

Thyroid Nodules and Thyroid Cancer:What to Do When You Find Them

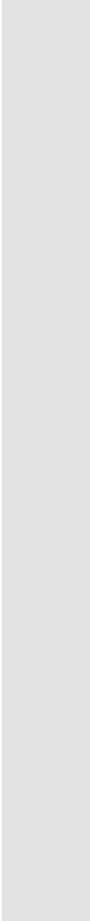
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Disclosures

No relevant
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Learning Objectives

At the conclusion of this session, learners should be able to:

01

Explain

- Explain the significance of thyroid nodules

02

Evaluate

- Evaluate a patient presenting with thyroid nodule

03

Develop

- Develop a thyroid cancer diagnosis and treatment plan

Patient Case

- CC: "I found a lump in my neck"
- Ginny Williams
- DOB: 8.11.1981
- B/P: 112/64
- HR: 78
- RR: 14
- Wt: 53 kg
- Ht: 63"



Meet the Thyroid Nodules

Prevalence

- palpable nodules
 - 5% of women, 1% of men
- nodules found on imaging
 - 19 - 68% of random people

More common in women and elderly

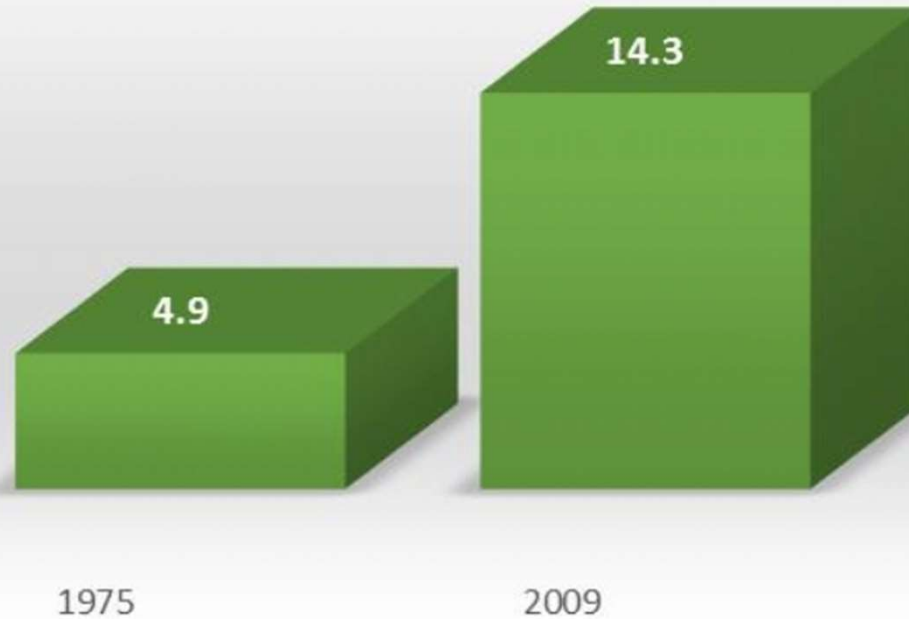
Why do we care?

[2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

Thyroid Cancer

7 - 15% of thyroid nodules

Thyroid cancer cases per 100000



[2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

Thyroid Nodule Workup

- History
- Physical Exam
- Labs
- Imaging
- Biopsy

Thyroid History

Recommendations:

- Age
- Personal/fam hx of thyroid disease or cancer
- Prior head/neck irradiation
- Anterior neck pain
- Dysphonia, dysphagia, dyspnea
- Hypo/hyperthyroid symptoms
- Iodine usage

[AAACE/ACE/AME Medical Guidelines for Clinical Practice for the Diagnosis and Management of Thyroid Nodules—2016 Update](#)

Thyroid Cancer Risk Factors

- Familial thyroid cancer
- History of radiation exposure
- Fixed when swallowing
- Pain
- Cough
- Dysphonia
- Nodule growth
- Lymphadenopathy
- Sonographic features

[2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

Thyroid exam

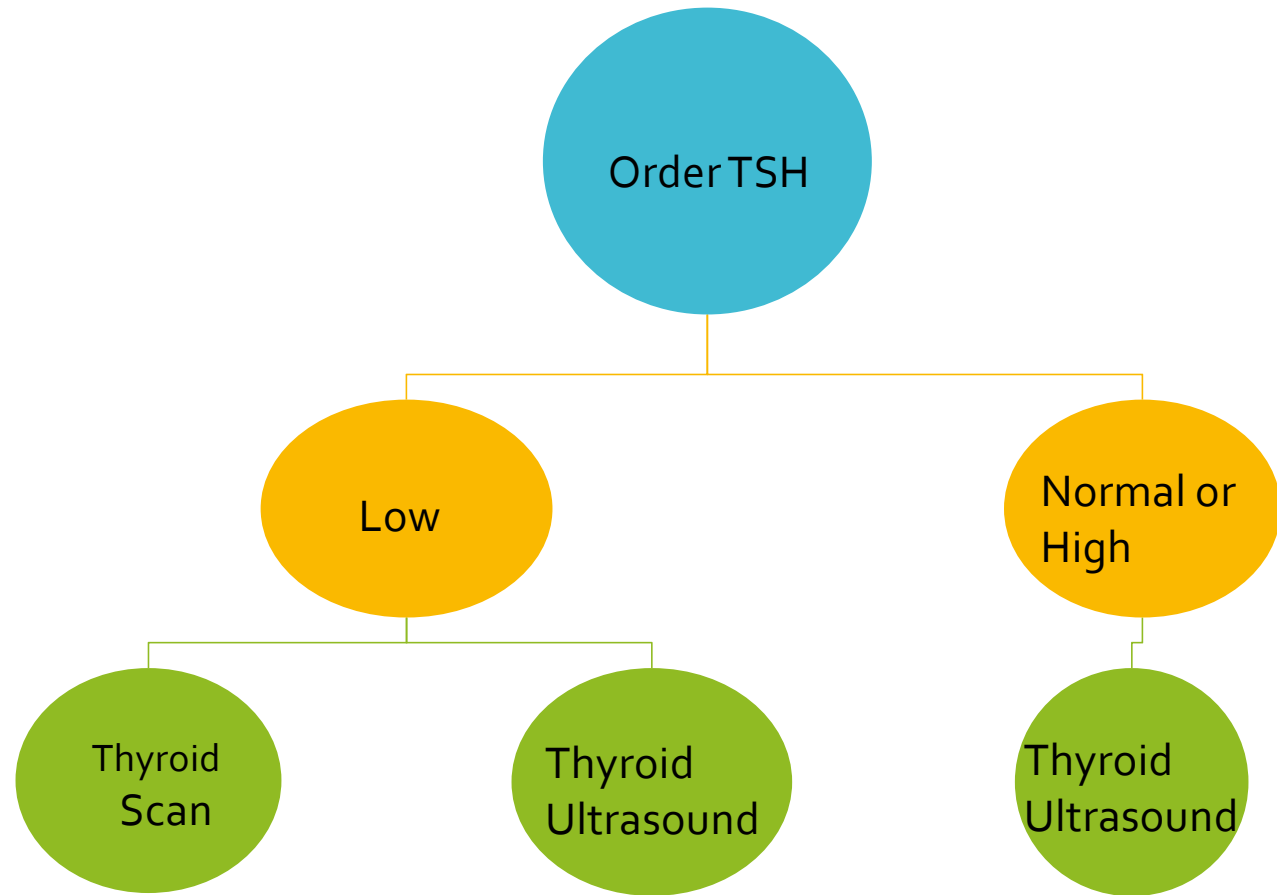


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Thyroid Exam Documentation

- Evaluate thyroid size and consistency
 - 15 – 25 g
- Location, consistency, size, number of nodules
- Neck tenderness or pain
- Cervical lymphadenopathy
- Presence or absence of thyroid bruit

Thyroid Nodule Workup



Low TSH

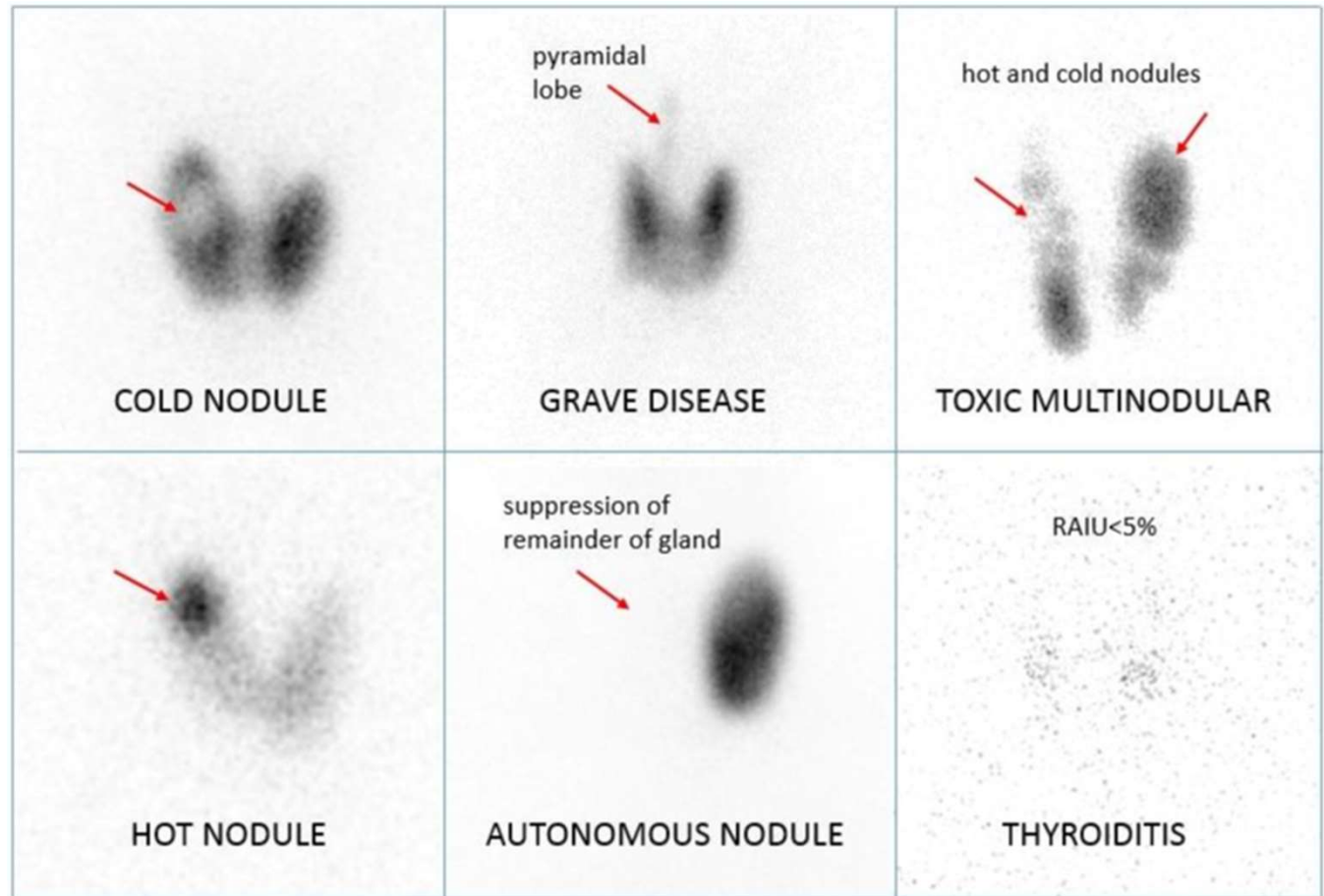
AACE 2016

Check FT₄ and FT₃
Get thyroid scan to assess
function

AKA

- Radionuclide scanning
- Thyroid scintigraphy
- Radioactive iodine scan with uptake
- Thyroid scan and uptake
- Radioactive iodine uptake test (RAIU)

Thyroid Scan and Uptake



<http://www.nucradshare.com/Thyroid.html>

Thyroid Scan and Uptake Interpretation

Hot (Hyperfunctioning) Nodule

- Rarely malignant
- If solitary, no biopsy needed

Cold (Hypofunctioning) Nodule

- Benign or malignant (3% - 15%)

Warm (Indeterminate) Nodule

- Benign or malignant (3% - 15%)

<https://www.aace.com/files/thyroid-nodule-guidelines.pdf>

Thyroid Scan and Uptake Interpretation

Bottom line:

- Helps determine if a nodule NOT malignant
 - Hot (hyperfunctioning) nodules do not require biopsy
 - predictive value for malignancy is low
- Order ONLY if TSH suppressed
 - Normal or high TSH go straight to ultrasound

[AAACE/ACE/AME Medical Guidelines for Clinical Practice for the Diagnosis and Management of Thyroid Nodules—2016 Update](#)

Hot Nodule Management

Recommended:

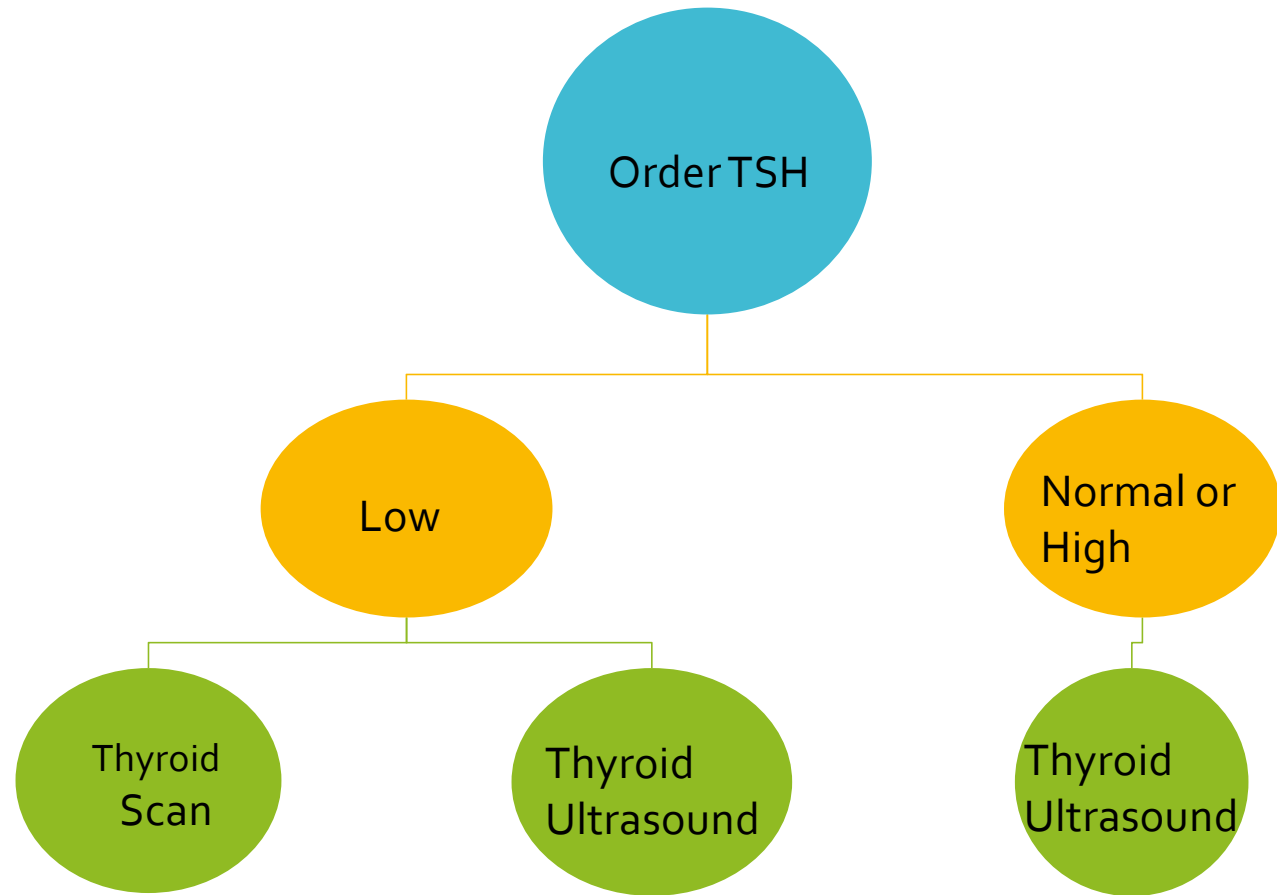
- RAI ablation
 - Normalizes thyroid function in 85% - 100% of patients
 - Decreases thyroid volume
 - 40% - 50% after 1 yr
 - Contraindicated during pregnancy and lactation
- Laser ablation
- Radiofrequency ablation

Not recommended:

- Percutaneous ethanol injection

[AAACE/ACE/AME Medical Guidelines for Clinical Practice for the Diagnosis and Management of Thyroid Nodules—2016 Update](#)

Thyroid Nodule Workup



Thyroid Ultrasound

Nodule characteristics:

- Position
 - Size
 - Shape
 - Margins
 - Content
 - Echogenicity
 - Vascularity
-
- Also note any suspicious lymph nodes

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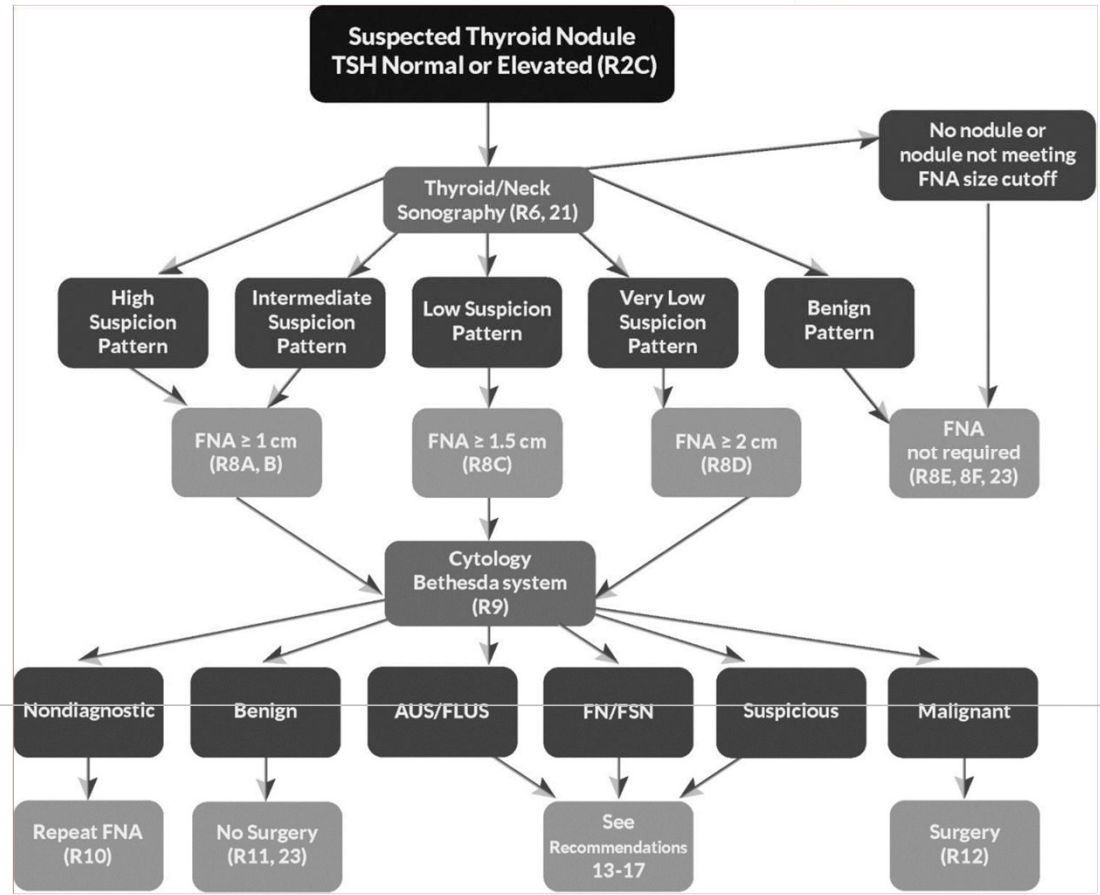


FIG. 1. Algorithm for evaluation and management of patients with thyroid nodules based on US pattern and FNA cytology. R, recommendation in text.

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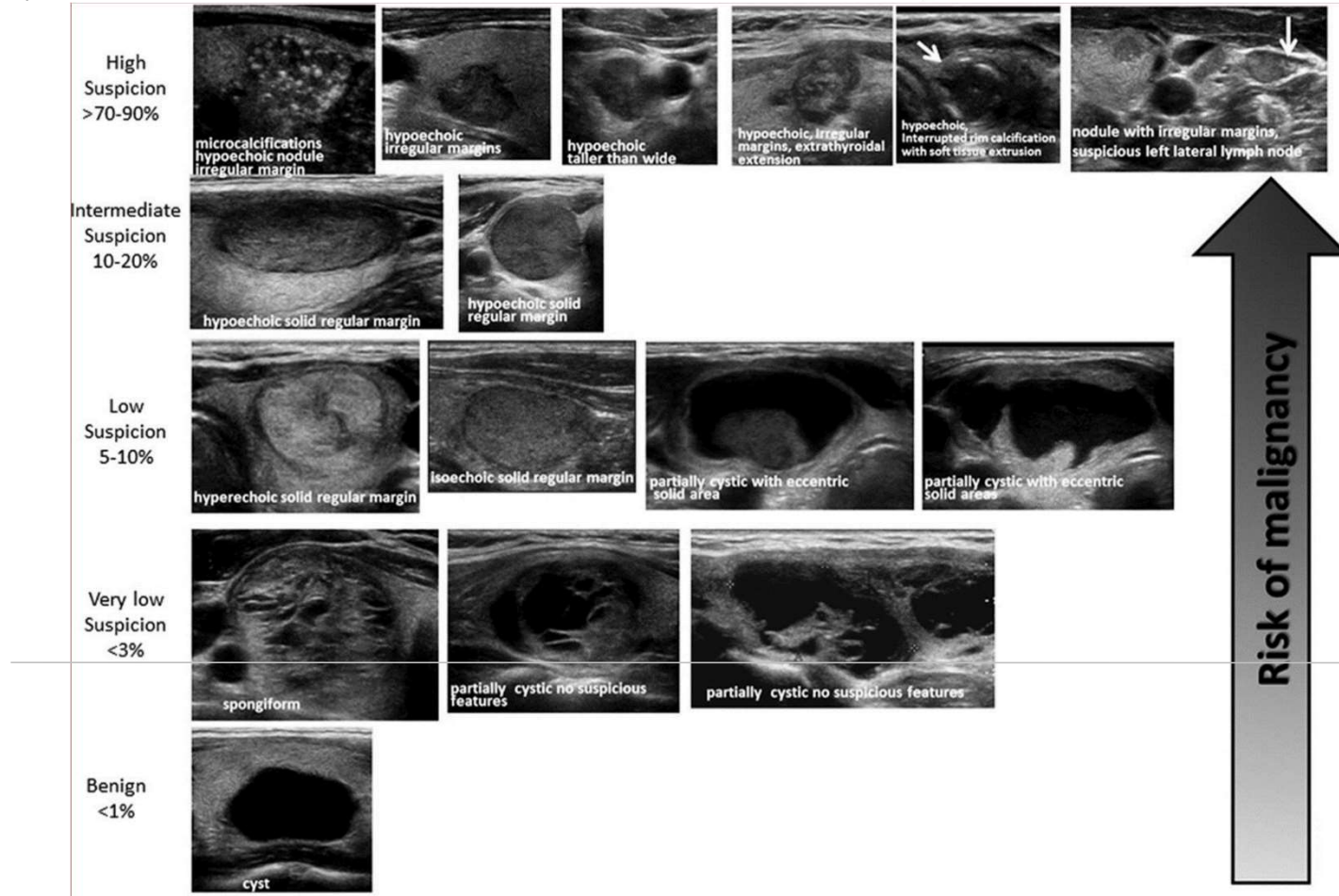


FIG. 2. ATA nodule sonographic patterns and risk of malignancy.

Thyroid Nodule Sonographic Features

High Suspicion

- Solid hypoechoic nodule OR solid hypoechoic portion of cystic nodule with one or more of the following features:
 - Irregular margins
 - Microcalcifications
 - Taller than wide shape
 - Rim calcifications
 - Extrathyroidal extension (ETE)
- Risk of malignancy > 70%
- FNA for nodules ≥ 1 cm

Thyroid Nodule Sonographic Features

Intermediate Suspicion

- Solid hypoechoic nodule with smooth margins and without:
 - Microcalcifications
 - Taller than wide shape
 - Extrathyroidal extension (ETE)
- Risk of malignancy 10% - 20%
- FNA for nodules ≥ 1 cm

Thyroid Nodule Sonographic Features

Low Suspicion

- Isoechoic, hyperechoic, or partially cystic nodule with smooth margins and without:
 - Microcalcifications
 - Taller than wide shape
 - Extrathyroidal extension (ETE)
- Risk of malignancy 5% - 10%
- FNA for nodules ≥ 1.5 cm

Thyroid Nodule Sonographic Features

Very Low Suspicion

- Spongiform or partially cystic nodule with smooth margins and without:
 - Microcalcifications
 - Taller than wide shape
 - Extrathyroidal extension (ETE)
- Risk of malignancy < 3%
- FNA for nodules ≥ 2 cm or observation

Thyroid Nodule Sonographic Features

Benign

- Purely cystic
- Risk of malignancy < 1%
- FNA not recommended

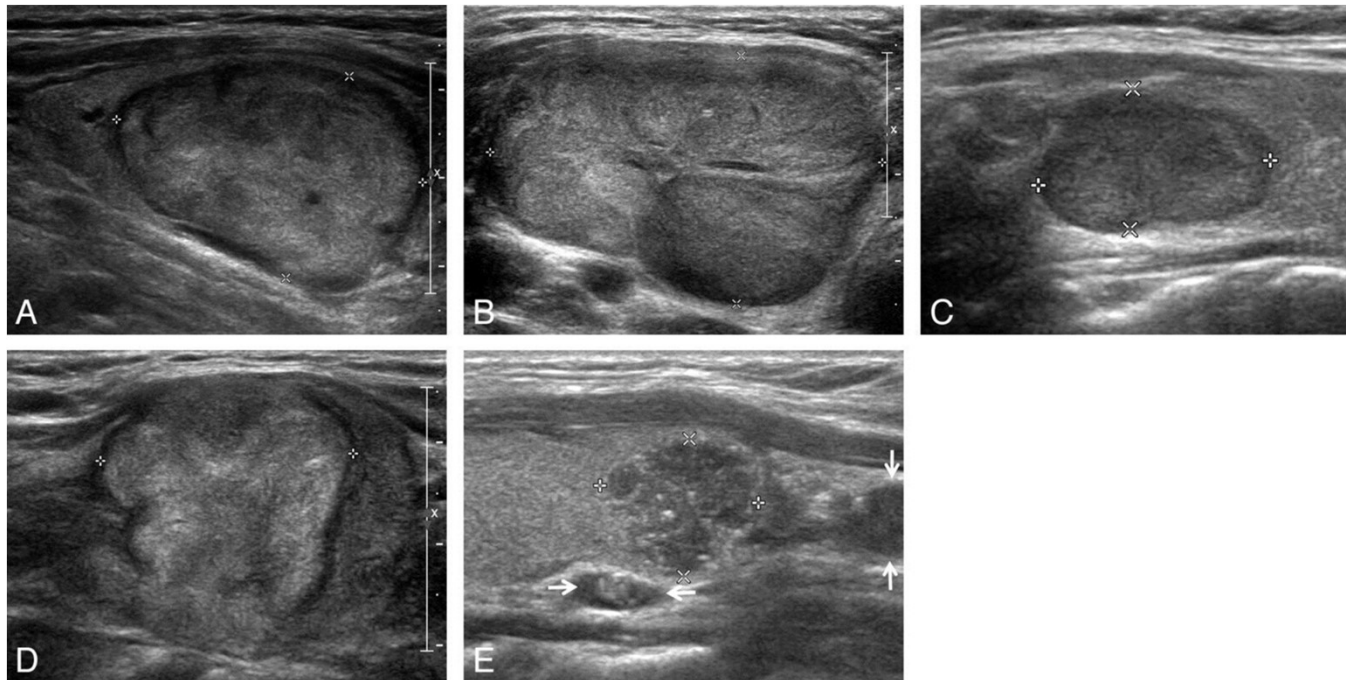
Thyroid Nodule Evaluation

When to biopsy:

- High thyroid cancer risk and ≥ 1 cm
 - Hypoechogenicity
 - Spiculated or microlobulated margins
 - Microcalcifications
 - Taller than wide
 - ETE
- Enlarged cervical lymph nodes
- Intermediate risk nodules ≥ 2 cm
- Low risk > 2 cm and increasing in size, prior to thyroid surgery or ablation

[AAACE/ACE/AME Medical Guidelines for Clinical Practice for the Diagnosis and Management of Thyroid Nodules—2016 Update](#)

Representative sonographic images of the 5 diagnostic categories for solid thyroid nodules.



D.W. Kim et al. AJNR Am J Neuroradiol 2012;33:1144-1149

©2012 by American Society of Neuroradiology



Thyroid Nodule Fine Needle Aspiration (FNA)

- Ultrasound guided
- 27g needle
- 2 - 3 passes per nodule
- Ethyl chloride matters



FNA results

Bethesda system

- Nondiagnostic (1% – 4% risk of malignancy)
- Benign (0 – 3%)
- Atypia or follicular lesion of undetermined significance (AUS/FLUS) (5% – 15%)
 - Follicular neoplasm (15% – 30%)
 - Suspicious (60% – 75%)
 - Malignant (97% – 99%)

2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer

FNA results

Benign

- Repeat ultrasound one year, FNA if changes occur

Nondiagnostic

- Repeat FNA

[2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

FNA results

Indeterminate (AUS/FLUS, follicular neoplasm, suspicious)

- Repeat FNA
- Consider molecular testing
 - BRAF, RAS, RET/PTC, PAX8/PPAR, galectin-3)
- Monitor AUS/FLUS
 - +BRAF or RAS then surgery
- Molecular testing or surgery for follicular neoplasm
 - If – BRAF or RAS, consider lobectomy over total thyroidectomy
- Thyroidectomy if suspicious

[2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

FNA results

Malignant

- thyroidectomy
- Active surveillance
 - Low risk tumors
 - High surgical risk
 - Relatively short remaining life span
 - Comorbidities that require correction prior to surgery

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Thyroid Nodule Evaluation

After biopsy

- If cancer, thyroidectomy
- If benign, monitor with ultrasound and TSH testing
 - If symptomatic, consider thyroidectomy
 - High suspicion nodules
 - Ultrasound, FNA within 12 months
 - Low to intermediate suspicion
 - Ultrasound at 12 – 24 months
 - Repeat FNA if 20% increase in growth or suspicious features
 - Very low suspicion
 - Ultrasound 24 months or more
 - After 2 benign FNA, no further surveillance

[2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

Types of Thyroid Cancer

- Differentiated
 - Papillary
 - Follicular
- Medullary
- Anaplastic

Thyroid Cancer

Differentiated

- Total or near total thyroidectomy
 - Tumor > 4 cm
 - ETE
 - Metastatic disease
- LN dissection
- Lobectomy possible in other cases
 - < 1cm tumor
 - No mets or ETE

2015 ATA Management Guidelines for Adult Patients with
Thyroid Nodules and Differentiated Thyroid Cancer

Thyroid Cancer

Differentiated

- Total or near total thyroidectomy
 - Tumor > 4 cm
 - ETE
 - Metastatic disease
- LN dissection
- Lobectomy possible in other cases
 - < 1cm tumor
 - No mets or ETE
- RAI remnant ablation depending on risk
- TSH goal dependent on risk
- Tg testing, ultrasound monitoring dependent on risk

[2015 ATA Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer](#)

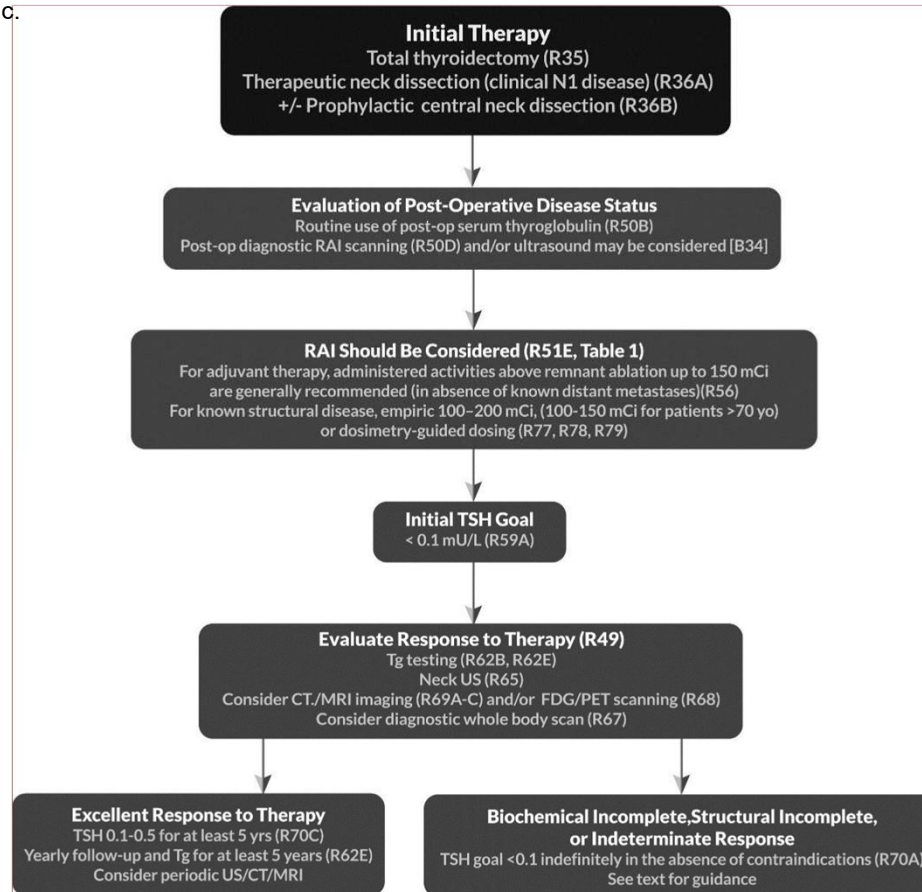


FIG. 8. Clinical decision-making and management recommendations in *ATA high risk* DTC patients that have undergone total thyroidectomy and have no gross residual disease remaining in the neck. R, recommendation in text.

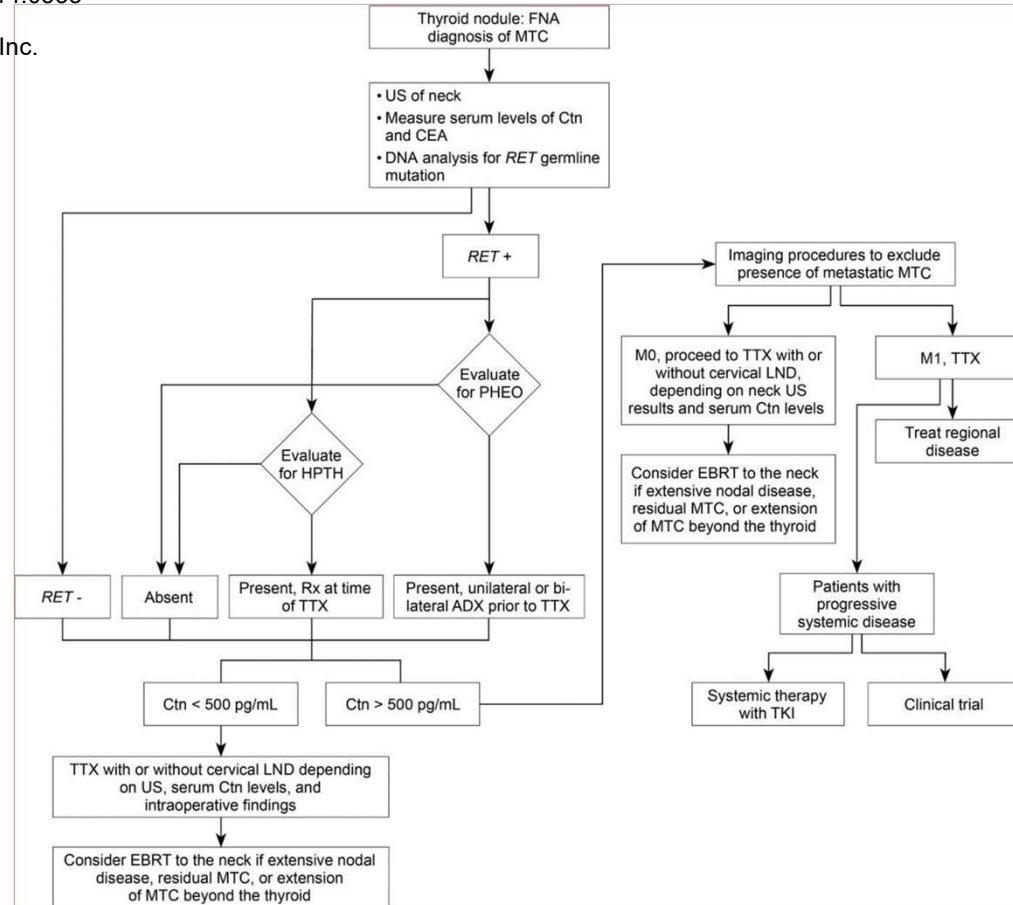


FIG. 1. Management of patients with a thyroid nodule and histological diagnosis of medullary thyroid carcinoma. ADX, adrenalectomy; Ctn, calcitonin; CEA, carcinoembryonic antigen; EBRT, external beam radiotherapy; FNA, fine-needle aspiration; HPTH, hyperparathyroidism; LND, lymph node dissection; MTC, medullary thyroid carcinoma; M, metastatic MTC; PHEO, pheochromocytoma; *RET*, *RE*arranged during *T*ransfection; TKI, tyrosine kinase inhibitor; TTX, total thyroidectomy; US, ultrasound.

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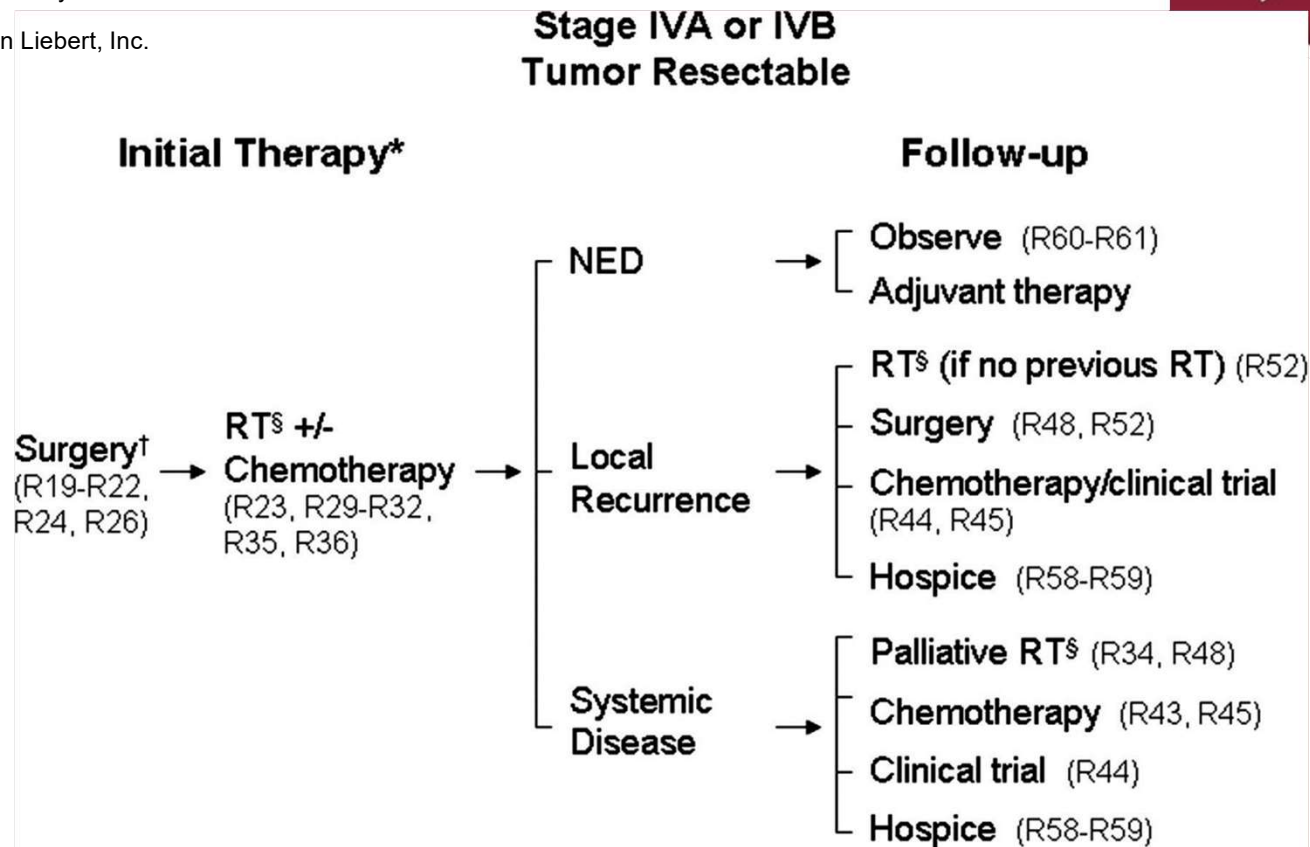


FIG. 2. Patients with anaplastic thyroid carcinoma, resectable disease, and no distant metastases should be considered for surgery and locoregional radiation therapy (with or without systemic therapy). Follow-up management options depend on whether the patient has no evidence of disease or local recurrence, or progresses to systemic disease. *Patient may decline surgery and/or RT ± chemotherapy (**Recommendation 34**) and prefer palliative/hospice care. †Neoadjuvant RT ± chemotherapy may precede surgery (**Recommendation 33**). §Intensity-modulated radiation therapy (IMRT) is preferred if possible. RT, radiation therapy; NED, no evidence of disease.

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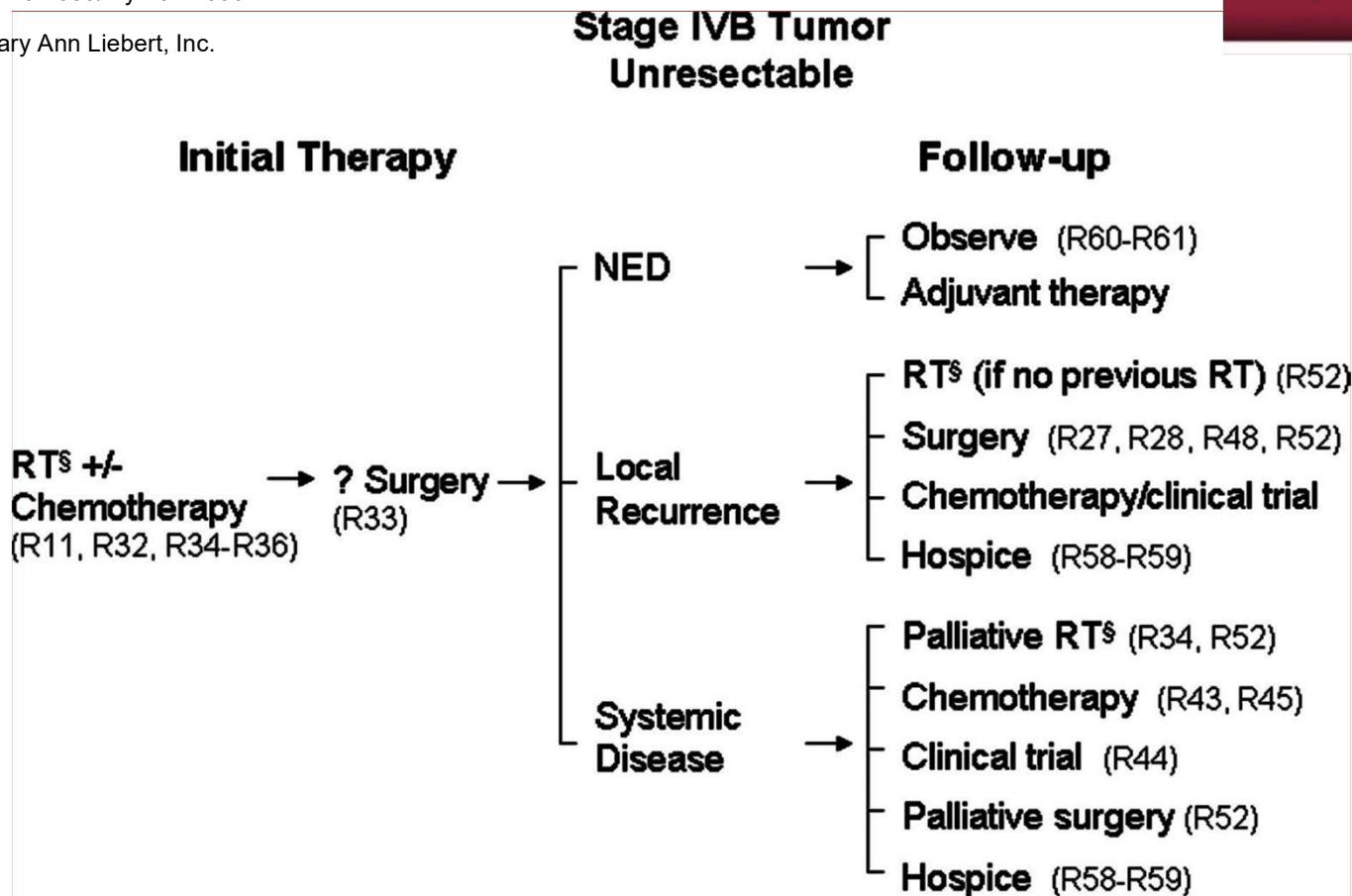


FIG. 3. Patients with anaplastic thyroid carcinoma who present with locoregionally confined but unresectable disease should consider radiotherapy with or without systemic therapy. Some patients may subsequently be deemed to have resectable tumor. Follow-up therapy options depend on patient responses to the initial therapy. S₁IMRT is preferred if possible.

Nodules during pregnancy

Autonomous nodule

- Tx with ATDs with caution, careful to avoid iatrogenic hypothyroidism
- Avoid RAI scan

FNA and monitor during pregnancy

- Thyroidectomy post-partum if malignant
- Consider surgery if substantial growth by 24 weeks

[2017 Guidelines of the ATA for Diagnosis and Management of Thyroid Disease During Pregnancy and the Postpartum](#)

Nodules in pediatrics

Uncommon but more likely to be malignant with LN/pulm mets, ETE

Low mortality

High risk in pts with prior cancer or radiation history, family history, or iodine deficiency

Management similar to adults

Total thyroidectomy with central neck dissection in most patients with DTC

TSH suppression < 1.0 mIU/L

More responsive to RAI

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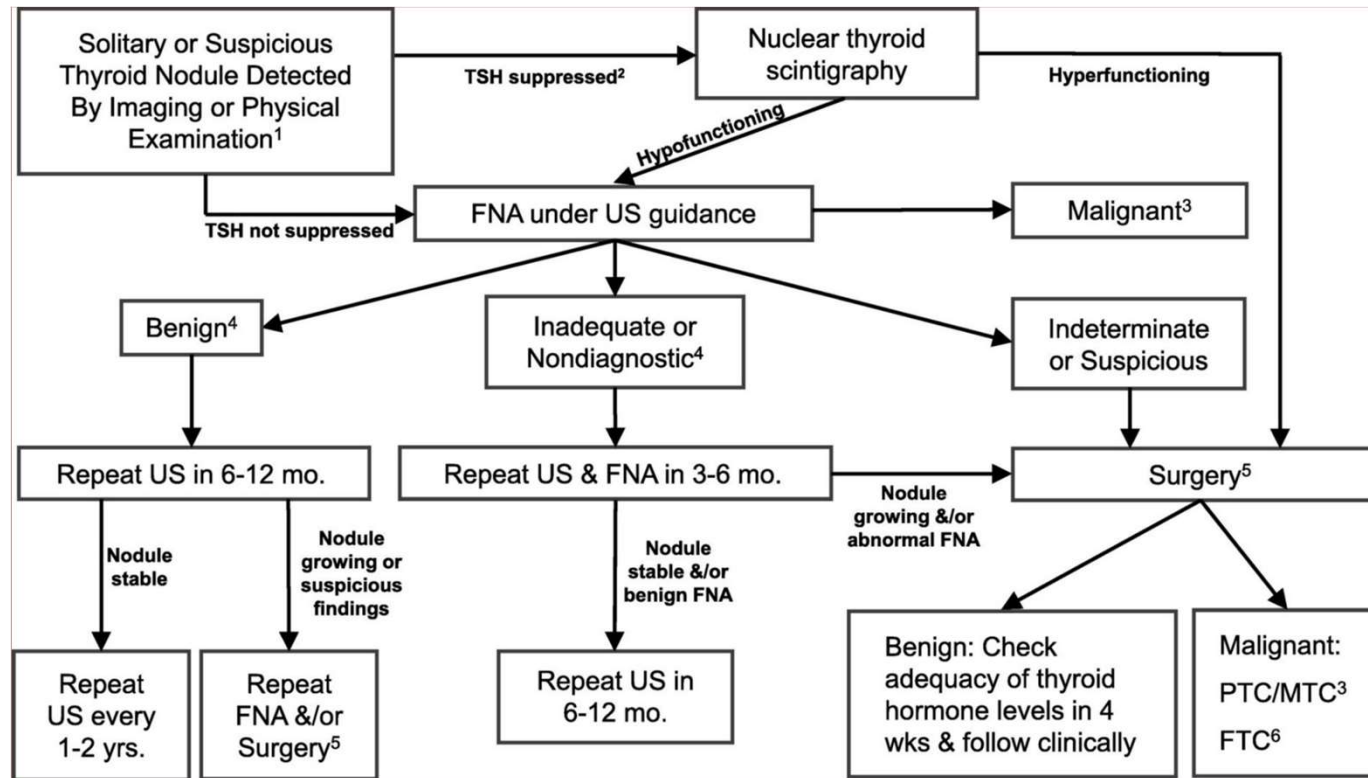


FIG. 1. Initial evaluation, treatment, and follow-up of the pediatric thyroid nodule. 1Assumes a solid or partially cystic nodule ≥ 1 cm or a nodule with concerning ultrasonographic features in a patient without personal risk factors for thyroid malignancy (see Sections B3 and B4). 2A suppressed TSH indicates a value below the lower limits of normal. 3Refer to PTC management guidelines (Section C1) or MTC management guidelines. 4Surgery can always be considered based upon suspicious ultrasound findings, concerning clinical presentation, nodule size >4 cm, compressive symptoms, and/or patient/family preference. 5Surgery implies lobectomy plus isthmusectomy in most cases. Surgery may be deferred in patients with an autonomous nodule and subclinical hyperthyroidism, but FNA should be considered if the nodule has features suspicious for PTC. (See Section B10.) Consider intraoperative frozen section for indeterminate and suspicious lesions. Can consider total thyroidectomy for nodules suspicious for malignancy on FNA. 6Consider completion thyroidectomy \pm RAI versus observation \pm TSH suppression based upon final pathology (see Section E1).

What Not to Do

Suppress nodules with levothyroxine

PET scan

Thyroid scan of nodule when TSH is high or normal

FNA of hot nodule

Tg testing for thyroid cancer screening

RAI during pregnancy

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Take Home Points

- Thyroid nodules are common
- Thyroid cancer incidence is increasing
- Management of thyroid nodules is based on:
 - TSH
 - Nodule size
 - Nodule characteristics on ultrasound
 - FNA results
- Thyroid cancer is a chronic disease involving TSH management and ultrasound follow-up

References

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Questions?

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