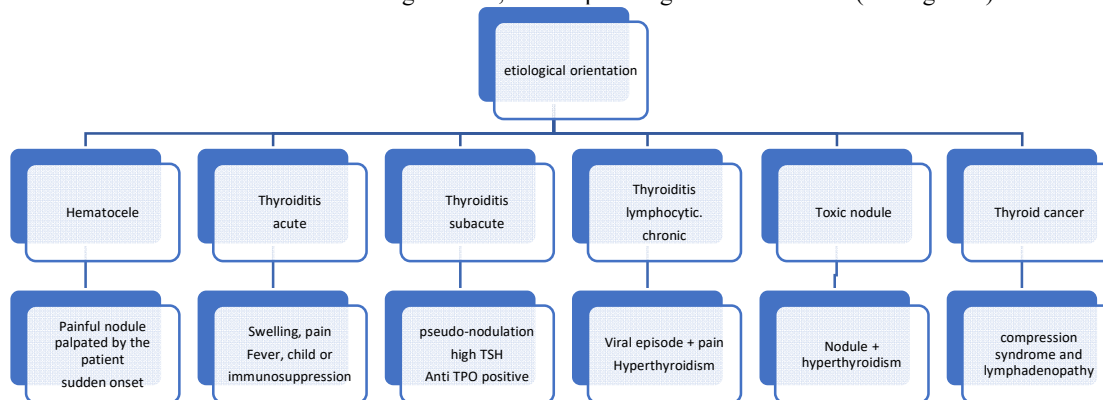


Figure 1: Signs suggestive of certain etiologies

Criterion of suspicion in ultrasound

Ultrasound signs are highly predictive of malignancy, however only definitive histology provides the definitive diagnosis. Since 2009, the assessment and management of thyroid nodules has been standardized, with the dissemination of the TIRADS system, which is now included in all published recommendations. The latest version that currently applies is that of the European Thyroid Association: EU-TIRADS. The EU-TIRADS system includes:

1. An illustrated glossary.
2. A standardised report.
3. Malignancy risk categories based on ultrasound appearance (EU-TIRADS score)
4. Recommendations for each category

The score contains five groups and is based on four major signs of suspicion: strong hypo-echogenicity, non-harmonious shape, microcalcifications, microlobulated or spiculated contours.

Score EU-TIRADS	Signification	Risk of malignancy
1	No nodule	
2	Benin	0 %
3	Low risk	2-4%
4	Intermediate risk	6 to 17%
5	High risk	26% to 87%

Figure 2 : Score EU-TIRADS

Les signes majeurs de suspicion ⁷:

1. The non-harmonious shape: corresponds to a nodule whose long axis is perpendicular to the long axis of the lobe. The nodule is then thicker than it is wide and/or thicker than it is tall. This can be quantified by the anteroposterior to transverse and/or anteroposterior to longitudinal ratio greater than 1. (a minimum of 02 mm difference for this ratio to be applied) (Figure 3)

2. The contours of a nodule can be classified into sharp, blurred, macrolobulated, microlobulated, and spiculate. The sharp contours are reassuring. Blurred contours are difficult to visualize and not very reproducible (not included in EU-TIRADS).

Macrolobulated contours are not a sign of strong suspicion.

Microlobulated and spicular contours are criteria of high suspicion (a minimum of three (a a minimum of three speculates or micro lobulations is required to retain them) (Figure 5)

3. High hypoechoogenicity: corresponds to a nodule that is less hypoechoic than the subhyoid muscles. (Figure 3, 6).

4. Microcalcifications: which are hyperechoic punctures (at least 5) of less than 1 mm, without a comet-tail artifact, and without a posterior shadow cone.

Microcalcifications are easily confused with colloidal granulations and hyperechoic images behind microcysts, which are responsible for many positive defects (Figure 4).

If the presence of a single sign is sufficient to classify the nodule in category 5.

Several major signs are present, this does not change the score but increases suspicion.

It is based on echogenicity in the absence of major signs: if the nodule is moderately hypoechoic (less than the muscle) it is classified as 4, if it is iso or hyperechoic it is classified as 3. Score 2 is reserved for spongiform and purely cystic nodules.

Ancillary signs

These criteria are used to refine the risk of malignancy within each score

Incidental signs that increase the risk of malignancy:

- Round shape
- Orientation not parallel to the gland.
- Extension extra-capsulaire.
- Exclusive solid echostructure.
- Peripheral macrocalcifications (Figure 7).
- High stiffness in elastography

Incidental signs that decrease the risk of malignancy:

- Thin and full halo.
- The presence of colloidal granulations.
- Echostructure mixte.

Conclusion :

Thyroid nodules are the most common reason for consultation in thyroid pathology. The difficulty of its management is the distinction between benign and malignant nodules. Hence the interest of a relevant clinical and paraclinical analysis, which remains essential in the identification of the predictive factors of malignancy of these nodules. Ultrasound remains an essential element in the characterization of thyroid nodules.

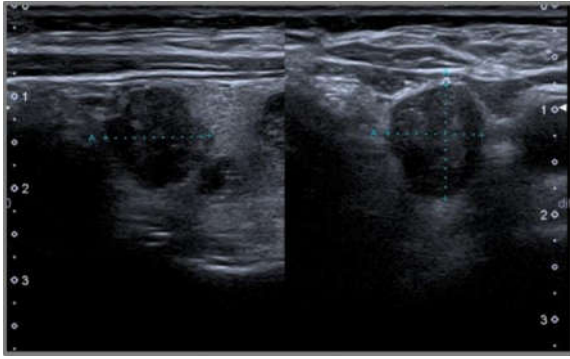


Figure 3: EU-TIRADS thyroid nodule 5. Strongly hypoechoic, non-harmonious shape: thicker than wide.

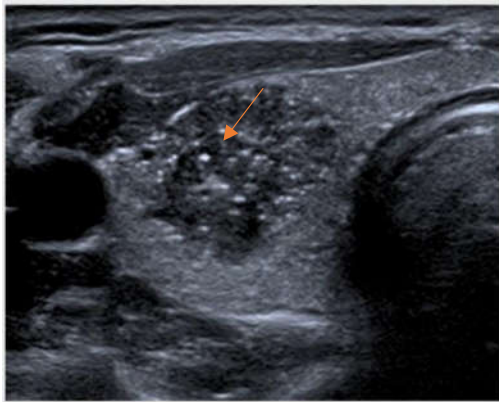


Figure 4: EU-TIRADS 5 thyroid nodule: shows multiple microcalcifications.

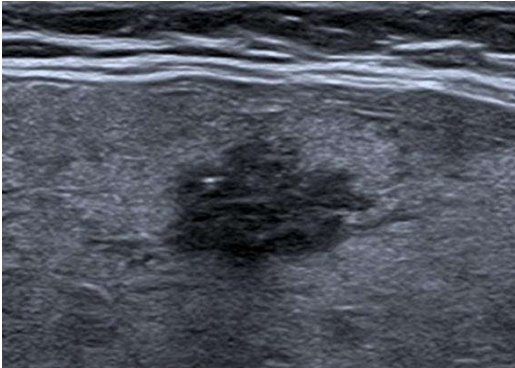


Figure 5: EU-TIRADS 5 thyroid nodule illustrating the speculated contours

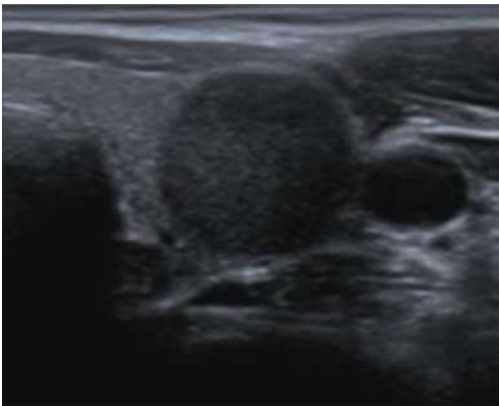


Figure 6: EU-TIRADS 5 thyroid nodule, in addition to its high hypoechogenicity, it has a round shape (secondary endpoint)



Figure 7: EU-TIRADS 4 thyroid nodule, with peripheral macrocalcifications

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