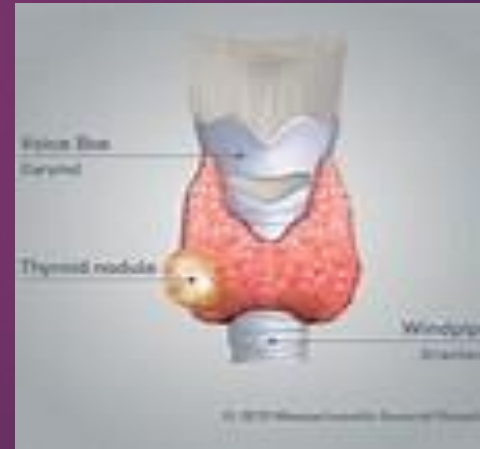




Clinical Approach to Thyroid Nodule

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Agenda

- ▶ Definition
- ▶ Epidemiology
- ▶ Clinical Importance
- ▶ Approach to thyroid nodule



Definition

- ▶ **Historically:** palpable lump in the thyroid gland
- ▶ **Now:** discrete lesion that is radiologically distinct from the surrounding thyroid parenchyma.
- ▶ **Incidentaloma:**
 - ▶ Nonpalpable nodules detected on US or other anatomic imaging studies are termed incidentally discovered nodules

Prevalence

- ▶ Thyroid nodules are a common clinical problem.

Prevalence :

- ▶ Studies based on inspection and palpation reported a 3 to 7%
- ▶ Clinically inapparent thyroid nodules have been detected by **US in 20%** to as many as **76%** of the general population a prevalence similar to that in **autopsy data**.

Clinical Importance

- the majority of thyroid malignancies are low-risk neoplasms that **do not have an impact on survival**
- ▶ Both benign and malignant disorders can cause thyroid nodules
- ▶ The clinical importance of a newly diagnosed thyroid nodule :the exclusion of malignancy
- ▶ Recent population-based study reported:
Doubling of thyroid cancer incidence from 2000 to 2012 compared to the prior decade
- ▶ Thyroid **cancer occurs in 7%–15%** of thyroid nodules depending on:
 - ▶ Age
 - ▶ Sex
 - ▶ Radiation exposure history
 - ▶ Family history
 - ▶



Approach to thyroid nodules

Management of thyroid Nodule

- ▶ *The basis of thyroid nodule management:*

- ▶ Clinical findings with:
- ▶ Sensitive thyrotropin (TSH) assay
- ▶ High-resolution ultrasonography (US)
- ▶ Fine-needle aspiration (FNA) biopsy

Clinical findings :

▶ **History:**

- ▶ Age
- ▶ Personal or family history of thyroid disease or cancer
- ▶ Previous head or neck irradiation
- ▶ Rate of neck mass growth
- ▶ Anterior neck pain
- ▶ Dysphonia, dysphagia, or dyspnea
- ▶ Symptoms of hyper- or hypothyroidism

Features suggesting Increased Risk of Malignant Potential

Table 3. Features Suggesting Increased Risk of Malignant Potential

- | |
|--|
| • History of head and neck irradiation |
| • Family history of medullary thyroid carcinoma, multiple endocrine neoplasia type 2, or papillary thyroid carcinoma |
| • Age <14 or >70 years |
| • Male sex |
| • Growth of the nodule |
| • Firm or hard nodule consistency |
| • Cervical adenopathy |
| • Fixed nodule |
| • Persistent dysphonia, dysphagia, or dyspnea |

Growth rate

▶ *The sudden appearance of a lump with pain:*

- ▶ Hemorrhage in a cystic nodule (more commonly)
- ▶ Anaplastic thyroid carcinoma
- ▶ Rare forms of chronic thyroiditis (Riedel disease)
- ▶ Primary lymphoma of the thyroid

History

- ▶ Symptoms such as :
 - ▶ Choking sensations
 - ▶ Vague cervical tenderness or pain
 - ▶ Dysphagia or
 - ▶ Hoarseness
- ▶ The symptoms and signs of tracheal compression (cough and dysphonia) may suggest the risk of an underlying malignant lesion

Clinical findings :

▶ ***Physical Examination:***

- ▶ Careful, focused examination of the thyroid gland and cervical lymph nodes:
 - ▶ Thyroid volume and consistency
 - ▶ Location, consistency, size, and number of nodule(s)
 - ▶ Neck tenderness or pain
 - ▶ Cervical adenopathy

Clinical findings :

- ▶ The risk of cancer is not substantially different in patients with a solitary nodule versus patients with a multinodular goiter (MNG)
[BEL 2, GRADE B].

Sensitive TSH assay

- ▶ ***Serum thyrotropin (TSH) should be measured during the initial evaluation of a patient with a thyroid nodule.***

(Strong recommendation, Moderate-quality evidence)

- ▶ ***If the serum TSH is subnormal, a radionuclide (preferably ¹²³I) thyroid scan should be performed.***

(Strong recommendation, Moderate-quality evidence)

Sensitive TSH assay

- ▶ Since hyperfunctioning nodules rarely harbor malignancy, no cytologic evaluation is necessary

Serum Thyroglobulin

- ▶ Routine measurement of serum Tg for initial evaluation of thyroid nodules is not recommended.

(Strong recommendation,
Moderate-quality evidence)

Serum calcitonin

- ▶ ***The panel cannot recommend either for or against routine measurement of serum calcitonin in patients with thyroid nodules.***

(No recommendation, Insufficient evidence)

- ▶ May be considered in the subgroup of patients in whom an elevated calcitonin may change the diagnostic or surgical approach:
 - ▶ Patients considered for less than total thyroidectomy
 - ▶ Patients with suspicious cytology not consistent with PTC
- ▶ Unstimulated serum calcitonin level >50–100 pg/mL:
 - ▶ Diagnosis of MTC is common

Thyroid Ultrasonography:

- ▶ When to Perform Thyroid Ultrasound:
- ▶ US evaluation is **recommended** for:
 - ▶ Patients who are at risk for thyroid malignancy
 - ▶ Have palpable thyroid nodules or goiter
 - ▶ Have neck lymphadenopathy suggestive of a malignant lesion [BEL 2, GRADE A].
- ▶ US evaluation is **not recommended** :
 - ▶ As a screening test for the general population or patients with a normal thyroid on palpation and a low clinical risk of thyroid disease [BEL 4, GRADEC].

Thyroid Imaging

- ▶ **Thyroid sonography with survey of the cervical LN should be performed in all patients with known or suspected thyroid nodules.**

(Strong recommendation, High-quality evidence)

- ▶ **Ultrasound should evaluate the following:**

- ▶ Thyroid parenchyma (homogeneous or heterogeneous)
- ▶ Thyroid gland size
- ▶ Nodules size
- ▶ Location
- ▶ Sonographic characteristics of any nodule(s)

- ▶ For suspicious regional neck lymph nodes, describe the cervical compartment, number, shape, size, margins, content, echogenic pattern, presence of hilum, and vascular features [BEL 2, GRADE A].

- ▶ **Ultrasound for FNA decision-making**

Thyroid Ultrasonography:

- ▶ How to Describe US Findings:
 - ▶ Focus the US report on stratification for risk of malignancy
 - ▶ Describe position, size, shape, margins, content, echogenic pattern, and vascular features of the nodule(s)
 - ▶ For multiple nodules, detail the nodule(s) bearing the US characteristics associated with malignancy rather than describing the largest (dominant) nodule.
 - ▶ For suspicious regional neck lymph nodes, describe the cervical compartment, number, shape, size, margins, content, echogenic pattern, presence of hilum, and vascular features [BEL 2, GRADE A].

US pattern of Thyroid Nodule (ATA)

US-Patterns	Estimated risk of malignancy (%)
High suspicion	>70-90
Intermediate suspicion	10-20
Low suspicion	5-10
Very low suspicion	<3
Benign	<1

<i>US patterns</i>	<i>US features</i>	<i>FNA size cut off indication (largest dimension)</i>
High suspicion	<p>Solid hypoechoic nodule or solid hypoechoic component of a partially cystic nodule with one or more of the following features:</p> <ul style="list-style-type: none"> • Irregular margins (infiltrative, microlobulated), • Microcalcifications, • Taller than wide shape, • Rim calcifications with small extrusive soft tissue component, • Evidence of ETE 	Recommend FNA at ≥ 1 cm
Intermediate suspicion	Hypoechoic solid nodule with smooth margins without microcalcifications, ETE, or taller than wide shape	Recommend FNA at ≥ 1 cm
Low suspicion	Isoechoic or hyperechoic solid nodule, or partially cystic nodule with eccentric solid areas, without microcalcification, irregular margin or ETE, or taller than wide shape	Recommend FNA at ≥ 1.5 cm
Very low suspicion	Spongiform or partially cystic nodules without any of the sonographic features described in low, intermediate, or high suspicion patterns	Consider FNA at ≥ 2 cm Observation without FNA is also a reasonable option
Benign	Purely cystic nodules (no solid component)	No biopsy

FNA

- ▶ ***FNA is the procedure of choice in the evaluation of thyroid nodules, when clinically indicated.***

(Strong recommendation, High-quality evidence)

- ▶ FNA:
 - ▶ Palpation-guide
 - ▶ US-guide

Palpation or US guide FNA

- ▶ US-guided FNA is preferred for nodules with higher likelihood of :
 - ▶ Nondiagnostic cytology (>25%–50% cystic component)
 - ▶ Sampling error (difficult to palpate or posteriorly located nodules)
- ▶ If the diagnostic US confirms the presence of a predominantly **solid nodule** corresponding to what is palpated, the FNA may be performed using palpation or US guidance.

Lymph Node Evaluation

- ▶ ***Sonographic evaluation of the anterior cervical lymph node compartments (central and lateral) should be performed*** when thyroid nodules are detected .
- ▶ FNA of the suspicious lymph node (for cytology and washout for Tg measurement) :
 - ▶ In US detects cervical lymph nodes that are sonographically suspicious for thyroid cancer

FNA of MNG

- ▶ We do **not recommend** the biopsy of more than 2 nodules in the same patient

FNA of complex thyroid nodule(s)

- ▶ We recommend sampling the solid component of the lesion through FNA biopsy [BEL 3, GRADE B].
- ▶ Submit both the FNA specimen and the drained fluid for cytologic examination [BEL2, GRADE A].

FNA interpretation

- ▶ ***Thyroid nodule FNA cytology should be reported using diagnostic groups outlined in the Bethesda System for Reporting Thyroid Cytopathology.***

(Strong recommendation, Moderate-quality evidence)

FNA reports:

- ▶ **Criteria for cytologic adequacy :**
- ▶ Presence of **at least six groups** of well-visualized follicular cells, **each group containing at least 10 well-preserved epithelial cells**, preferably on a single slide)

Bethesda System for Reporting Thyroid Cytopathology

Bethesda category	Bethesda subcategory
I. Nondiagnostic or unsatisfactory	Virtually acellular specimen Cyst fluid only Other (obscuring blood, clotting artifact, drying artifact, etc)
II. Benign	Consistent with a benign follicular nodule (includes adenomatoid nodule, colloid nodule, etc) Consistent with chronic lymphocytic (Hashimoto) thyroiditis in the proper clinical context Consistent with granulomatous (subacute) thyroiditis Other
III. Atypia of undetermined significance or follicular lesion of undermined significance	Focal cytologic (nuclear) atypia Extensive but mild cytologic (nuclear) atypia Atypical cyst-lining cells A scanty cellular specimen with architectural atypia Cytologic (nuclear) and architectural atypia (NIFTP may be present) Hürthle cell aspirates with low-risk pattern Atypia, not otherwise specified, not papillary type Psammomatous calcifications in the absence of cellular atypia Atypical lymphoid cells; rule out lymphoma

**IV. Follicular neoplasm or suspicious of a
Follicular neoplasm**

Cellular aspirate composed of follicular cells with altered architectural pattern and microfollicle formation

Cellular aspirate composed of follicular cells with almost exclusively Hürthle cell features
Follicular-patterned aspirates with mild nuclear changes (NIFTP may be present)

V. Suspicious for malignancy

Suspicious for papillary thyroid carcinoma

Suspicious for medullary thyroid carcinoma

Suspicious for metastatic carcinoma

Suspicious for lymphoma

Other

VI. Malignant

Papillary thyroid carcinoma

Poorly-differentiated carcinoma

Medullary thyroid carcinoma

Undifferentiated (anaplastic) carcinoma

Squamous cell carcinoma

Carcinoma with mixed features (specify)

Metastatic malignancy

Non-Hodgkin lymphoma

Other

Abbreviation: NIFTP = noninvasive follicular thyroid neoplasm with papillary-like nuclear features.

Long term follow-up of nodules with benign FNA cytology

- ▶ (A) Nodules with high suspicion US pattern:
repeat US and US-guided FNA within 12 months.
(Strong recommendation, Moderate-quality evidence)
- ▶ (B) Nodules with low to intermediate suspicion US pattern:
repeat US at 12–24 months. If sonographic evidence of growth (20% increase in at least two nodule dimensions with a minimal increase of 2mm or more than a 50% change in volume) or development of new suspicious sonographic features, the FNA could be repeated or observation continued with repeat US, with repeat FNA in case of continued growth.
(Weak recommendation, Low-quality evidence)
- ▶ (C) Nodules with very low suspicion US pattern (including spongiform nodules): the utility of surveillance US and assessment of nodule growth as an indicator for repeat FNA to detect a missed malignancy is limited.
- ▶ If US is repeated, it should be done at \pm 24 months. (Weak recommendation, Low-quality evidence)

The strategy for sonographic follow-up Nodules do not meet criteria for FNA

- ▶ (A) Nodules with high suspicion US pattern: repeat US in 6–12 months
(Weak recommendation, Low-quality evidence)
- ▶ (B) Nodules with low to intermediate suspicion US pattern: consider repeat US at 12–24 months.
(Weak recommendation, Low-quality evidence)
- ▶ (C) Nodules >1 cm with very low suspicion US pattern (including spongiform nodules) and pure cyst: the utility and time interval of surveillance US for risk of malignancy is not known. If US is repeated, it should be at 24 months. (No recommendation, Insufficient evidence)
- ▶ (D) Nodules ≤1 cm with very low suspicion US pattern (including spongiform nodules) and pure cysts do not require routine sonographic follow-up.
(Weak recommendation, Low-quality evidence)



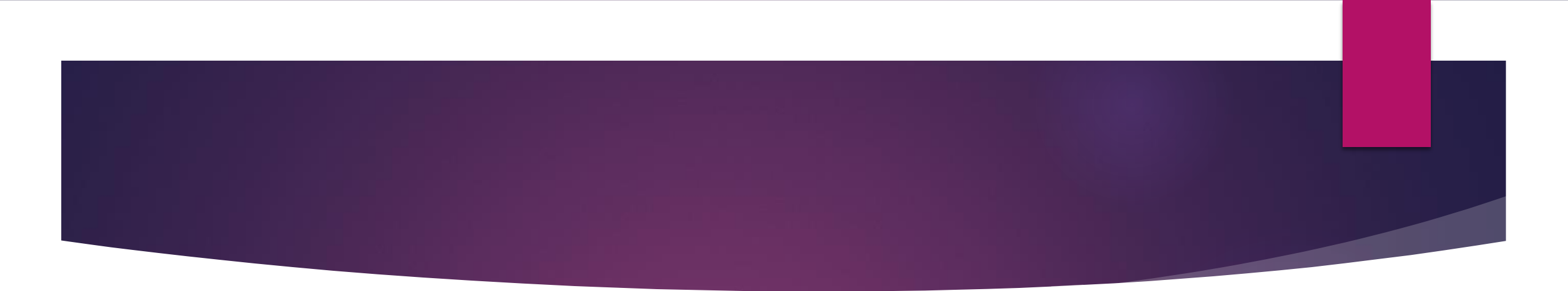
Routine TSH suppression therapy for benign thyroid nodules in iodine sufficient populations **is not recommended**.

- ▶ (Strong recommendation, High-quality evidence)



► RECOMMENDATION 26

Individual patients with benign, solid, or mostly solid nodules should have adequate iodine intake. If inadequate dietary intake is found or suspected, a daily supplement (containing 150µg iodine) is recommended. (Strong recommendation, Moderate-quality evidence)

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- ▶ **Definition** discrete lesion within the thyroid gland that is radiologically distinct from the surrounding thyroid parenchyma.
 - ▶ **Prevalence** 3 to 7%
 - ▶ US evaluation is **recommended** for:
 - Patients who are at risk for thyroid malignancy
 - Have palpable thyroid nodules or goiter
 - Have neck lymphadenopathy suggestive of a malignant lesion .

Features suggesting Increased Risk of Malignant Potential

Table 3. Features Suggesting Increased Risk of Malignant Potential

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► features:

- Irregular margins (infiltrative, microlobulated),
- Microcalcifications,
- Taller than wide shape,
- Rim calcifications with small extrusive soft tissue component,
- Evidence of ETE

repeat US and US-guided FNA

▶ **with benign FNA cytology**

(A) **high suspicion US pattern**: US and US-guided FNA within 12 months

(B) Nodules with **low to intermediate suspicion** US pattern: at 12–24 months

FNA :growth (20% increase in at least two nodule dimensions with a minimal increase of 2mm
more than a 50% change in volume)
development of new suspicious sonographic features

(C) Nodules with **very low suspicion** US pattern utility of surveillance US?

If US is repeated, it should be done at \pm 24 months. (Weak recommendation, Low-quality evidence)

do not meet criteria for FNA

(A) Nodules **with high suspicion** US pattern: repeat US in 6–12 month

(B) Nodules **with low to intermediate suspicion** US pattern: consider repeat US at 12–24 mon

(C) Nodules >1cm with **very low suspicion** US pattern (including spongiform nodules) and pure cyst: the utility and time interval of surveilla?

If US is repeated, it should be at 24 months.

(D) Nodules <1cm with *very low suspicion* US pattern do not require routine sonographic follow-up.

(Weak recommendation, Low-quality evidence)

