Thyroid Nodules

Alex Nelson, DO

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Banner University Medical Center- Phoenix

THE UNIVERSITY OF ARIZONA

Disclosures

- None

Objectives

- Know the rate of malignancy for incidentally discovered thyroid nodules
- Describe several risk factors for thyroid cancer
- Understand appropriate workup for thyroid nodules including role of FNA

Case 1

- 57 F with history of HTN and DM presents with a new dx of a 2.7 cm left thyroid nodule. Seen on a CTA chest during a workup for SOB in the ED.

What else do you want to know?

- Radiation exposure?
- Compressive symptoms?
- Symptoms of hypo/hyperthyroidism?
- Family history of other cancers
- Exam findings?
- Labs- TSH

Patient asks you, “What are the chances this is cancer?”

A. No chance
B. 5%
C. 10-15%
D. 20-30%
E. 50%
F. I’m not sure, let’s order a PET scan

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Which of the following additional pieces of information would signify an increased risk of cancer?

A. Complaints of dysphagia
B. Weight loss
C. Bone pain
D. Nodule is firm, not mobile
E. Polyuria

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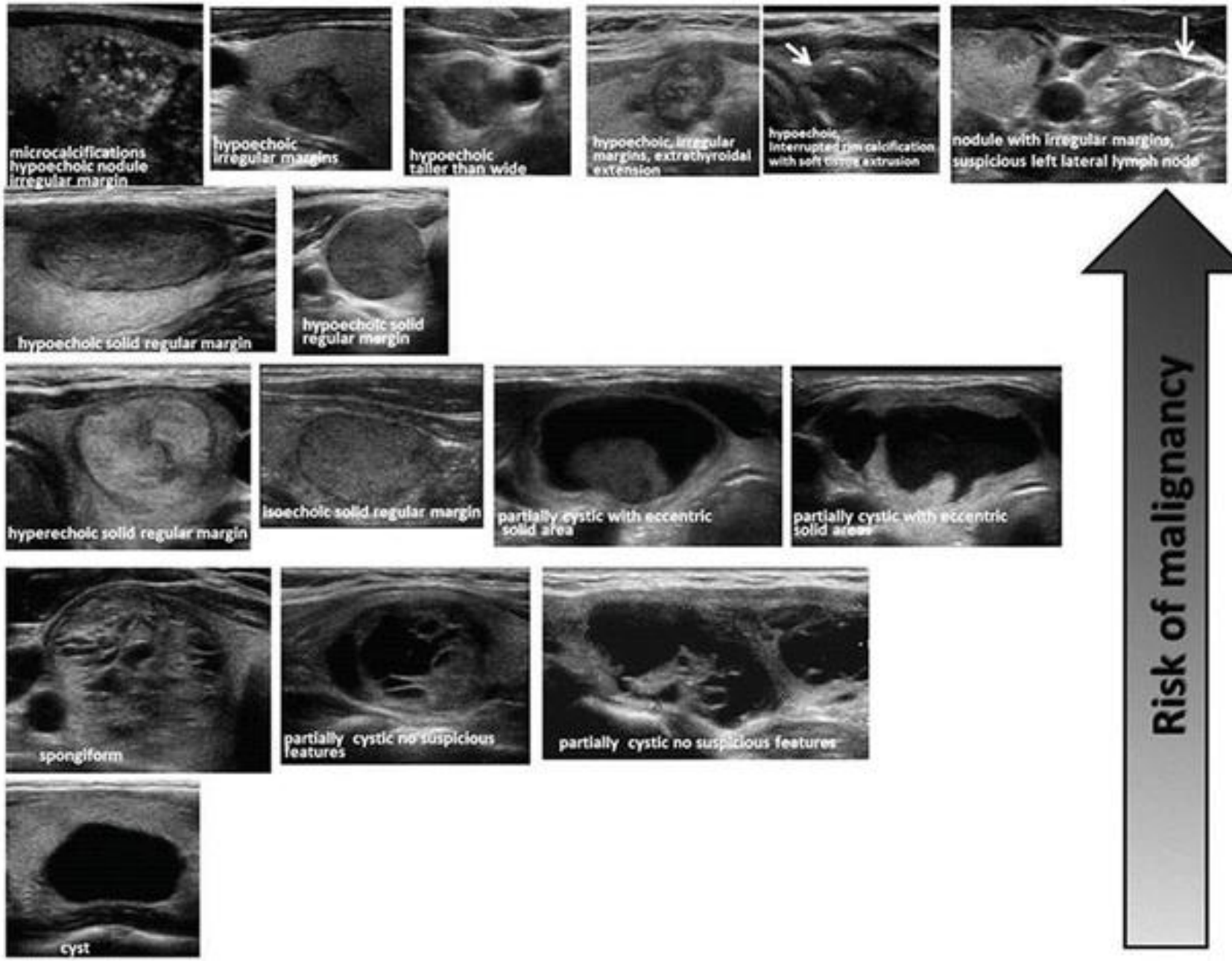
Next Step?

A. Dedicated CT soft tissue neck
B. Cervical Ultrasound
C. FNA
D. Thyroid uptake scan
E. Referral to surgeon for thyroidectomy


High Suspicion >70-90%
microcalcifications hypoechoic nodule irregular margin
hypoechoic irregular margins
hypoechoic taller than wide
hypoechoic, irregular margins, extrathyroidal extension
hypoechoic, interrupted rim calcification with soft tissue extrusion
nodule with irregular margins, suspicious left lateral lymph node
Intermediate Suspicion 10-20%
hypoechoic solid regular margin
hypoechoic solid regular margin
Low Suspicion 5-10%
hyperechoic solid regular margin
isoechoic solid regular margin
partially cystic with eccentric solid area
partially cystic with eccentric solid area
Very low Suspicion <3%
spongiform
partially cystic no suspicious features
partially cystic no suspicious features
Benign <1%
cyst
Risk of malignancy

ACR TI-RADS

COMPOSITION (Choose 1)	
Cystic or almost completely cystic	0 points
Spongiform	0 points
Mixed cystic and solid	1 point
Solid or almost completely solid	2 points

ECHOGENICITY (Choose 1)	
Anechoic	0 points
Hyperechoic or isoechoic	1 point
Hypoechoic	2 points
Very hypoechoic	3 points

SHAPE (Choose 1)	
Wider-than-tall	0 points
Taller-than-wide	3 points

MARGIN (Choose 1)	
Smooth	0 points
Ill-defined	0 points
Lobulated or irregular	2 points
Extra-thyroidal extension	3 points

ECHOGENIC FOCI (Choose All That Apply)	
None or large comet-tail artifacts	0 points
Macrocalcifications	1 point
Peripheral (rim) calcifications	2 points
Punctate echogenic foci	3 points

Add Points From All Categories to Determine TI-RADS Level

0 Points	2 Points	3 Points	4 to 6 Points	7 Points or More
TR1	**TR2**	**TR3**	**TR4**	**TR5**
Benign	**Not Suspicious**	**Mildly Suspicious**	**Moderately Suspicious**	**Highly Suspicious**
No FNA	No FNA	FNA if ≥ 2.5 cm Follow if ≥ 1.5 cm	FNA if ≥ 1.5 cm Follow if ≥ 1 cm	FNA if ≥ 1 cm Follow if ≥ 0.5 cm*

COMPOSITION	ECHOGENICITY	SHAPE	MARGIN	ECHOGENIC FOCI
Spongiform: Composed predominantly (>50%) of small cystic spaces. Do not add further points for other categories. *Mixed cystic and solid:* Assign points for predominant solid component. Assign 2 points if composition cannot be determined because of calcification.	*Anechoic:* Applies to cystic or almost completely cystic nodules. *Hyperechoic/isoechoic/hypoechoic:* Compared to adjacent parenchyma. *Very hypoechoic:* More hypoechoic than strap muscles. Assign 1 point if echogenicity cannot be determined.	*Taller-than-wide:* Should be assessed on a transverse image with measurements parallel to sound beam for height and perpendicular to sound beam for width. This can usually be assessed by visual inspection.	*Lobulated:* Protrusions into adjacent tissue. *Irregular:* Jagged, spiculated, or sharp angles. *Extrathyroidal extension:* Obvious invasion = malignancy. Assign 0 points if margin cannot be determined.	*Large comet-tail artifacts:* V-shaped, >1 mm, in cystic components. *Macrocalcifications:* Cause acoustic shadowing. *Peripheral:* Complete or incomplete along margin. *Punctate echogenic foci:* May have small comet-tail artifacts.

**Refer to discussion of papillary microcarcinomas for 5-9 mm TR5 nodules.*

What is the single most important lab test for workup of thyroid nodules?

A. TSH
B. T3
C. T4
D. Thyroid stimulating antibodies
E. TPO antibodies
F. Thyroglobulin
G. PTH
H. CA 19-9

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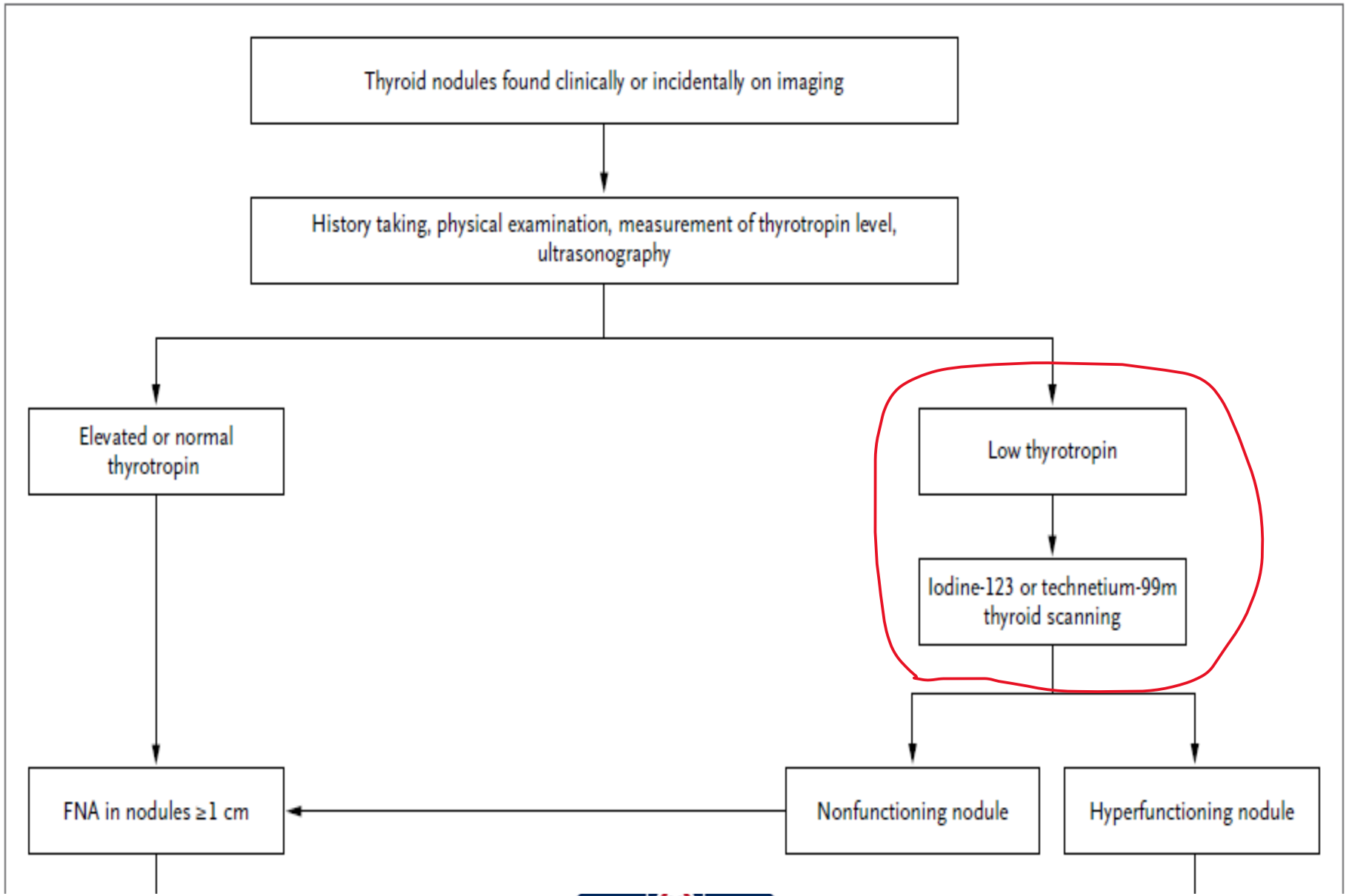
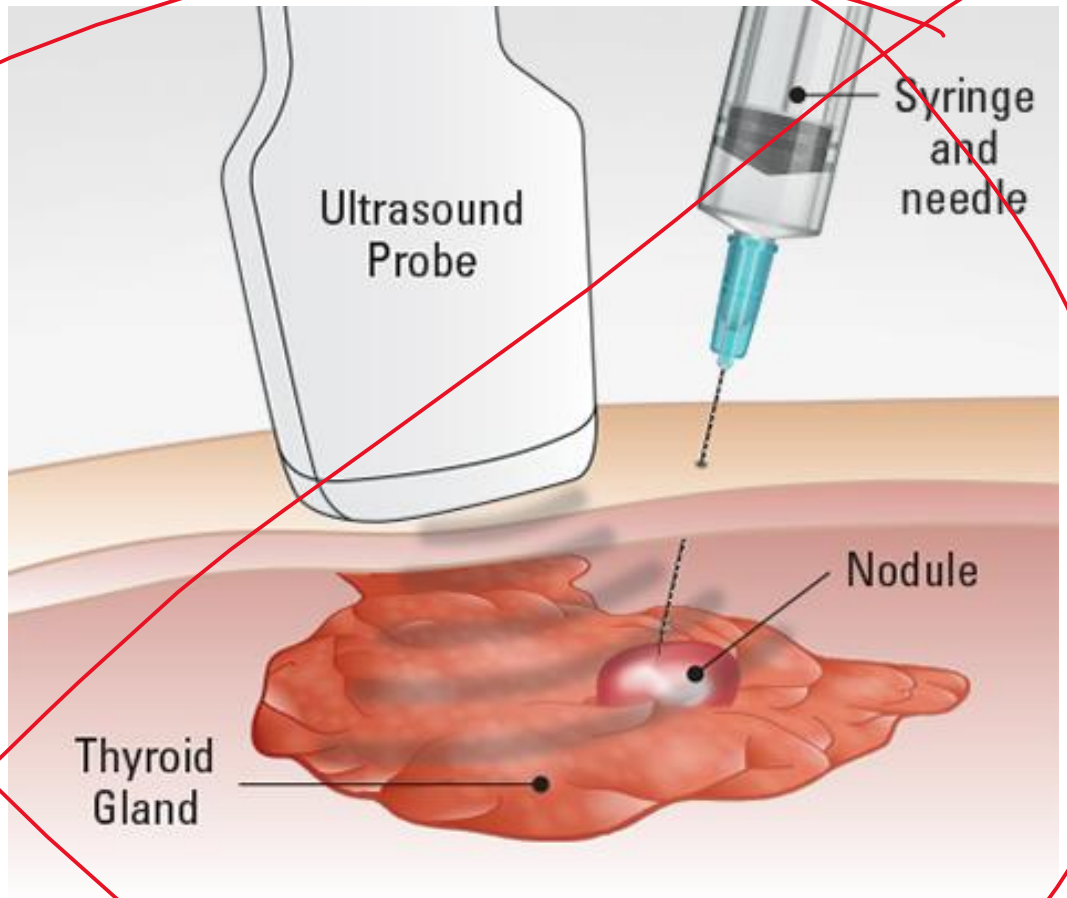
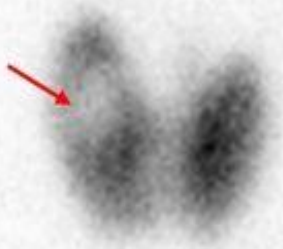
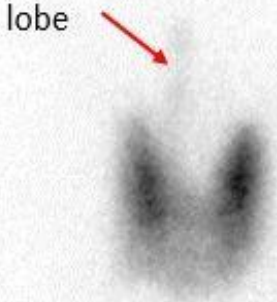

Thyroid nodules found clinically or incidentally on imaging
History taking, physical examination, measurement of thyrotropin level, ultrasonography
Elevated or normal thyrotropin
Low thyrotropin
Iodine-123 or technetium-99m thyroid scanning
FNA in nodules ≥1 cm
Nonfunctioning nodule
Hyperfunctioning nodule

Please do not do FNA on a hyperthyroid patient!

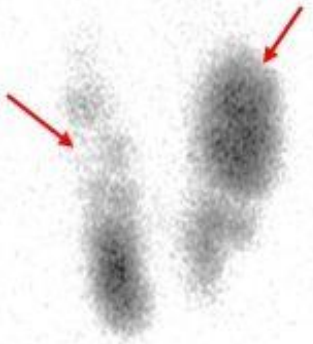




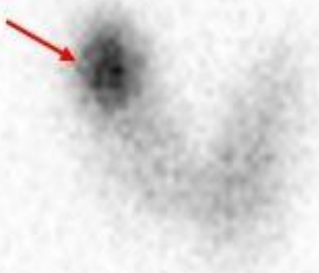
COLD NODULE



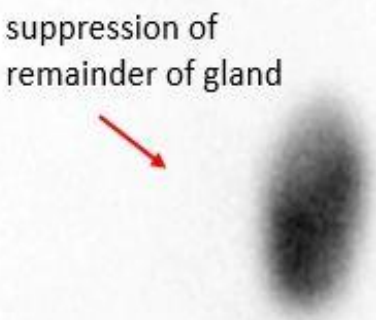
GRAVE DISEASE



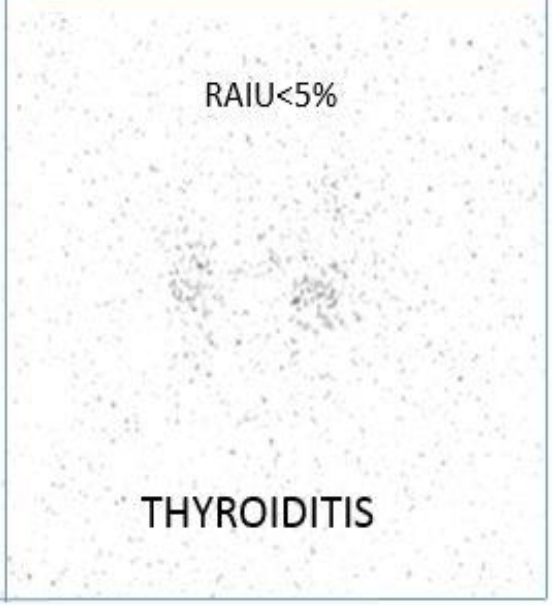
TOXIC MULTINODULAR



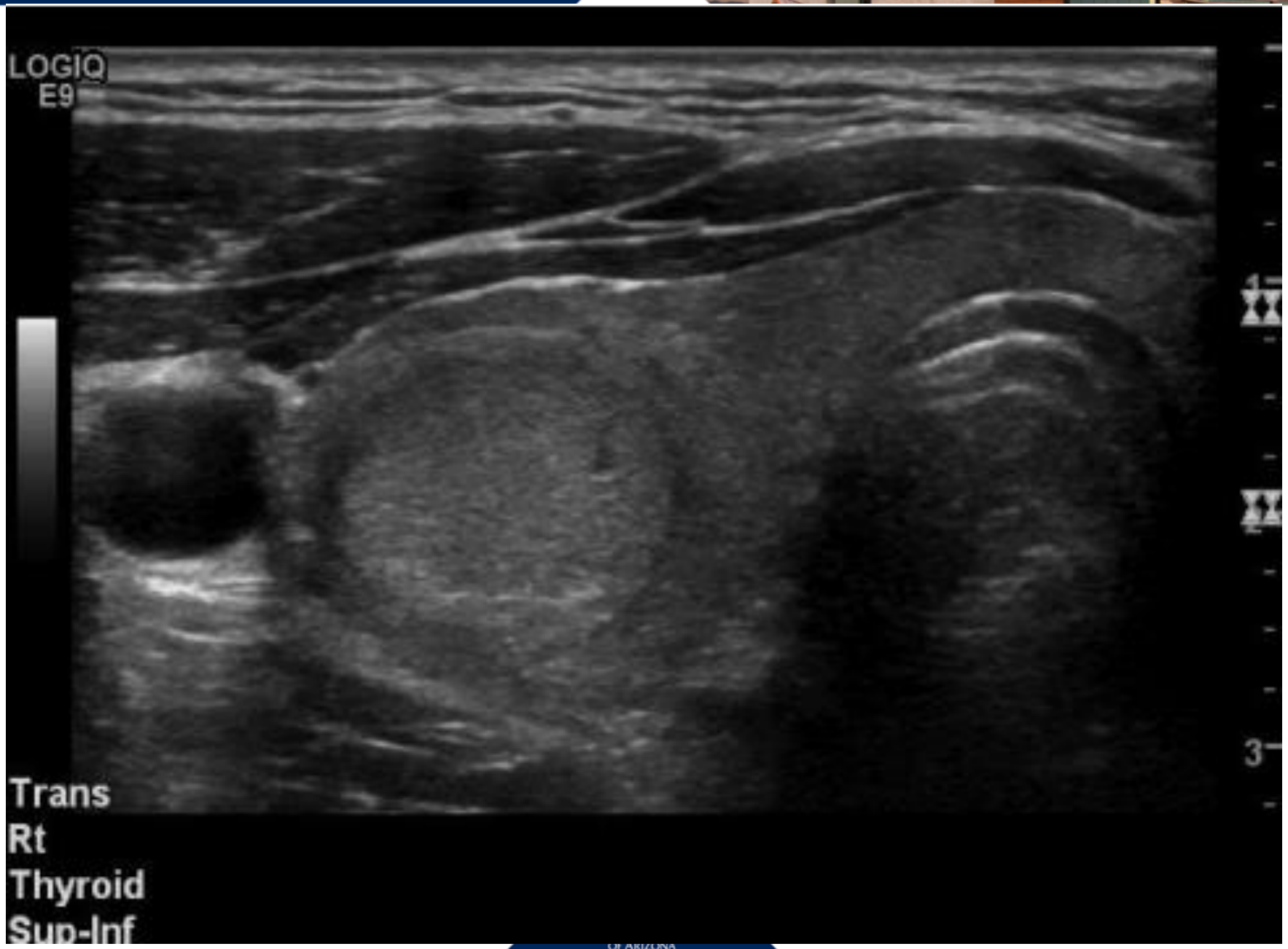
HOT NODULE

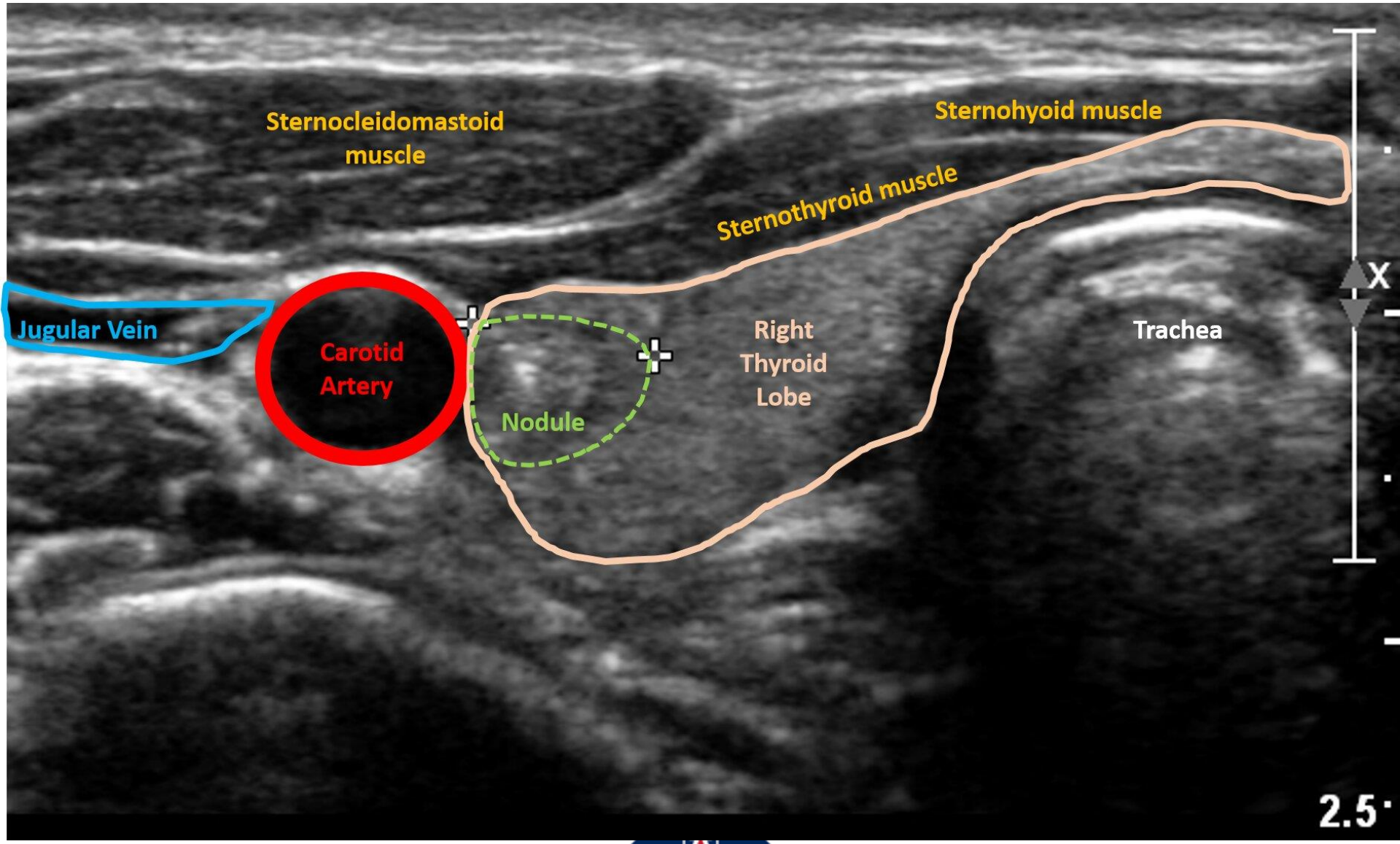


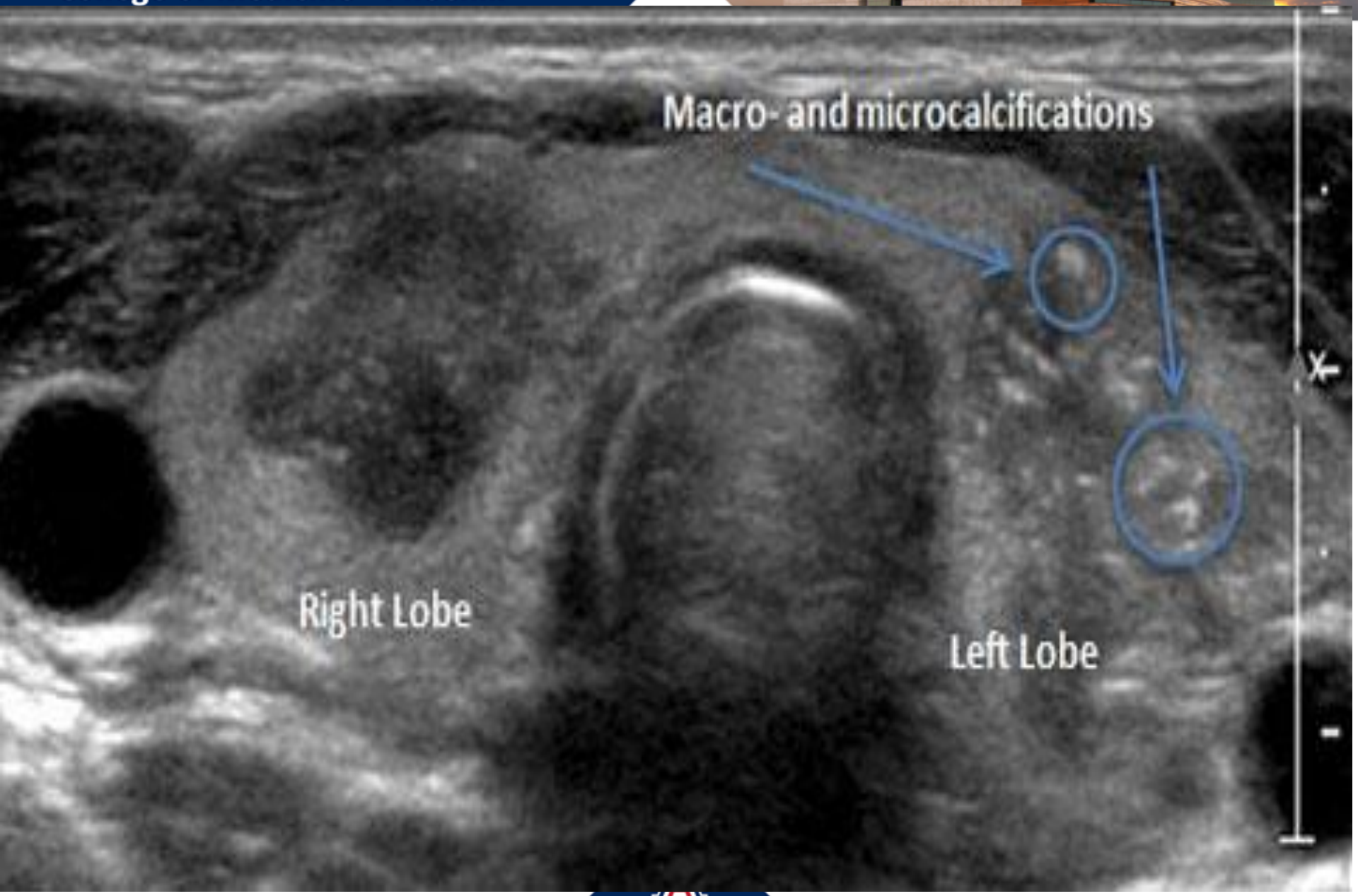
AUTONOMOUS NODULE

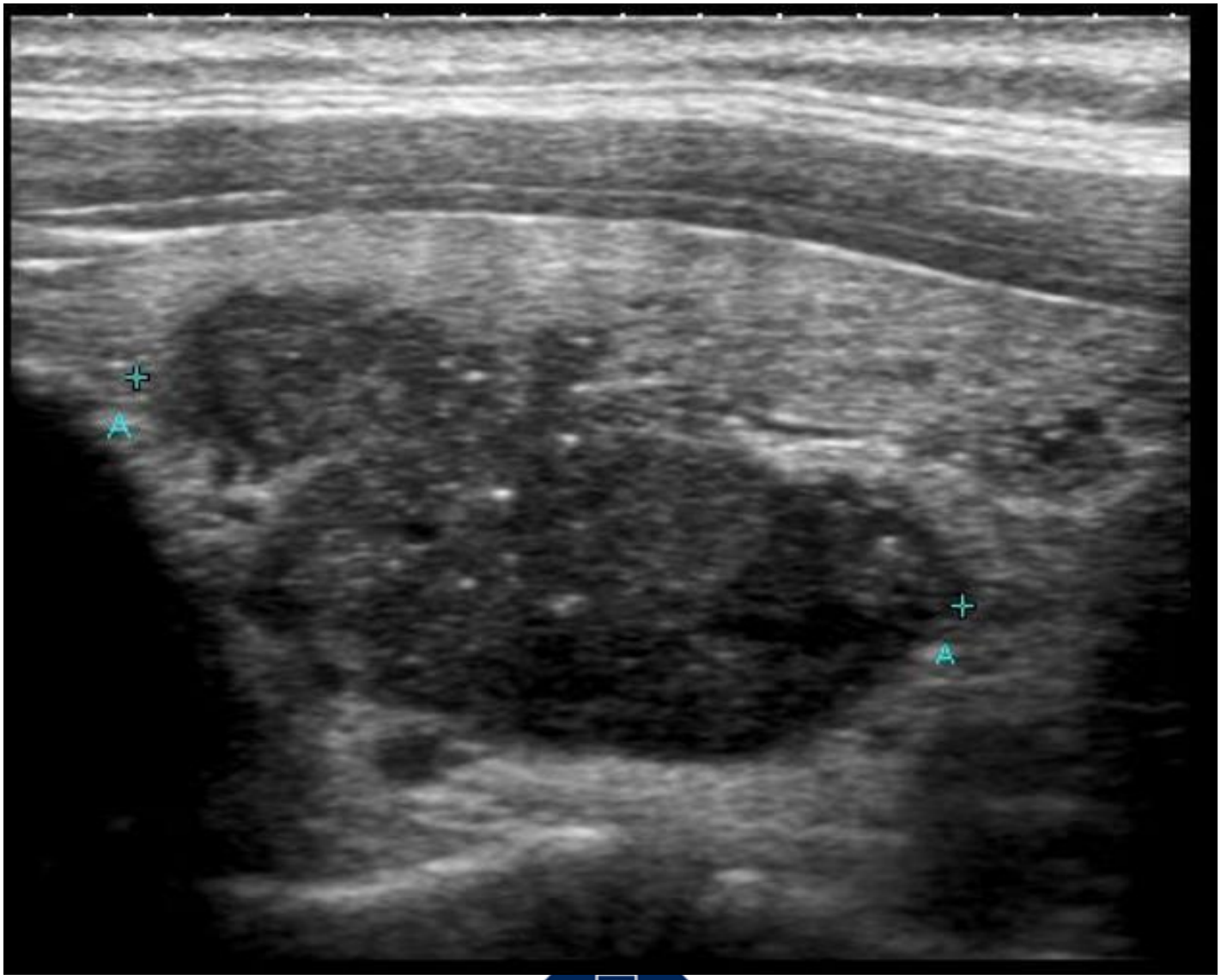


THYROIDITIS


LOGIQ
E9
Trans
Rt
Thyroid
Sup-Inf


Sternocleidomastoid muscle
Sternohyoid muscle
Sternothyroid muscle
Jugular Vein
Carotid Artery
Nodule
Right Thyroid Lobe
Trachea
X
2.5


Macro- and microcalcifications
Right Lobe
Left Lobe


A
A

Important Note

- No thyroid ultrasound is complete without assessing the central and lateral neck for enlarged/ pathologic lymph nodes!
- * Sometimes requires separate order for lymph node mapping

Case 2

62 F recently had FNA biopsy of a 3.1 cm left thyroid nodule.

Cytology report: Bethesda III Atypia of undetermined significance

What is the malignancy risk associated with this cytology interpretation?

A. None

B. 0-5%

C. 5-15%

D. 15-30%

E. 60-75%

F. 99%

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Diagnostic category	*Risk of malignancy (%)*	*Usual management*
I. Nondiagnostic or unsatisfactory	1-4	Repeat FNA with ultrasound guidance
II. Benign	0-3	Clinical follow-up
III. AUS or FLUS	5-15	Repeat FNA
IV. Follicular neoplasm or suspicious for a follicular neoplasm	15-30	Surgical lobectomy
V. Suspicious for malignancy	60-75	Near-total thyroidectomy or surgical lobectomy
VI. Malignant	97-99	Near-total thyroidectomy

AUS: Atypia of undetermined significance, FLUS: Follicular lesion of undetermined significance, FNA: Fine needle aspiration

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Your patient asks if there is any alternative to repeat FNA or surgery?

A. Order additional laboratory tests
B. PET scan
C. Gallium Dotatate scan
D. Molecular testing
E. Repeat FNA or surgery are the only options

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Molecular Testing

Afirma®

THYROID FNA ANALYSIS

ThyroSeq®

Thyroid Genomic Classifier

Thank you!