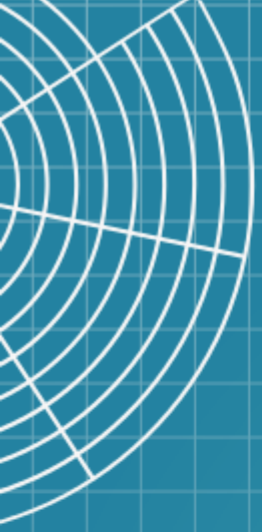
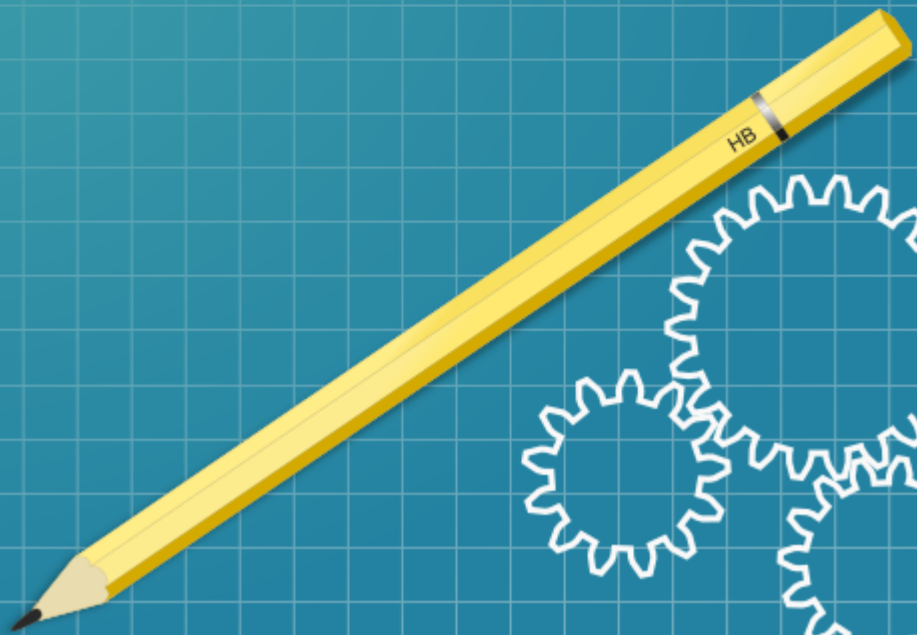
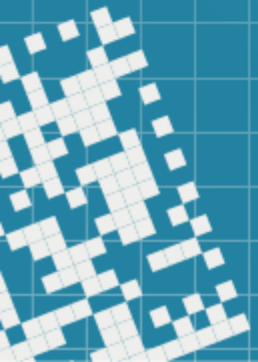
STN (Solitary Thyroid Nodule)







Objectives

- Thyroid Lump diagnosis :
- - **General considerations** and **essentials of diagnosing**.
- - **Clinical evaluation of thyroid nodules** (based on index of suspicion of malignancy).
- - **Modalities of diagnosing the thyroid nodule**.
- * Symptoms and signs.
- * Lab findings.
- * Imaging
- * Fine needle aspiration (FNA).

General Considerations & Essentials of diagnosis

- Thyroid cancer is the most common malignancy in endocrine system, composed of four major types; **papillary thyroid carcinoma**, **follicular thyroid carcinoma**, **anaplastic thyroid carcinoma**, and **medullary thyroid carcinoma**.
- The incidence of thyroid cancer, especially differentiated thyroid cancer, is increasing in developed countries.
- About 90% of palpable thyroid nodules are benign adenomas, colloid adenomas, or cysts, but some are primary thyroid malignancies.
- Thyroid nodules are even more common in areas of iodine deficiency.
- Thyroid nodules 1 cm or larger require follow-up and testing for function and malignancy.
- Most patients w/ thyroid nodules are euthyroid (have normal hormonal levels), but there is a high incidence of hypothryoidism or hyperthryoidism.
- Patients with multiple thyroid nodules have the same overall risk of malignancy as those w/ solitary nodule.
- The risk of malignancy is higher :
    - in men and among patients w/ history of head-neck radiation.
    - If there's hoarseness of voice or vocal fold paralysis.
    - Adherence of the nodule to the trachea or neck muscles.
    - Cervical lymphadenopathy.
    - Solitary nodules.
    - 4.5 cm diameter or larger.
- A nodule of 1 cm or larger in a gland with thyroiditis carries an extra 8% chance of malignancy.

Clinical evaluation of thyroid lump

Table 26–6. Clinical evaluation of thyroid nodules.[1]

Clinical Evidence	Low Index of Suspicion	High Index of Suspicion
History	Family history of goiter; residence in area of endemic goiter	Previous therapeutic radiation of head, neck, or chest; hoarseness
Physical characteristics	Older women; soft nodule; multinodular goiter	Young adults, men; solitary, firm nodule; vocal fold paralysis; enlarged lymph nodes; distant metastatic lesions
Serum factors	High titer of thyroid peroxidase antibody; hypothyroidism; hyperthyroidism	Elevated serum calcitonin
Fine-needle aspiration biopsy	Colloid nodule or adenoma	Papillary carcinoma, follicular lesion, medullary or anaplastic carcinoma
Scanning techniques		
Uptake of ^{123}I	Hot nodule	Cold nodule
Ultrasonogram	Cystic lesion	Solid lesion
Radiograph	Shell-like calcification	Punctate calcification
Response to levothyroxine therapy	Regression after 0.05–0.1 mg/day for 6 months or more	Increase in size

[1]Clinically suspicious nodules should be evaluated with fine-needle aspiration biopsy.

Modalities of diagnosing : Symptoms & Signs

Modality	Symptoms & Signs
Details	Rarely, nodules can press against other structures in the neck and cause symptoms, including: • Trouble with swallowing or breathing. • Hoarseness or voice change. • Pain in the neck. • Goiter (enlargement of the thyroid gland). • Hyperthyroidism. • Also, symptoms of hypo and hyperthryoidism can be considered in some cases and they include :
Hypothyroidism	**Hypothyroidism :** • Fatigue (feeling tired) • Frequent, heavy menstrual periods • Forgetfulness • Weight gain • Dry, coarse skin and hair, and hair loss • Hoarse voice • Trouble dealing with cold temperatures • Weakness/irritability • Constipation • Depression • Generalized edema (swelling)
Hyperthyroidism	**Hyperthyroidisim :** • Irritability/nervousness • Muscle weakness/tremors • Light or missed menstrual periods • Weight loss • Difficulty sleeping • Enlarged thyroid gland • Vision problems or eye irritation • Heat sensitivity (trouble dealing with heat) • Increase or decrease in appetite • Shortness of breath • Itchy skin/clammy skin • Thinning hair • Skin flushing (sudden reddening of face, neck or upper chest) • Heart palpitations (rapid or irregular heartbeat) • Thyroid nodules may also be associated with low thyroid hormone levels, or hypothyroidism.

Modalities of diagnosing : Lab findings

- Serum TSH level should be obtained for all patients w/ a thyroid nodules :
    - Patients with subnormal TSH must have a radionuclide thyroid scan (radioisotope iodine) to determine whether the nodule is hyperfunctioning (hot nodule) or hypofunctioning (cold nodule).

    - If the nodule is :
        1) Hyperfunctioning → rarely malignant.
        2) Hypofunctioning → usually malignant.

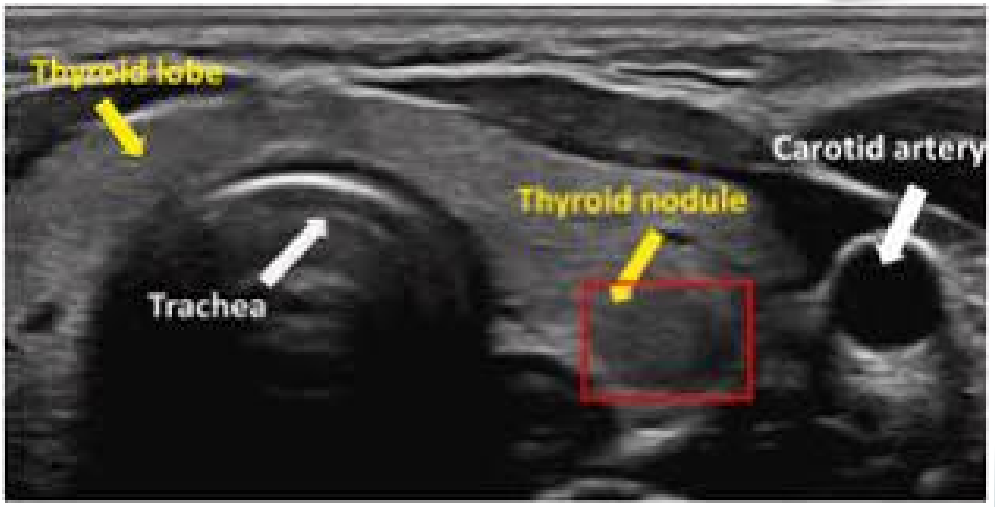
Notes :

1) Very high levels of anti-hyroperoxidase antibodies & antithyroglobulin antibodies are found in Hasimoto's thyroiditis.
2) Thyroiditis usually coexists w/ malignancy, so suspicious nodules in shape and activity should always be biopsied and plugged into the six categories of thyroid cytopathology.
3) Serum calcitonin is obtained if a medullary thyroid carcinoma is suspected.
4) Hashimoto's thyroiditis is an autoimmune disease caused by an immune response to thyroid autoantigens

Modalities of diagnosing : Imaging

Study	Ultrasonography	Radioisotope	CT & MRI	PET
Details	• The imaging study of choice for thyroid nodules. • It can identify nodules **too small** to be palpated, the presence of **multiple nodules, central**, or **lateral neck lymphadenopathy**, • Provides accurate measurements of nodule diameter for interval monitoring. Additionally, it allows characterization of nodules by sonographic features which suggest malignancy.	• Can be used to determine if a thyroid nodule is functioning, but it does not provide an accurate measurement of size.	• Both of these imaging modalities have **almost no role in the initial evaluation of a thyroid nodule**, and are rarely indicated in the initial workup. • However, they are both excellent (100% sensitivities) for **evaluating the extent of large substernal goiters** which may be compressing nearby structures .	• Full name : 18F-fluorodeoxyglucose positron emission tomography-computed tomography. • Used extensively in oncology for staging, evaluation of treatment response, and detecting recurrences on the principle that malignant cells have a higher uptake of 18FDG due to increased metabolic demands when compared to normal tissues .

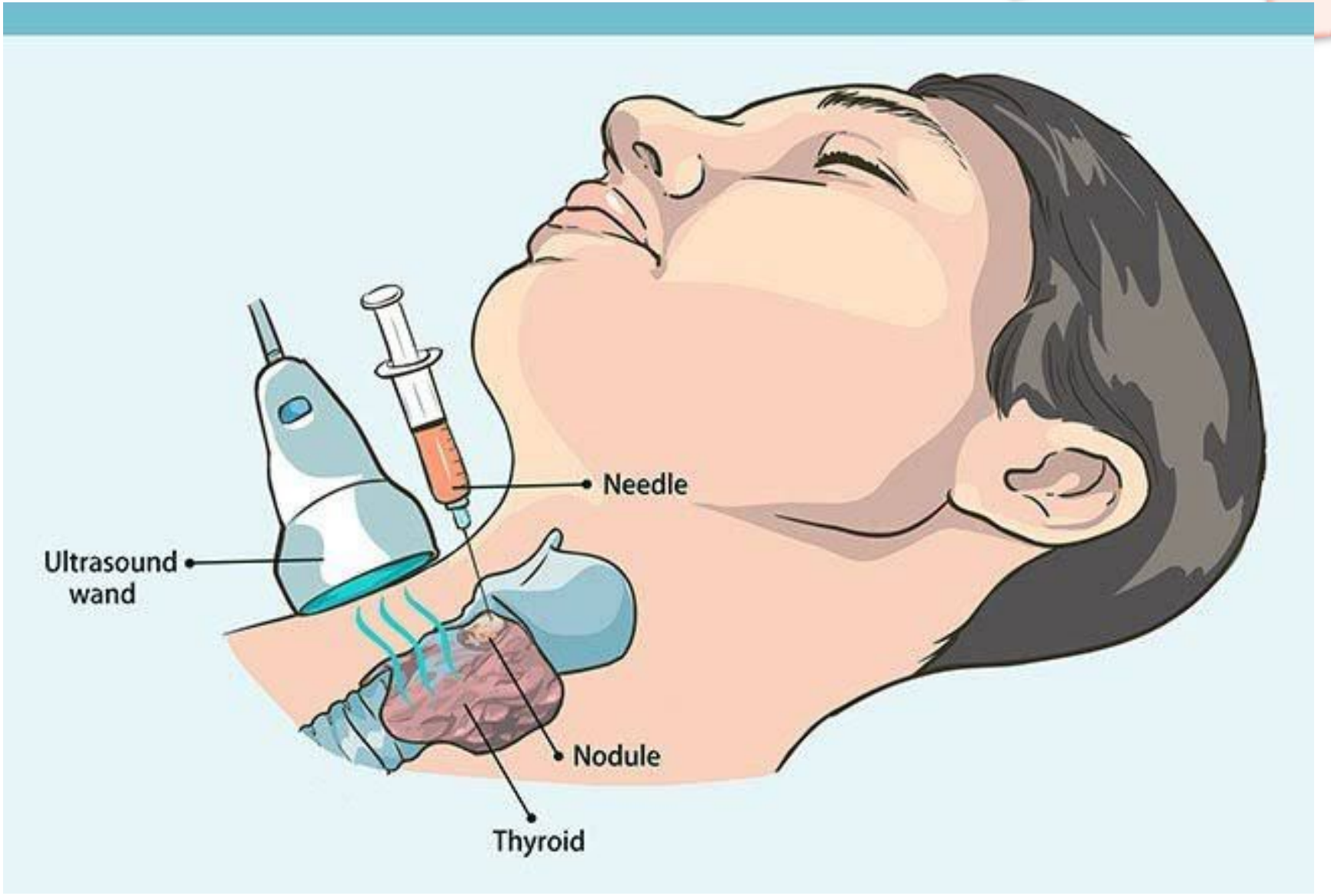
Ultrasonography illustrative image



Modalities of diagnosing : Fine needle aspiration (FNA)

Objective	Indications	Thyroid Cytopathology (TBSRTC)
Details	• FNA is the best method to assess a thyroid nodule for malignancy. • FNA can be done while patients continue taking anticoagulants or aspirin. • For Solitary nodules, 1) Nodules > 0.5 cm in diameter w/ a suspicious appearance on the ultrasound. 2) Nodules associated w/ abnormal cervical lymph nodes. 3) Nodules 1 cm in diameter or larger that have solid features or microcalcifications. 4) Mixed cystic-solid nodules 1.5 cm diameter or larger w/ benign features on ultrasound. 5) Spongiform nodules 2 cm diameter or larger. • For multinodular goiters, the **four largest nodules** (1 cm or larger) are usually biopsied to minimize the risk of missing a malignancy. • **NB** : Pure cystic nodules are benign and don't require FNA biopsy.	FNA Cytology is typically reported using The Bethesda System for Reporting Thyroid Cytopathology – which divides results into 6 categories : **1) Non-diagnostic :** Of malignancy risk 1-4% and the FNA need to be repeated under ultrasound guidance. **2) Benign :** Of malignancy risk 2.5% and the usual management is clinical follow-up with palpation and/or ultrasound for 6-18 months. **3) Atypia of undetermined significance (AUS) :** The malignancy risk is about 14%, higher with sonographic features of malignancy. The usual management is clinical correlation and a repeat FNA. **4) Suspicious for follicular neoplasm (SF) or follicular neoplasm (FN):** The malignancy risk is about 25%, higher when Hürthle cells are present and in patients over age 50. The usual management is thyroid lobectomy. **5) Suspicious for malignancy (SFM):** The malignancy risk is about 70%. The usual management is thyroid lobectomy or near-total thyroidectomy. **6) Malignant:** The malignancy risk is about 99%. The usual management is a near-total thyroidectomy.

FNA illustrative image



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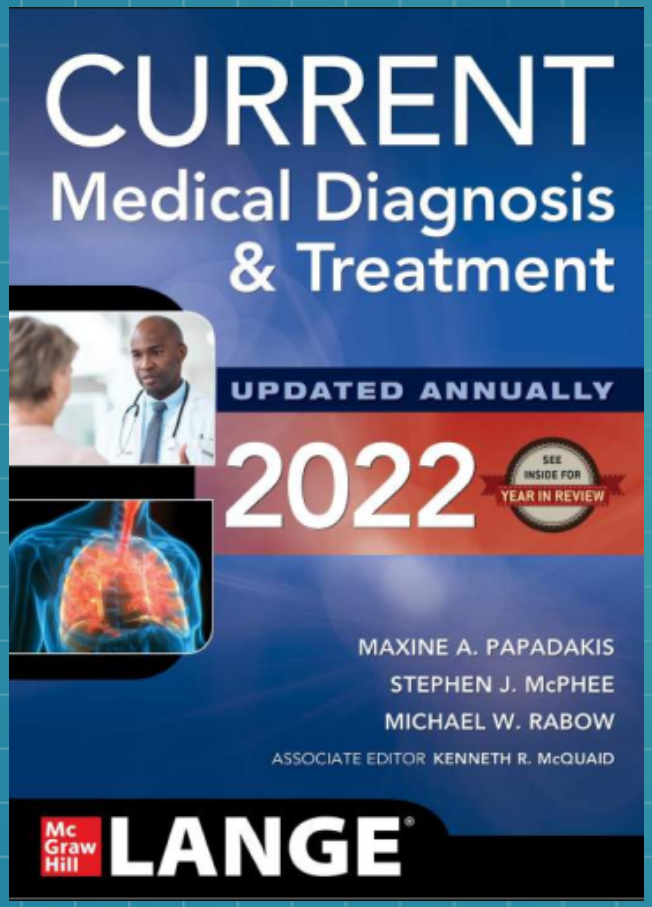
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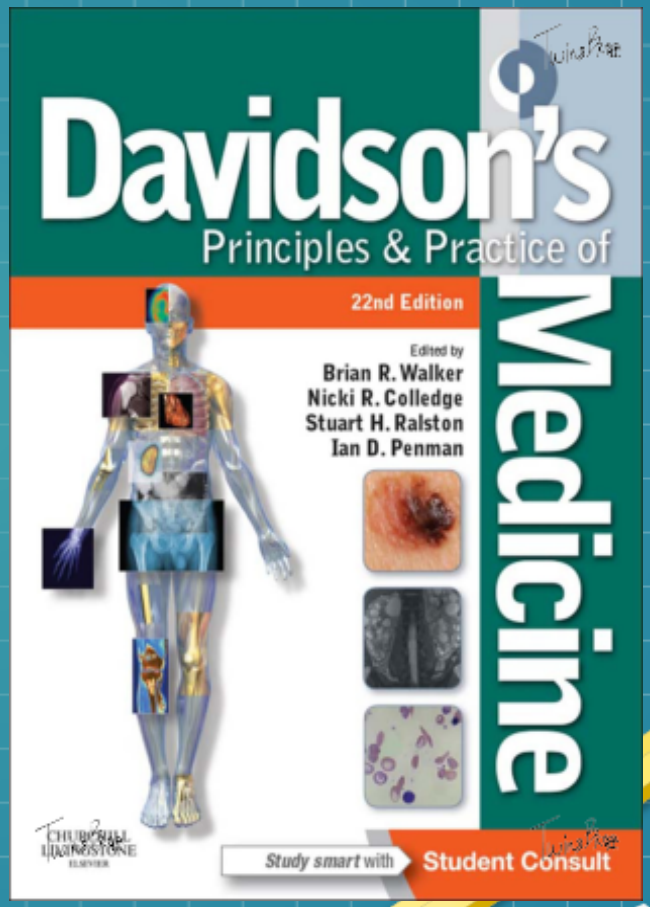
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