Clinical Sonograpahy of Cervical Lymph Nodes & Parathyroid Disease

AACE/AME

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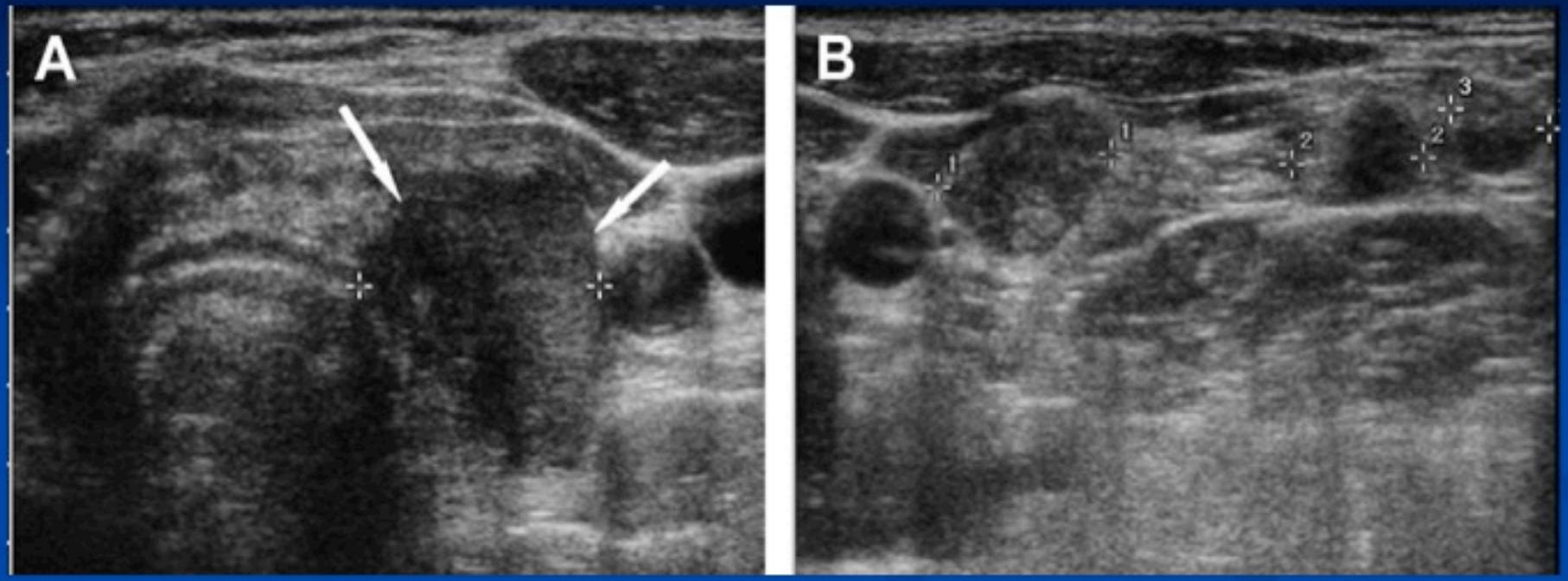
US of Thyroid only…..

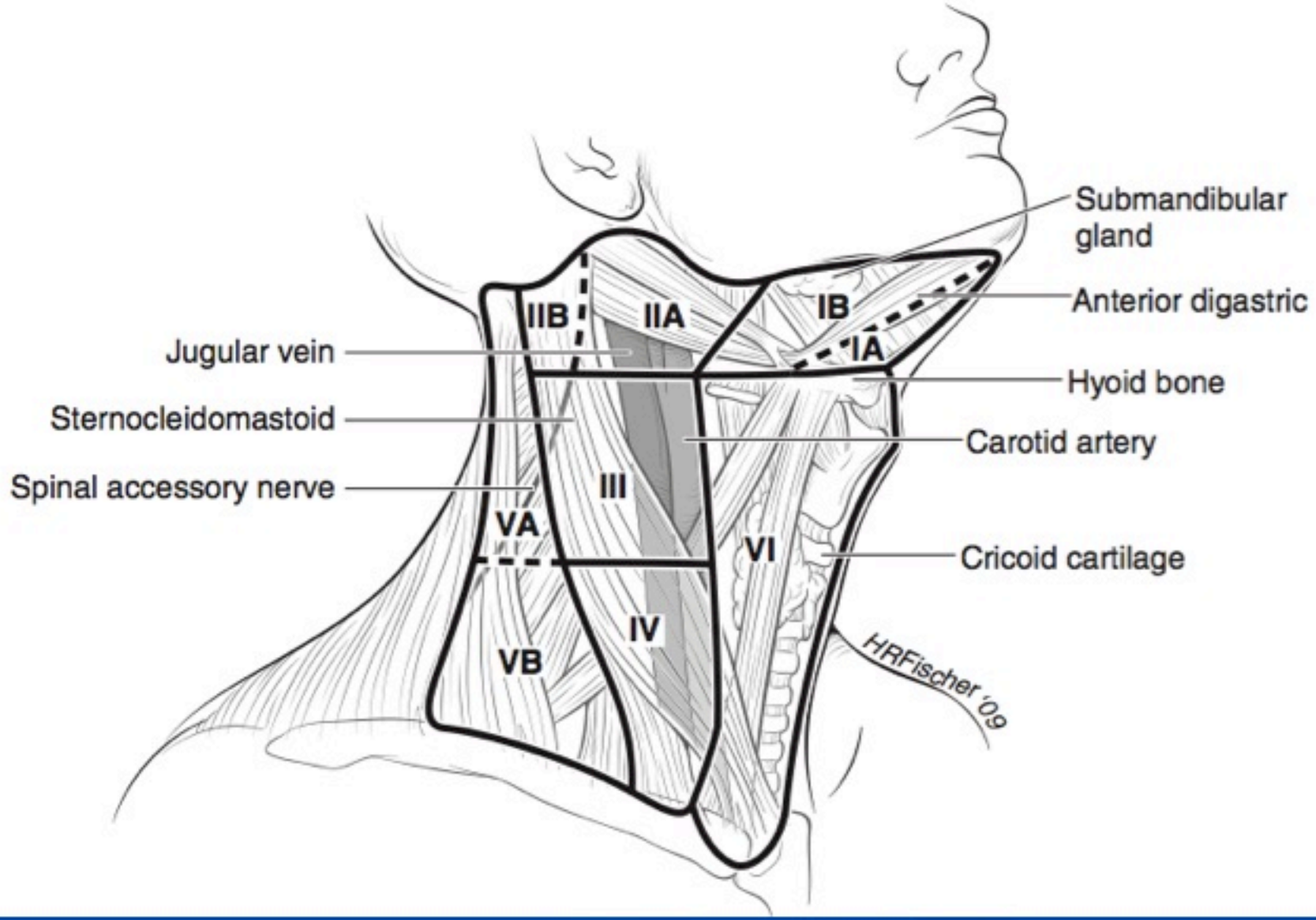
US of Entire Neck reveals…..



LEFT Nodule -- PTC

LEFT Lateral Neck: Abnl LNs

Image from: Sheth, S: Role of Ultrasonography in Thyroid Disease. Otolaryngol Clin N Am 43 (2010) 239–255


Submandibular gland
Anterior digastric
Hyoid bone
Carotid artery
Cricoid cartilage
Jugular vein
Sternocleidomastoid
Spinal accessory nerve
IIB
IIA
IB
IA
III
VA
VI
IV
VB
HRFischer '09

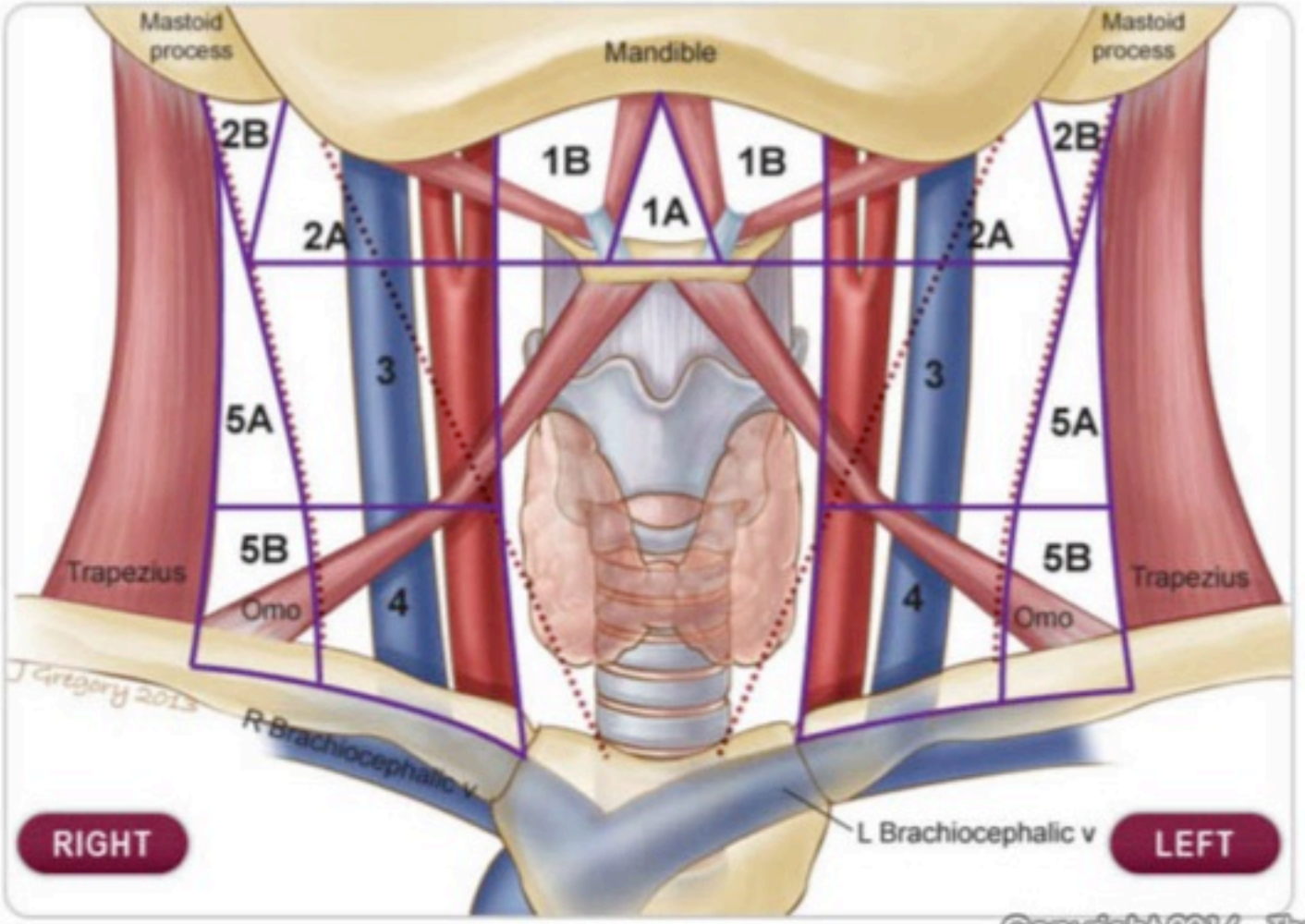
MORE INFO

Surgical Management

Compartments Dissected or Nodes Removed from Following Levels

Highlight the compartment of the neck that was dissected with your mouse and click to make your selection.

Back | Save & Continue



No Thyroidectomy

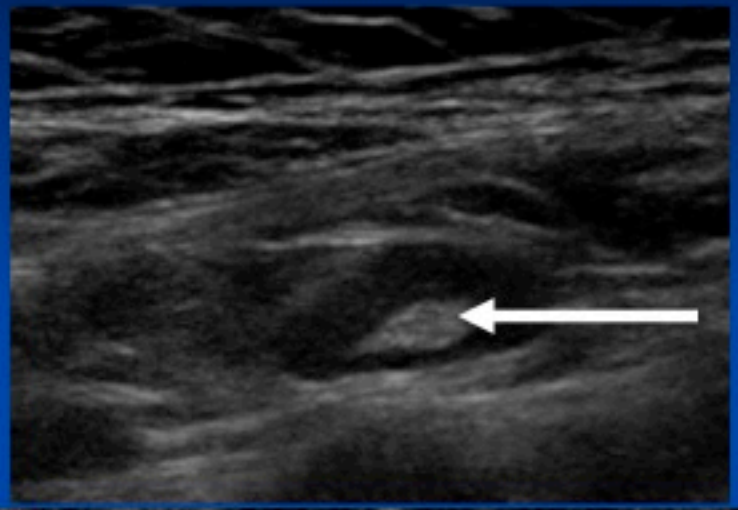
Click to Edit

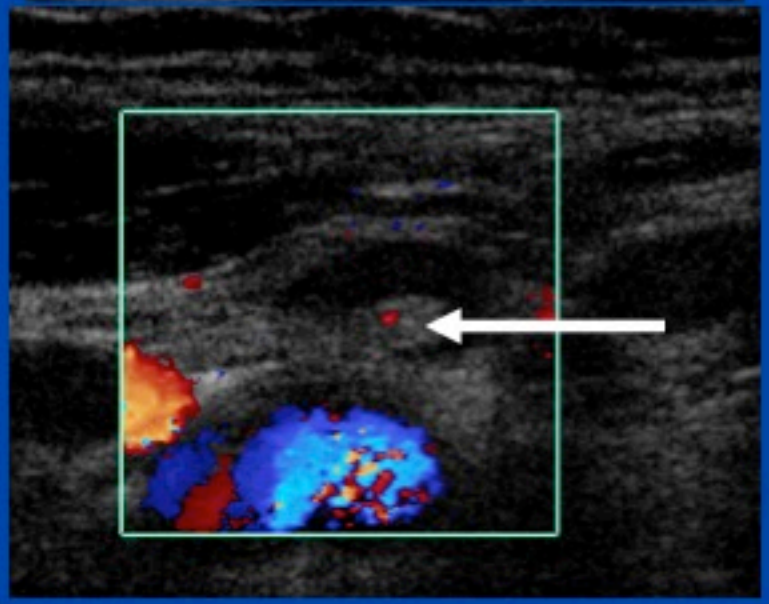
Lymph Node Dissection

Click on the image to select lymph node dissections.

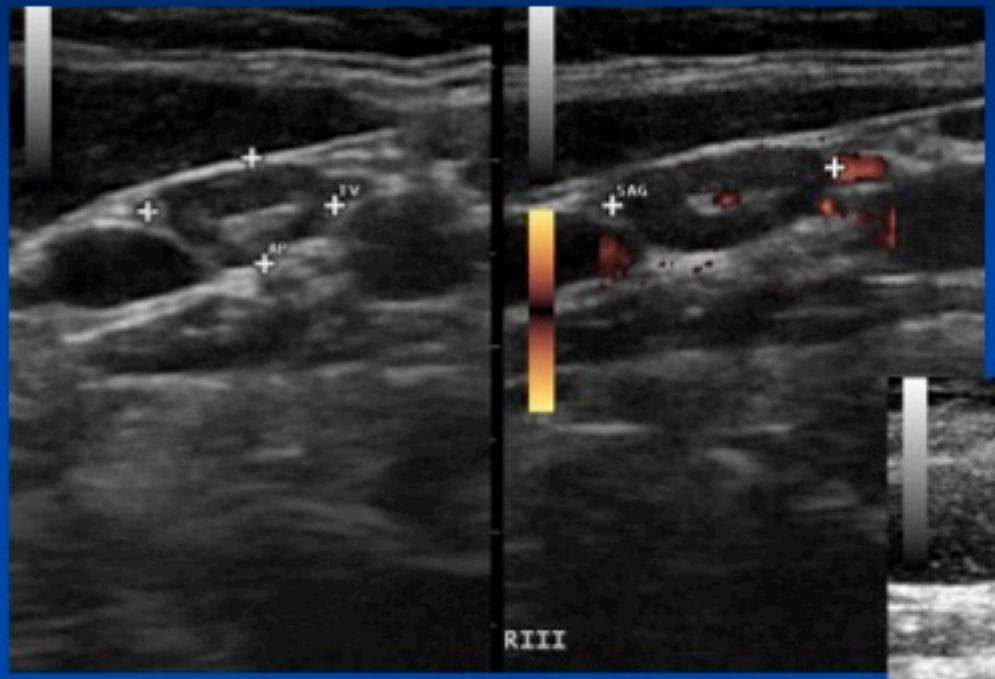
Back | Save & Continue

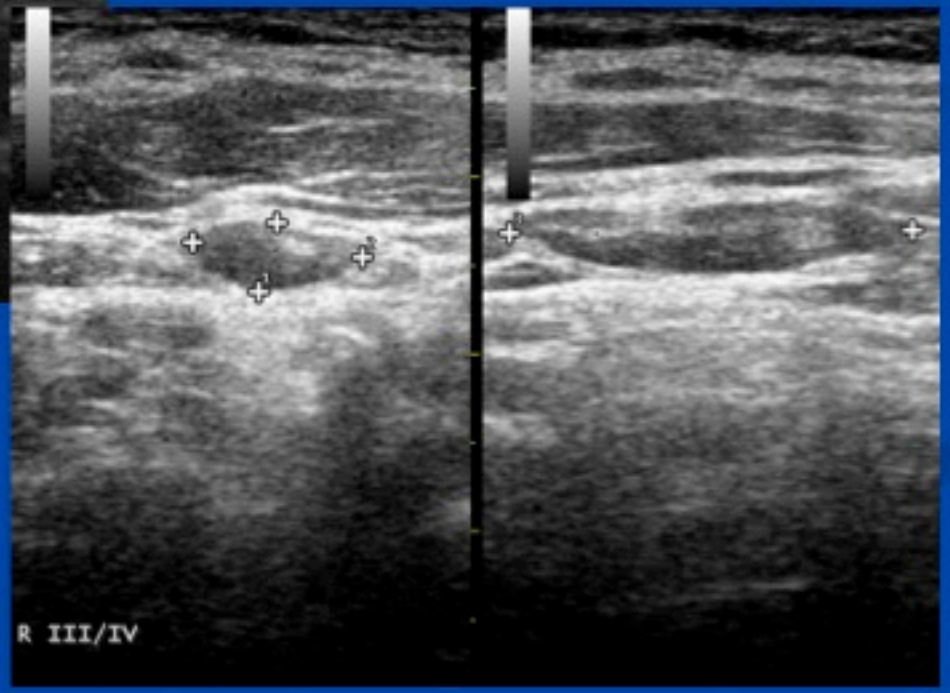
Normal lymph node- hilus



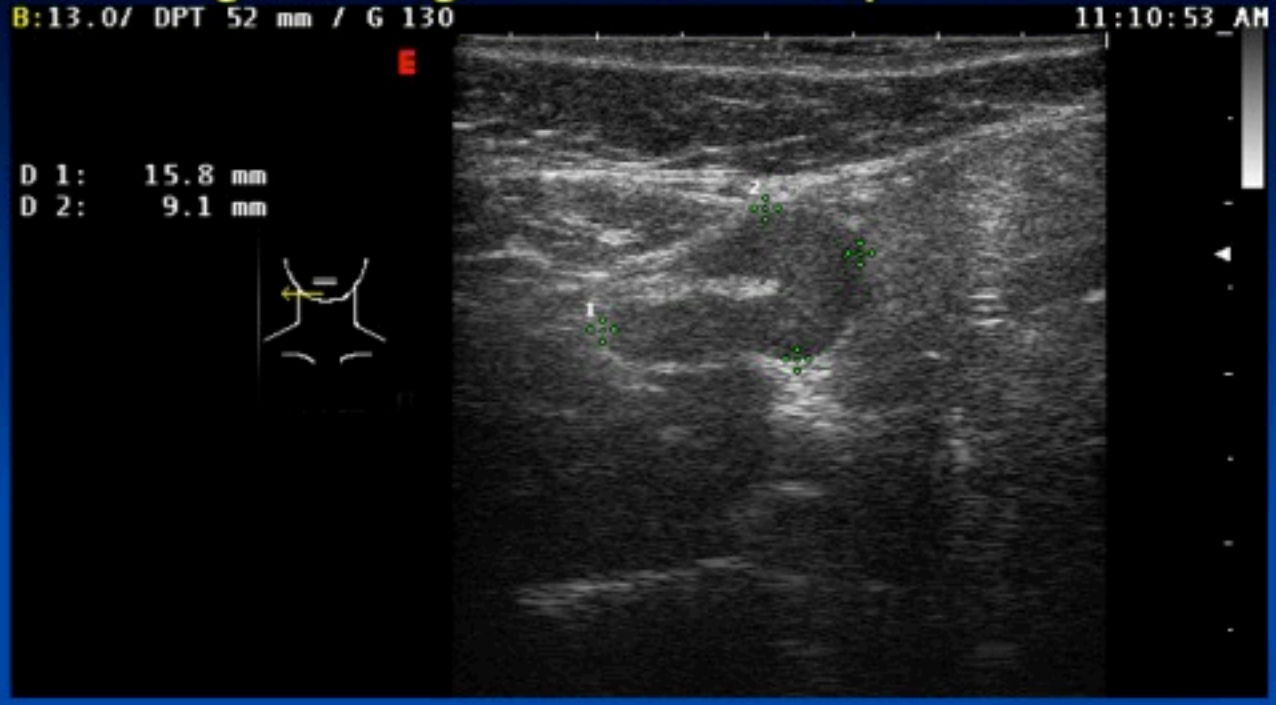


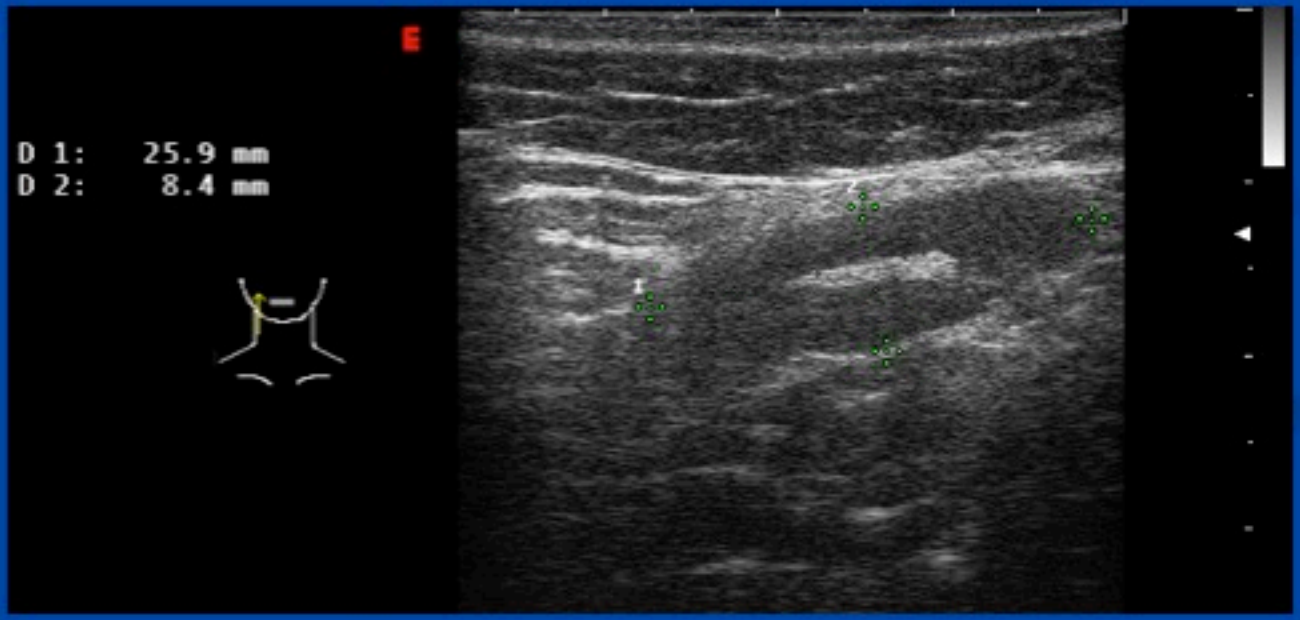
Normal LN



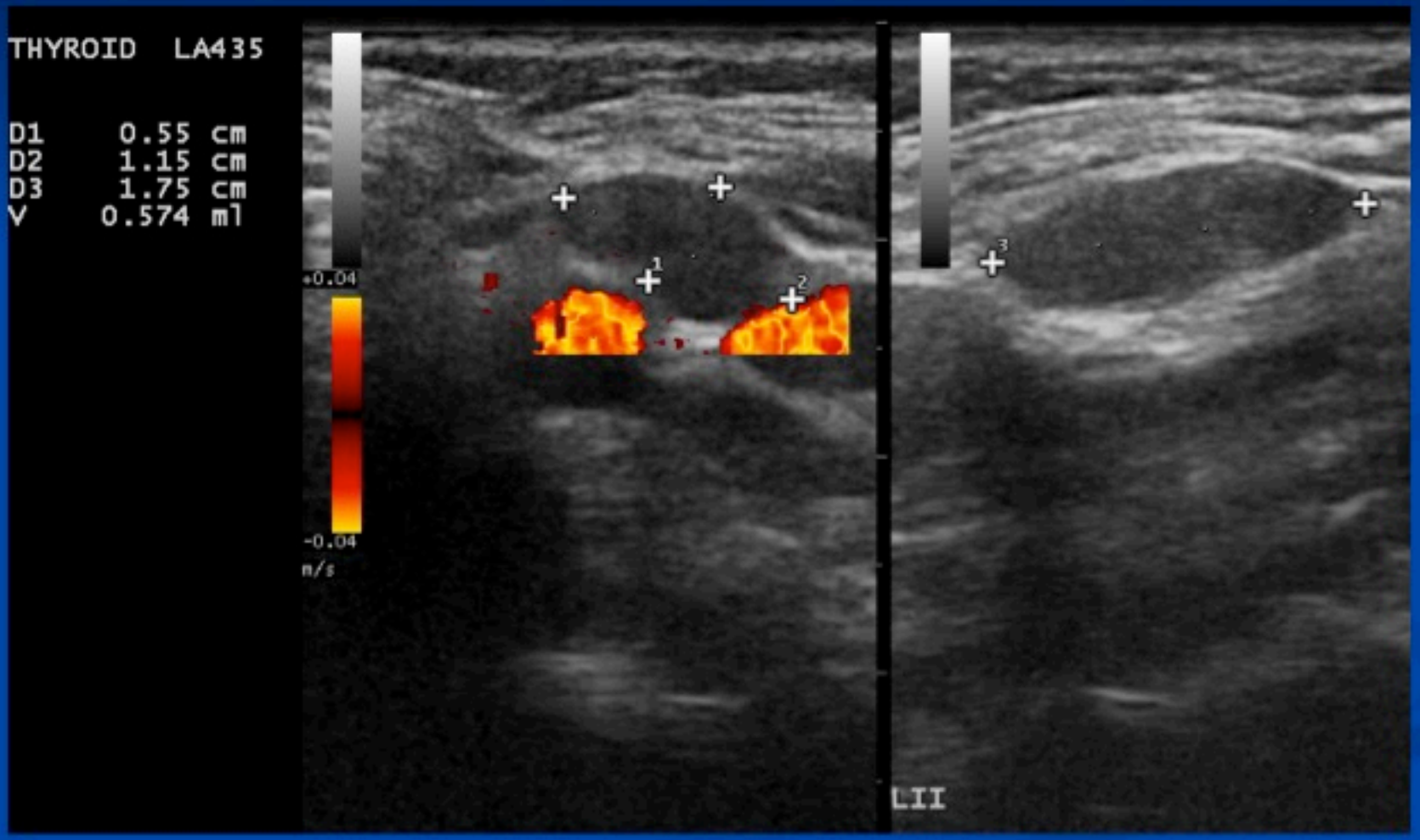


Large Benign Node - Compartment 2

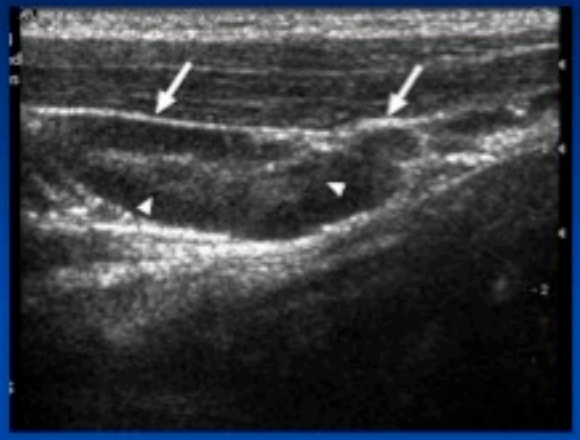




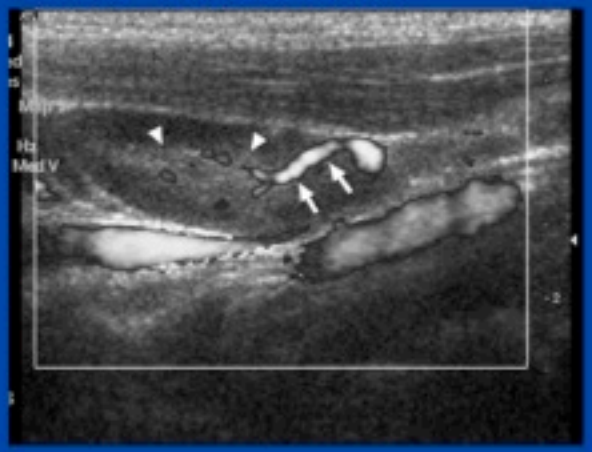
L II/III – at Carotid Bifurcation Normal LN



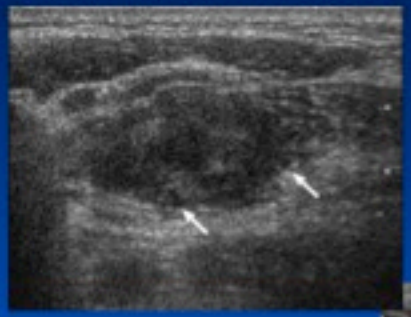
NORMAL



Hilum – with vascular flow

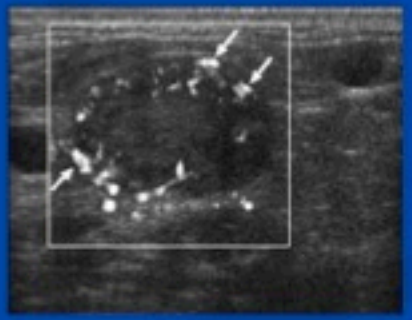


ABNORMAL



Rounded & Infiltrative

Calcifications



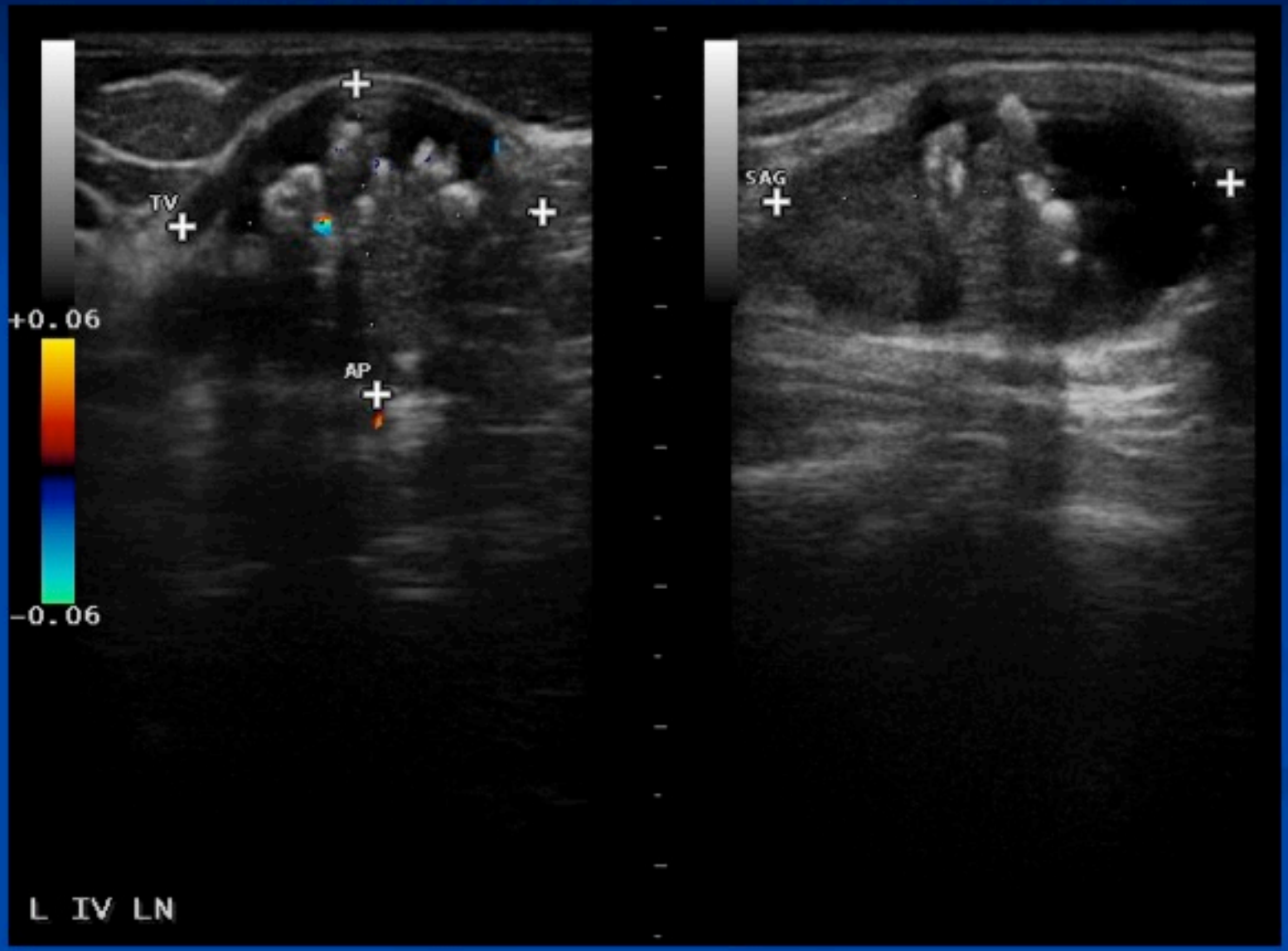
Peripheral Vascularity

TABLE 7. ULTRASOUND FEATURES OF LYMPH NODES PREDICTIVE OF MALIGNANT INVOLVEMENT[a]

Sign	*Reported sensitivity, %*	*Reported specificity, %*
Microcalcifications	5–69	93–100
Cystic aspect	10–34	91–100
Peripheral vascularity	40–86	57–93
Hyperechogenicity	30–87	43–95
Round shape	37	70

[a]Adapted with permission from the European Thyroid Association guidelines for cervical ultrasound (20).

Metastatic PTC to LN



Suspicious Lymph Node Features

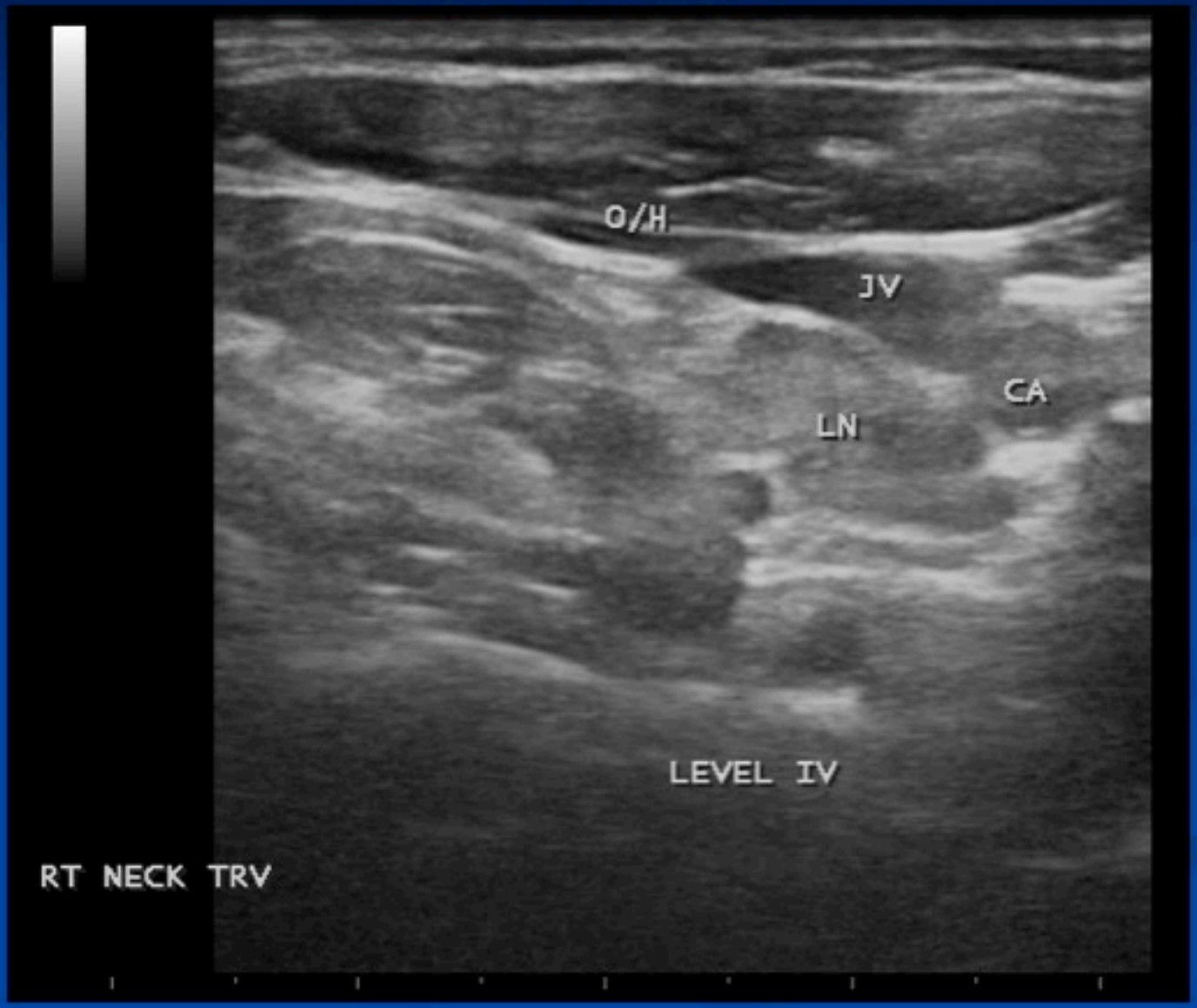
- Rounded Shape
- Peripheral/Chaotic Vascularity
- Loss of hilar line
- Jugular Compression

Features (not seen here):

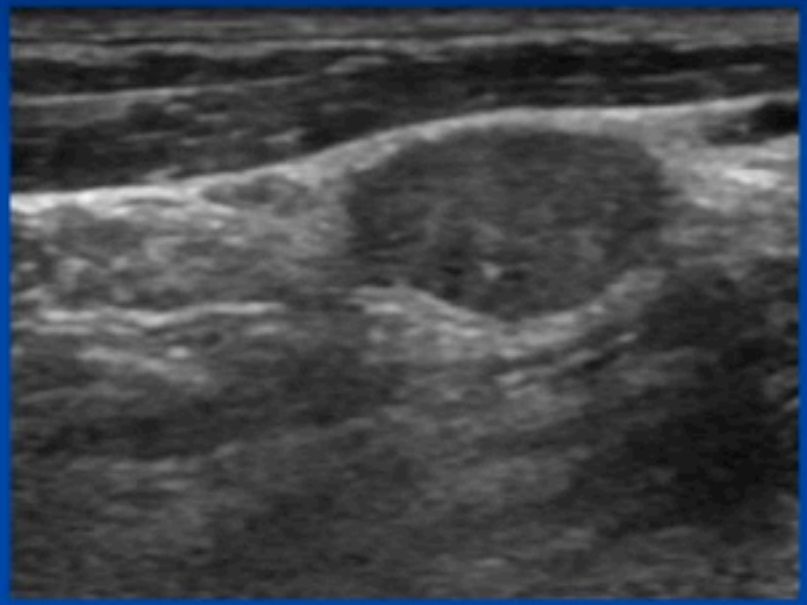
- Calcification
- Cystic change

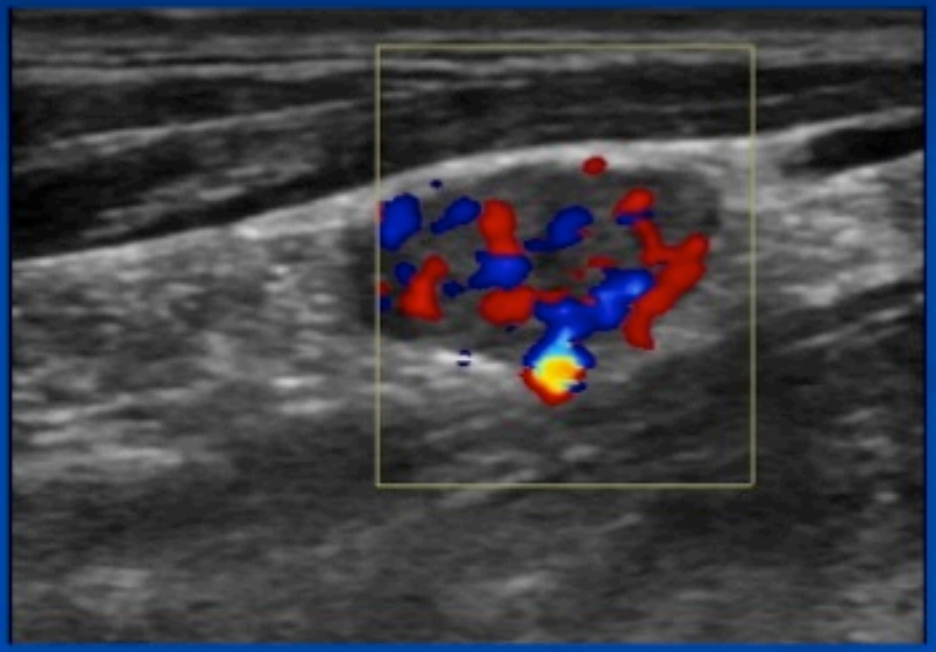
Level II (left) PTC node

R IV LN

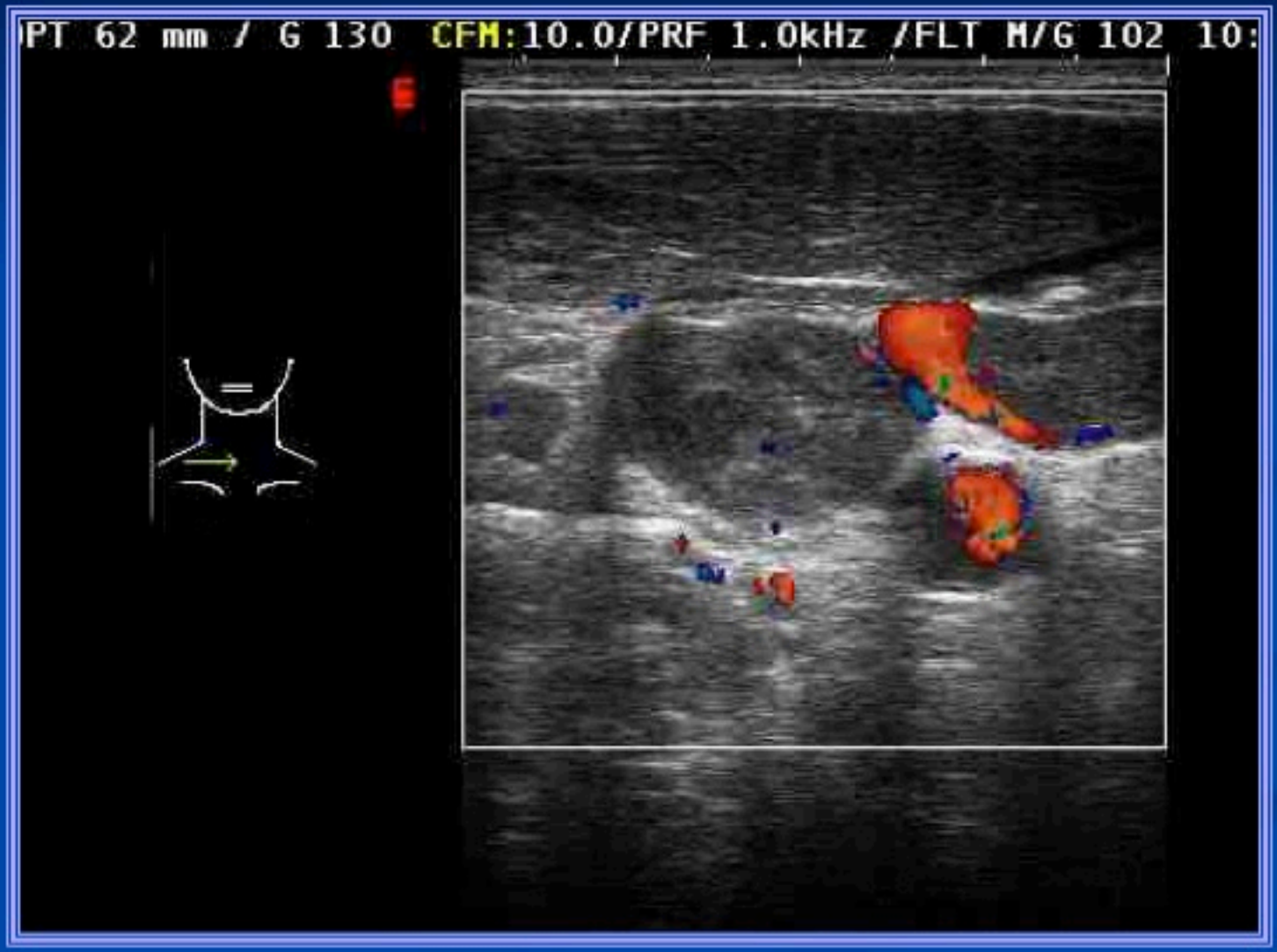


Malignant Node

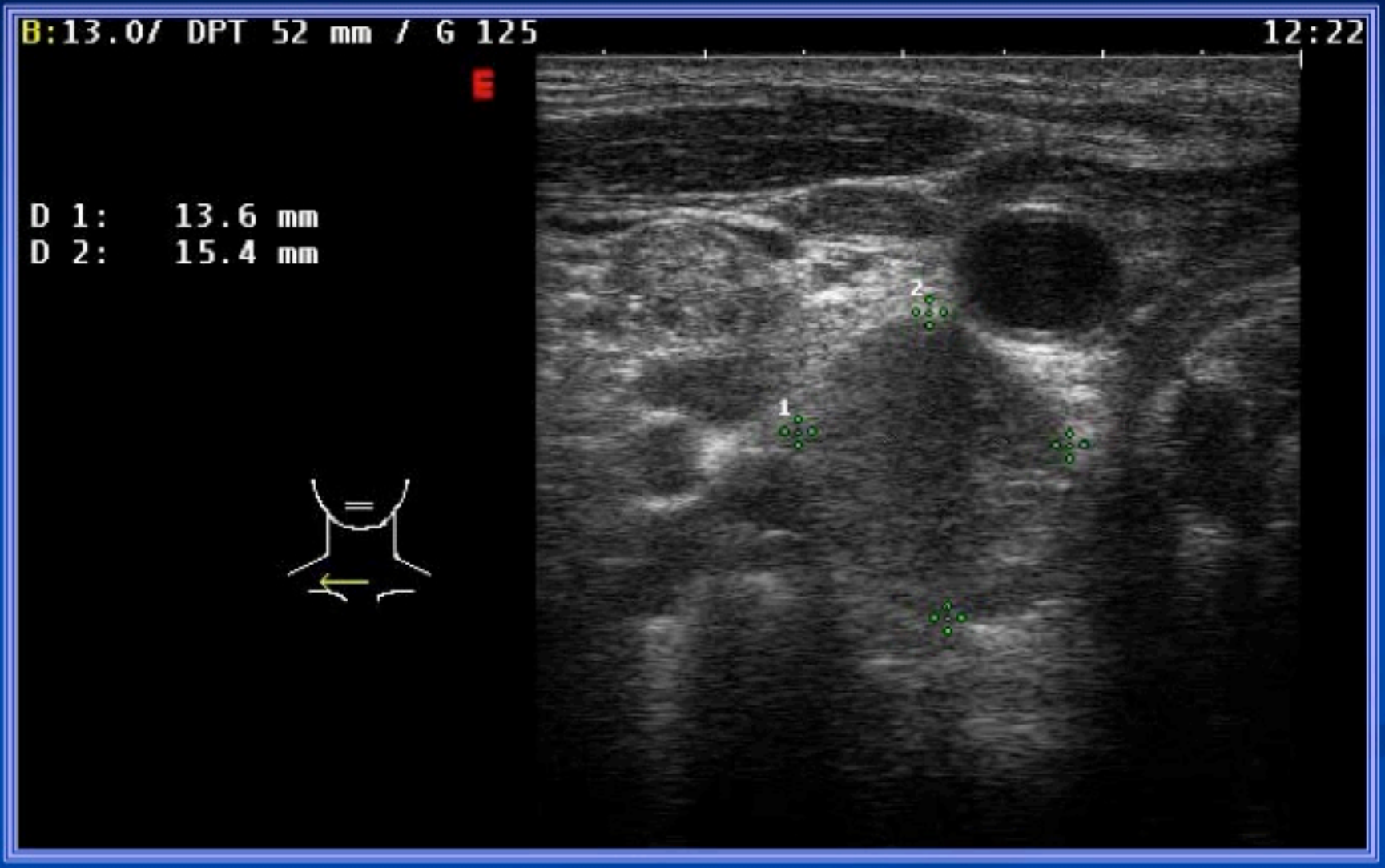


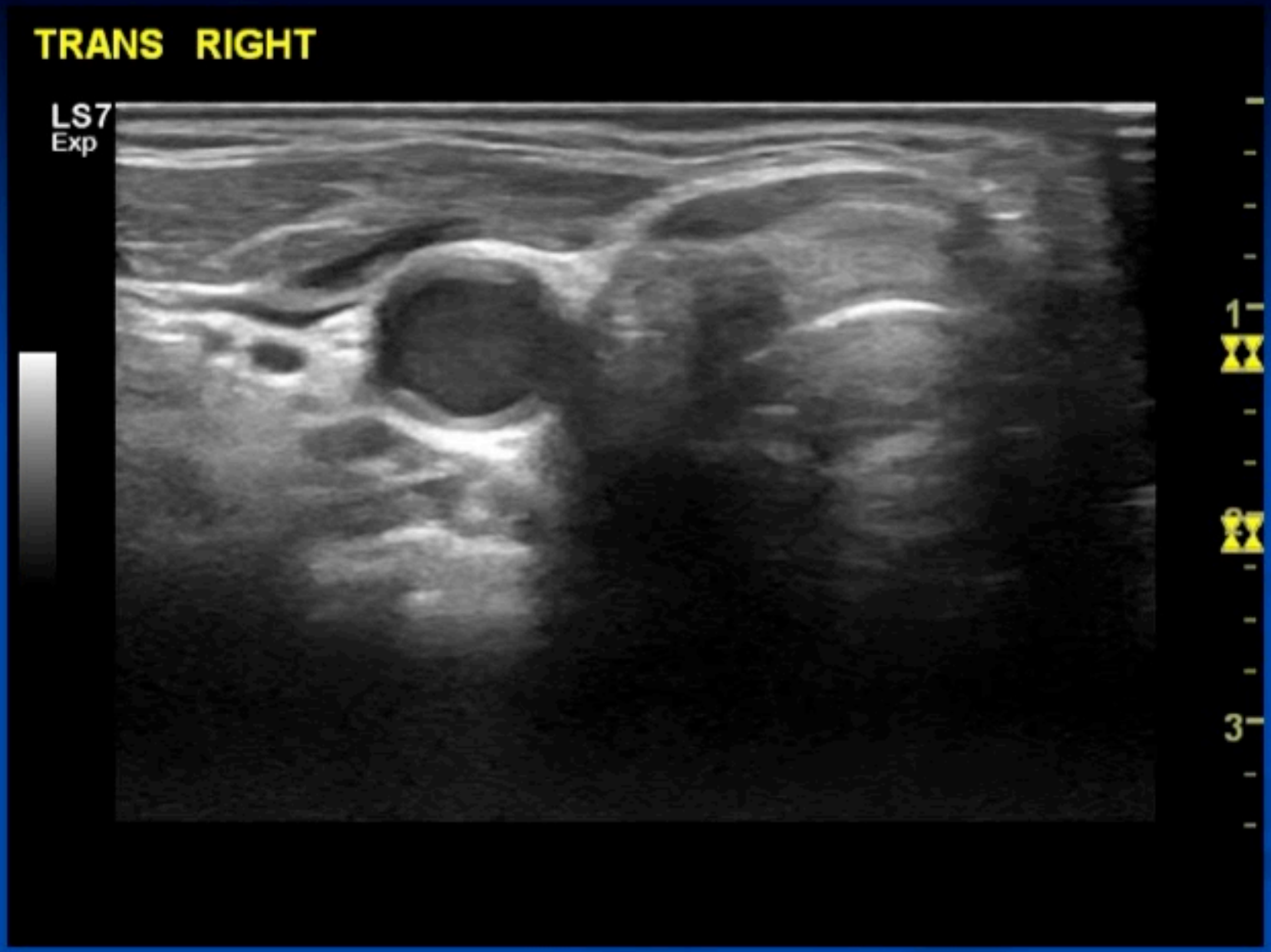


Malignant Node – Round Shape



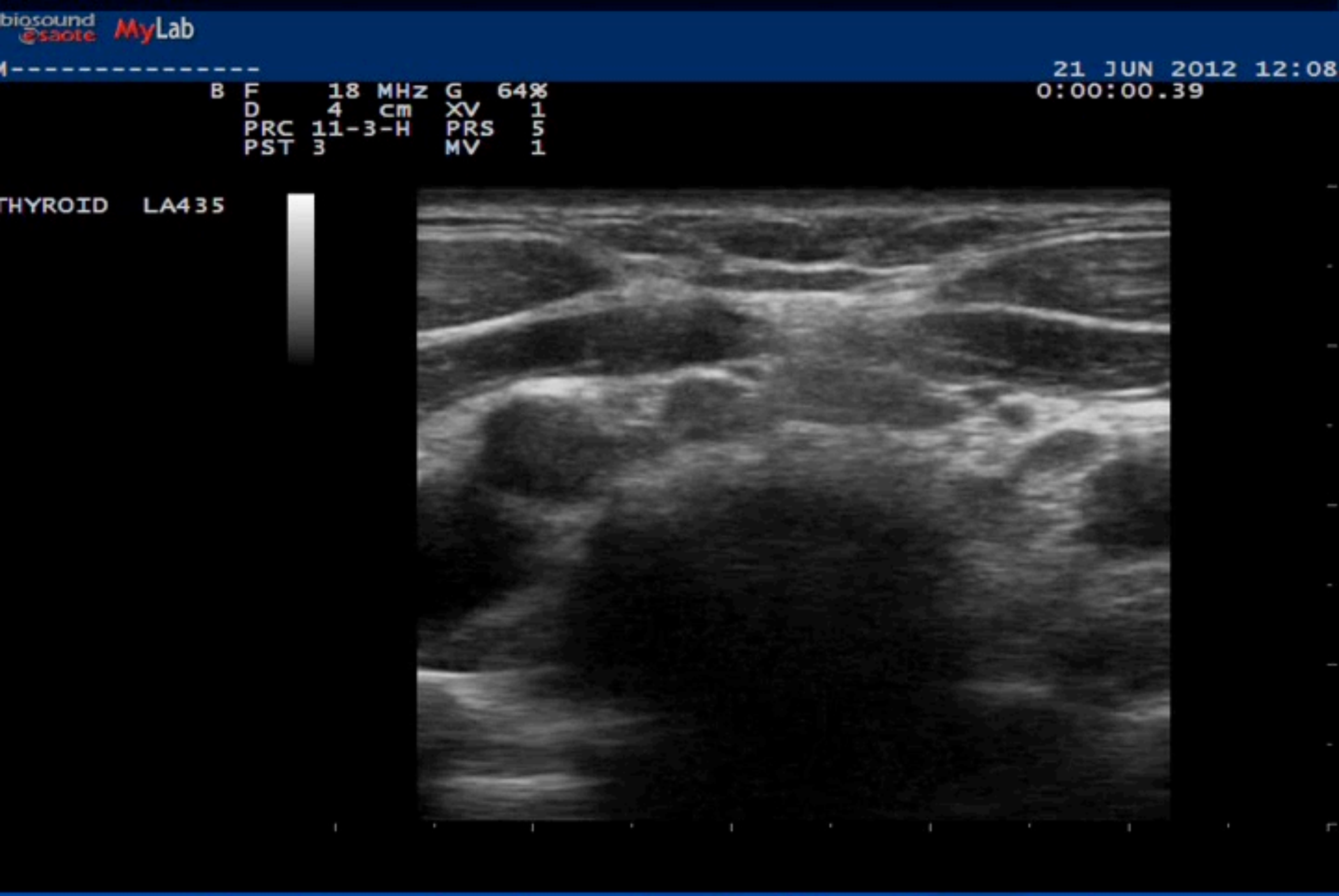
Malignant Nodes – Round Shape





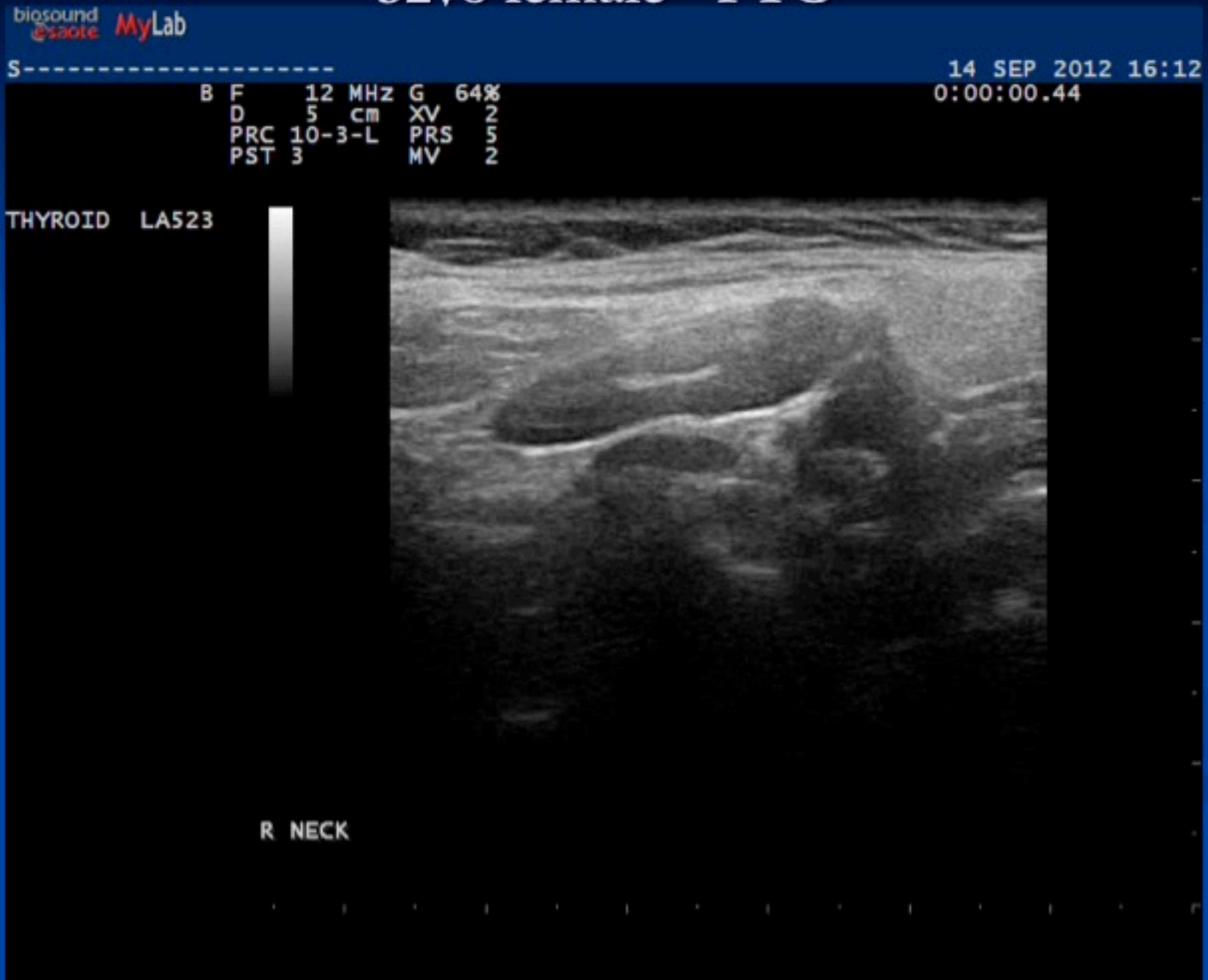
Right Level III/IV node

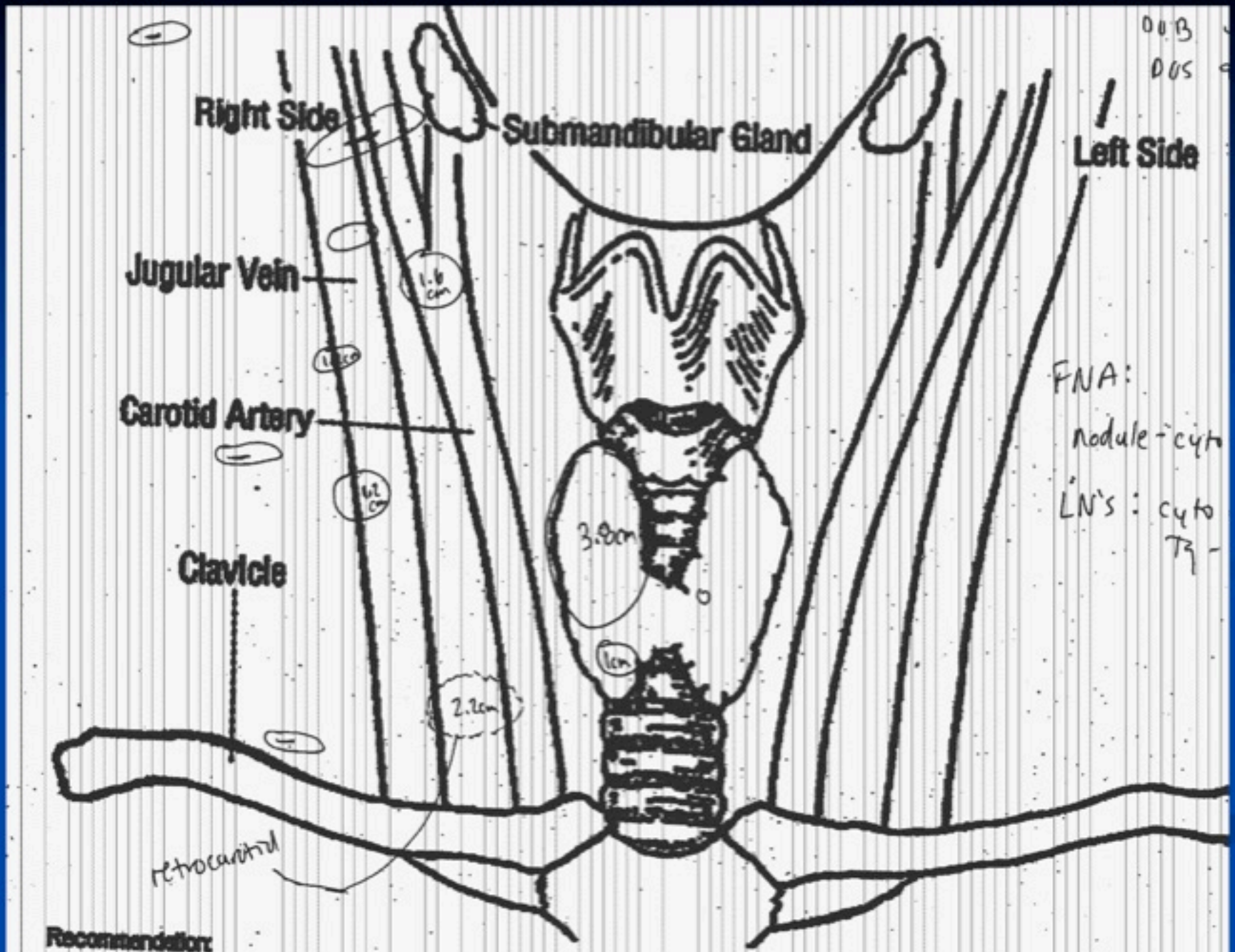
Level VI node – inferior to lobe



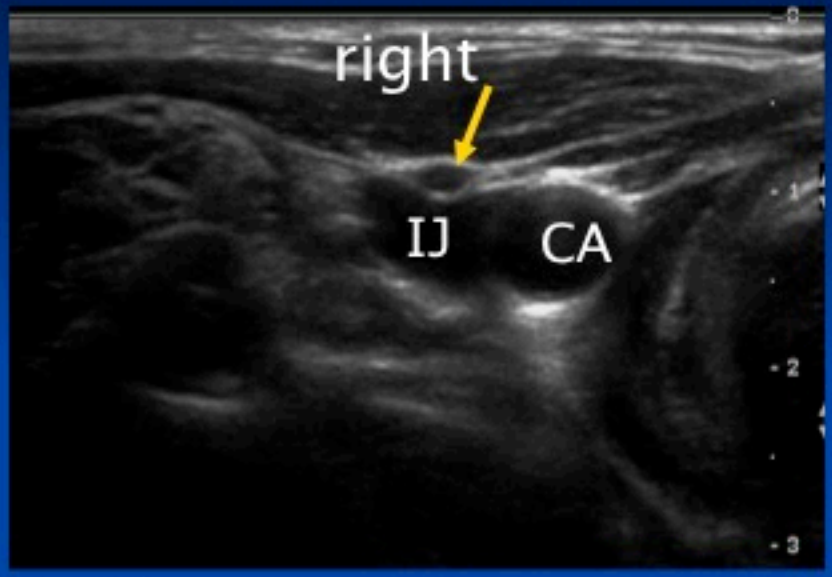
Paratracheal nodes in Hashimoto's

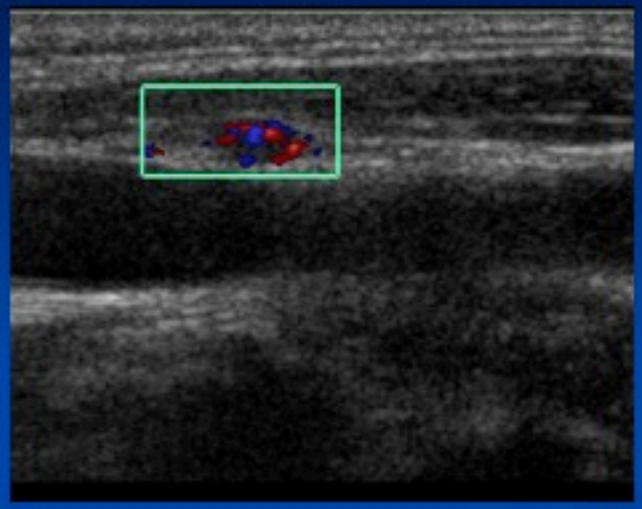
32yo female - PTC

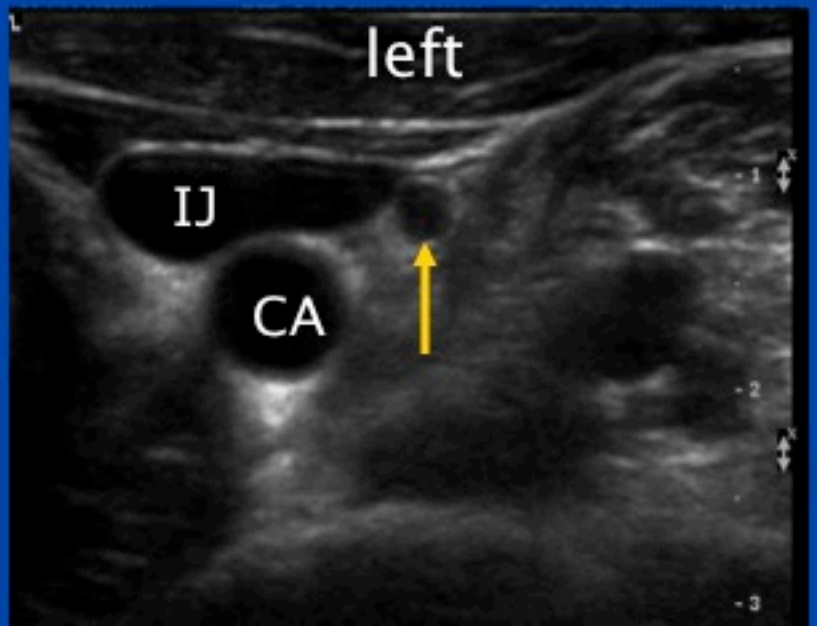


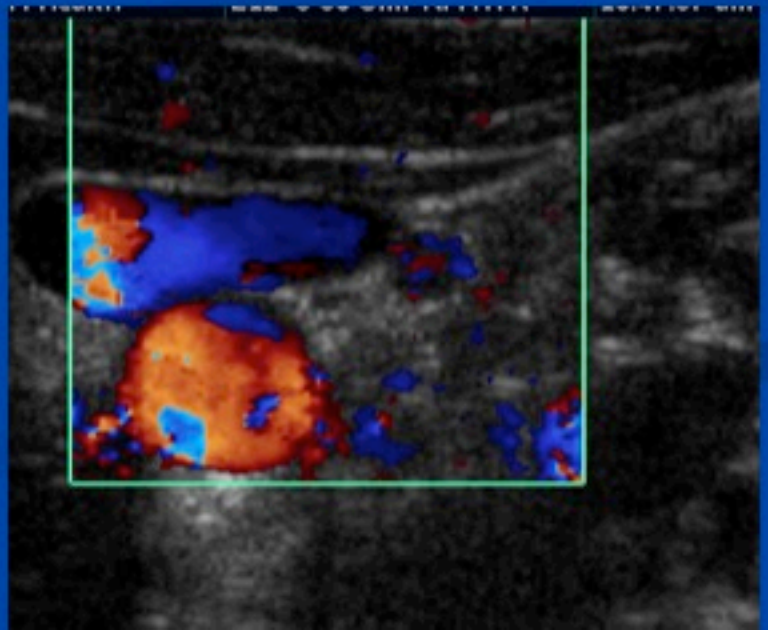

Right Side
Submandibular Gland
Left Side
Jugular Vein
Carotid Artery
Clavicle
3.8cm
2.2cm
1cm
retrocarotid
FNA:
nodule - cyto
LN's : cyto
Recommendation:

The challenge of minimal residual/recurrent disease









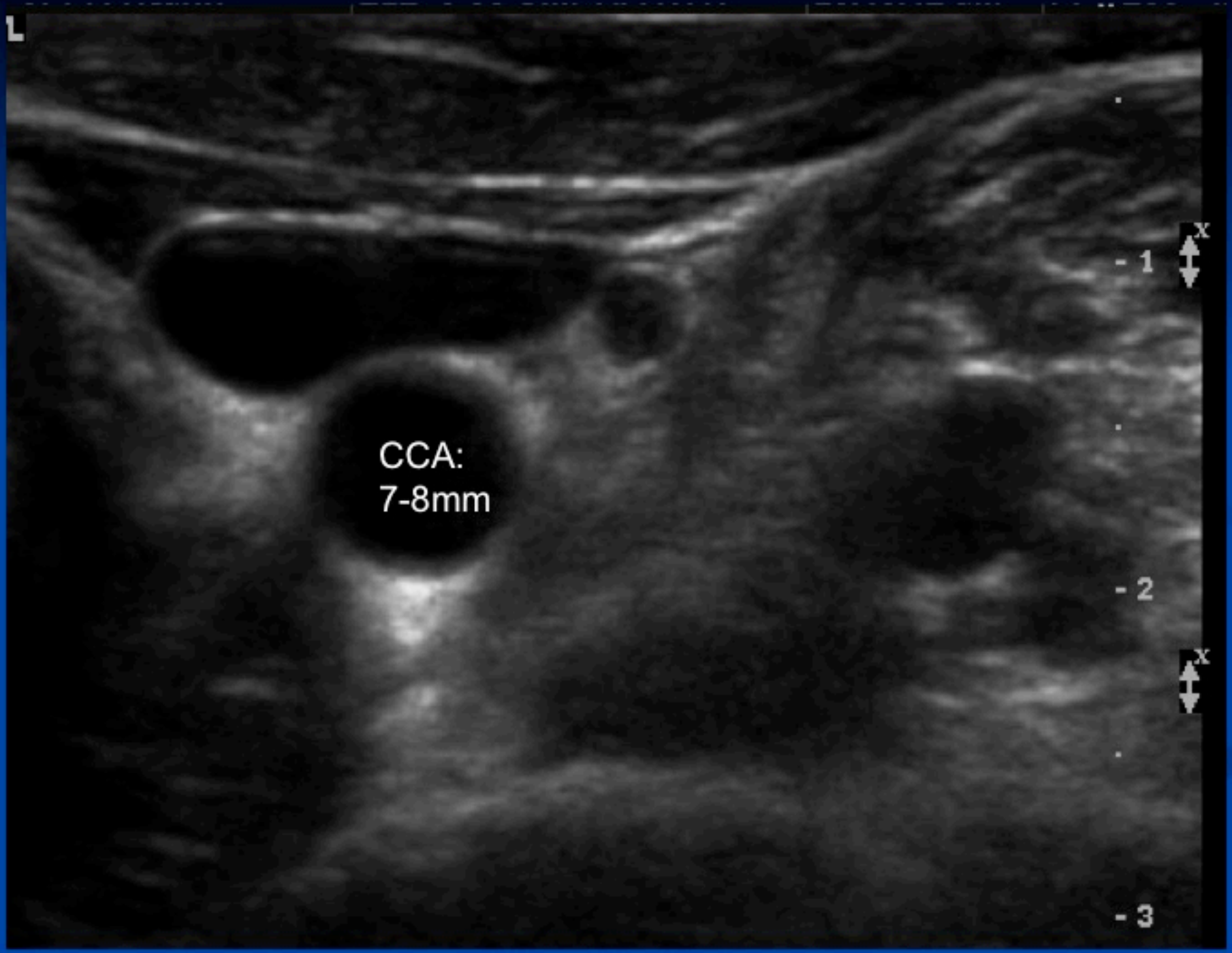
What do we do when US detects an abnormal LN?

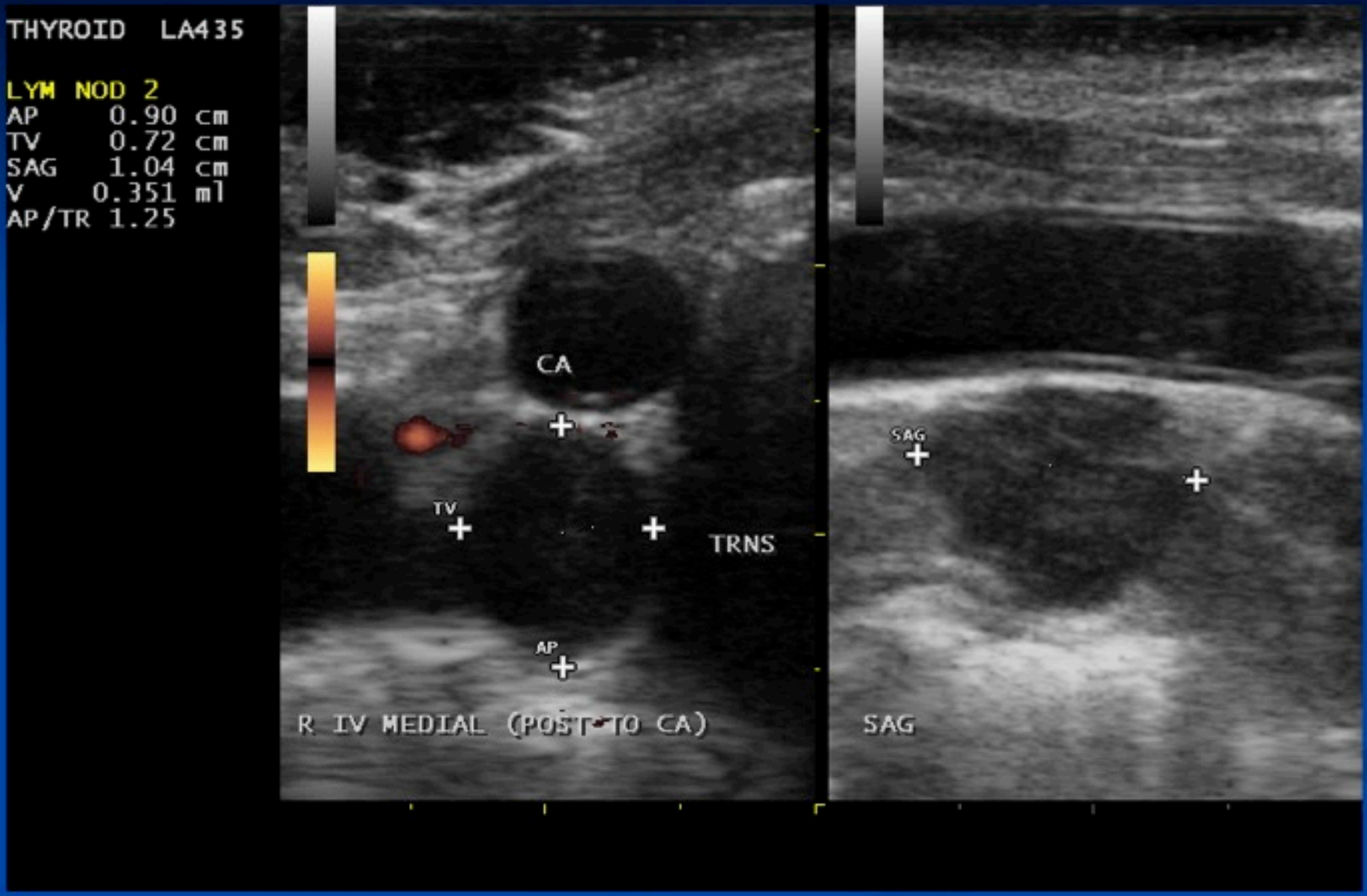
R32-

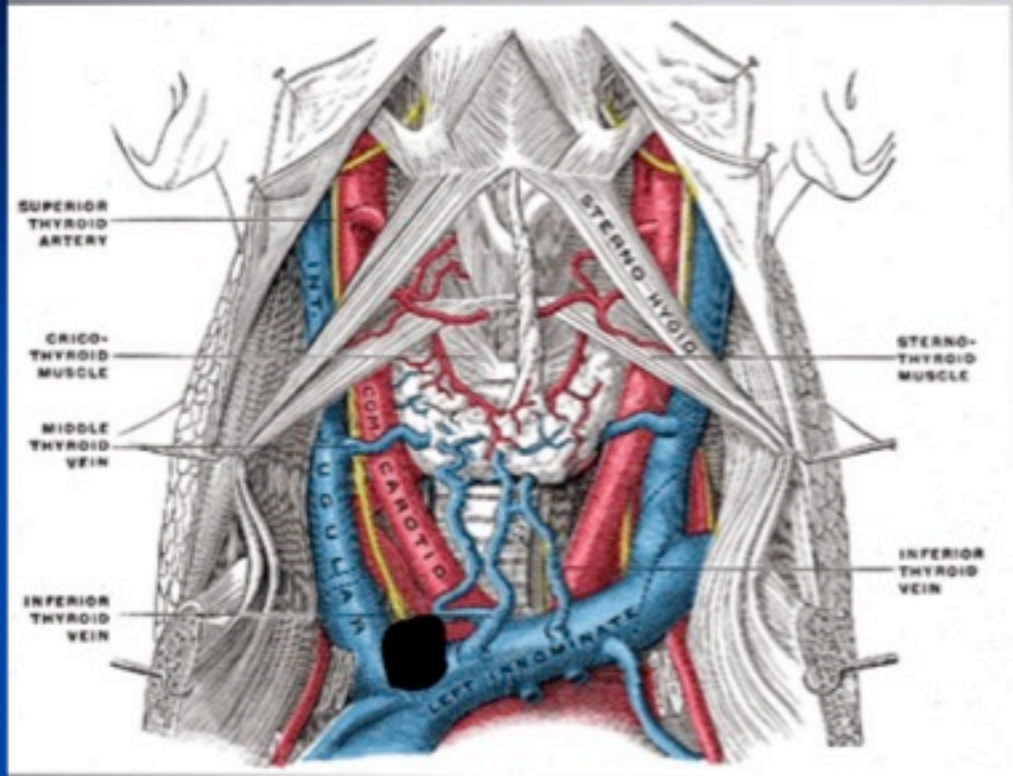
(B) US-guided FNA of sonographically suspicious lymph nodes ≥ 8-10 mm in the smallest diameter should be performed to confirm malignancy if this would change management.

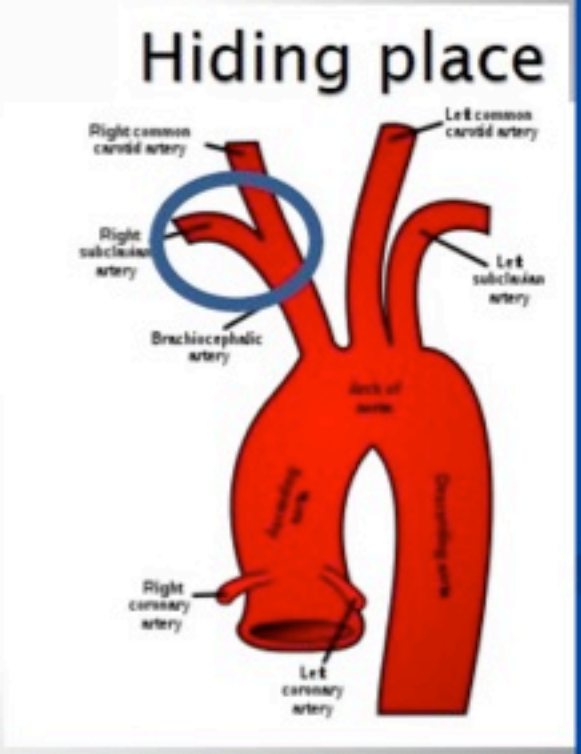
(Strong recommendation, Moderate-quality evidence.)

ATA 2015 Guidelines

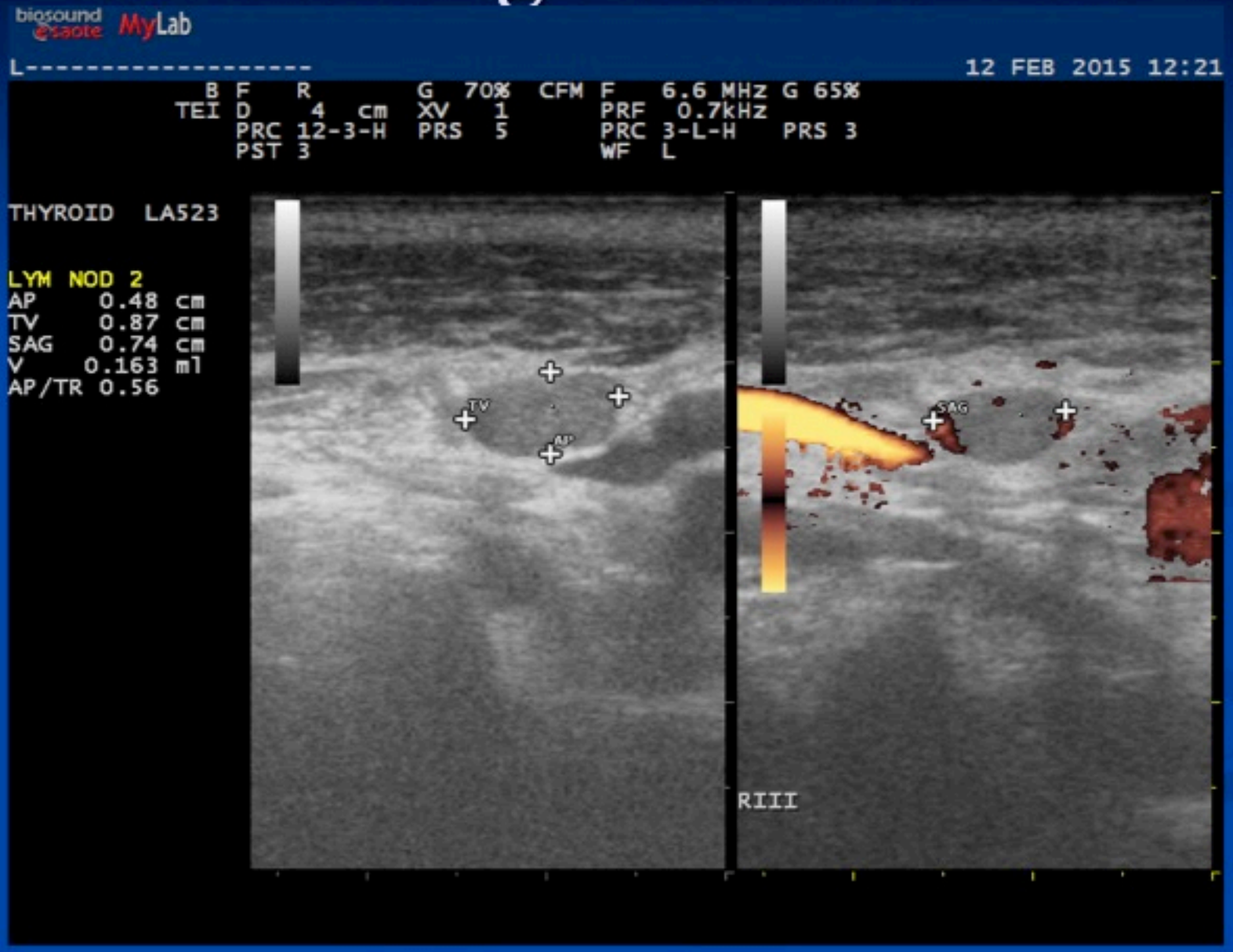

L
CCA:
7-8mm
- 1
- 2
- 3

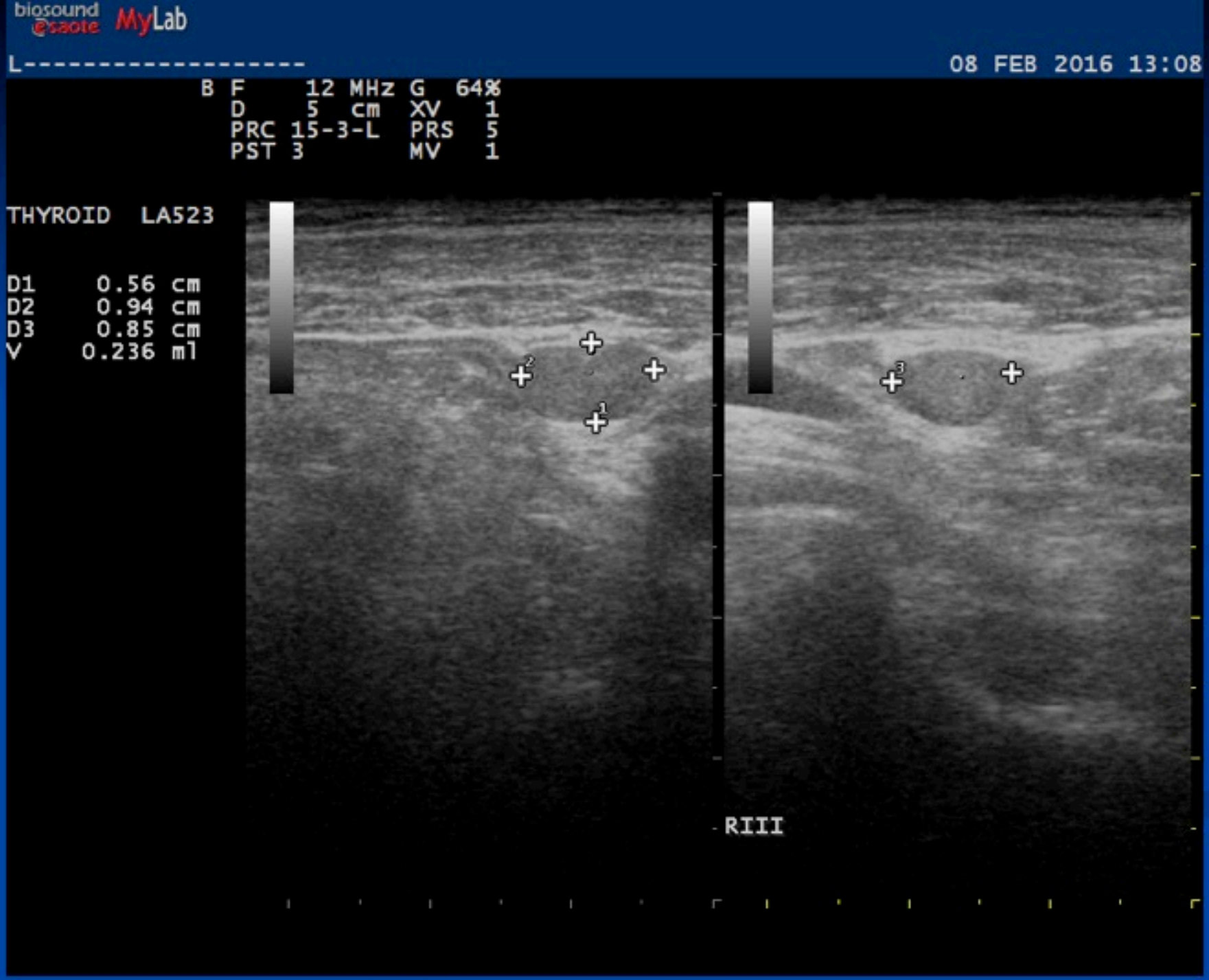

THYROID LA435
LYM NOD 2
AP 0.90 cm
TV 0.72 cm
SAG 1.04 cm
V 0.351 ml
AP/TR 1.25
CA
TV
TRNS
AP
R IV MEDIAL (POST TO CA)
SAG
SAG

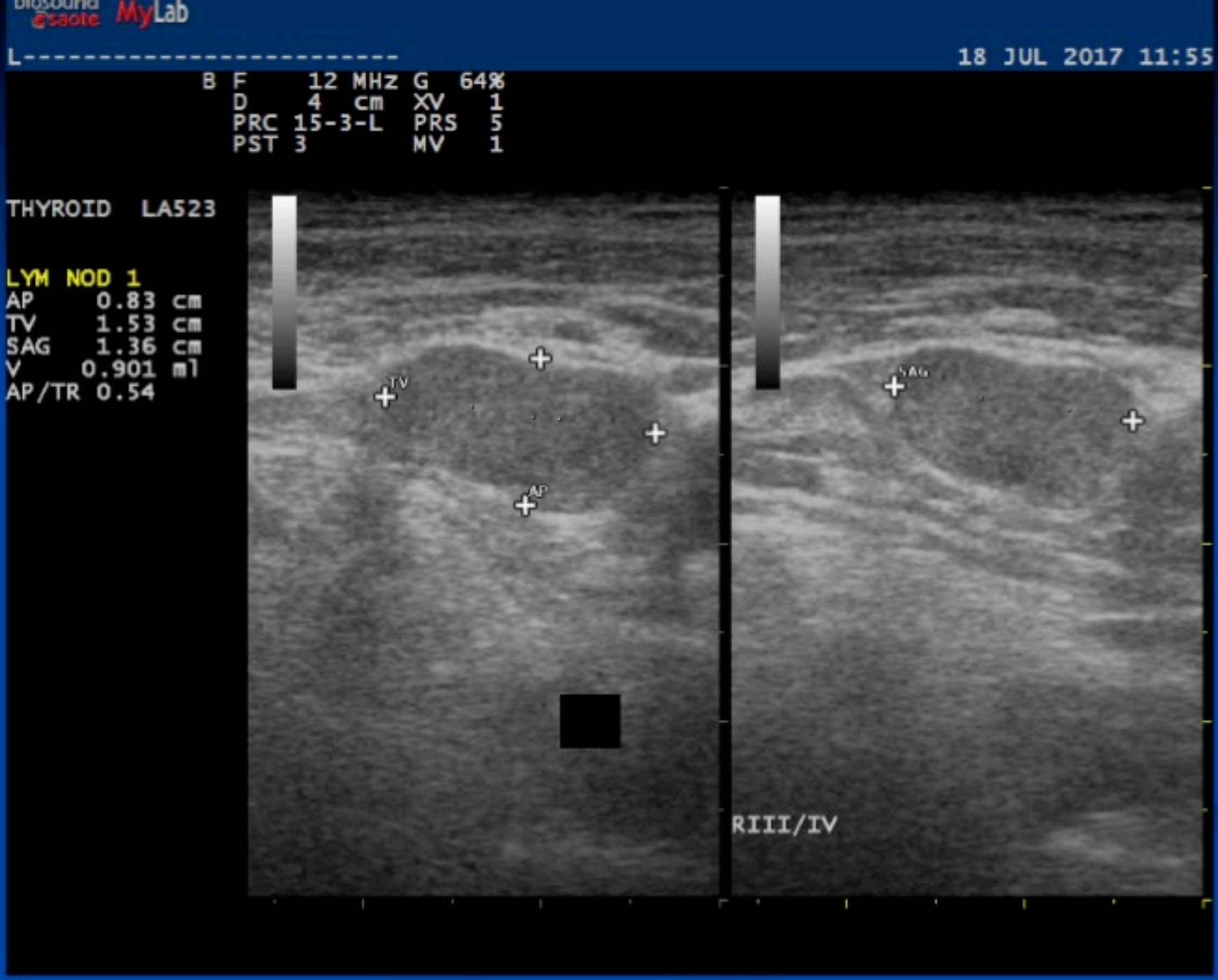

SUPERIOR THYROID ARTERY
CRICO-THYROID MUSCLE
MIDDLE THYROID VEIN
INFERIOR THYROID VEIN
STERNO-THYROID MUSCLE
INFERIOR THYROID VEIN
STERNO-HYOID
INT.
COM.
CAROTID
JUGULAR
LEFT BRACHIOCEPHALIC

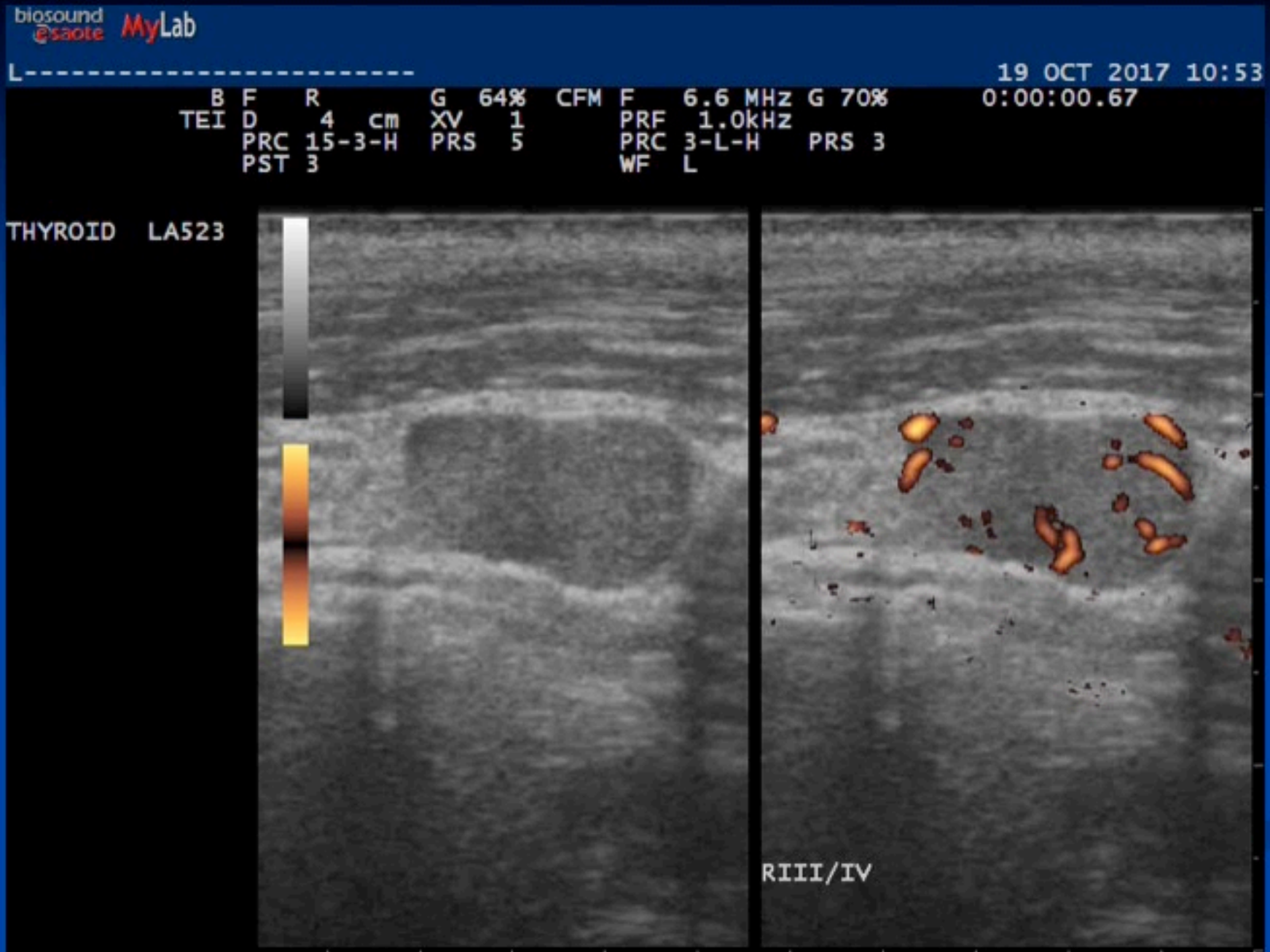

Hiding place
Right common carotid artery
Left common carotid artery
Right subclavian artery
Left subclavian artery
Brachiocephalic artery
Right coronary artery
Left coronary artery

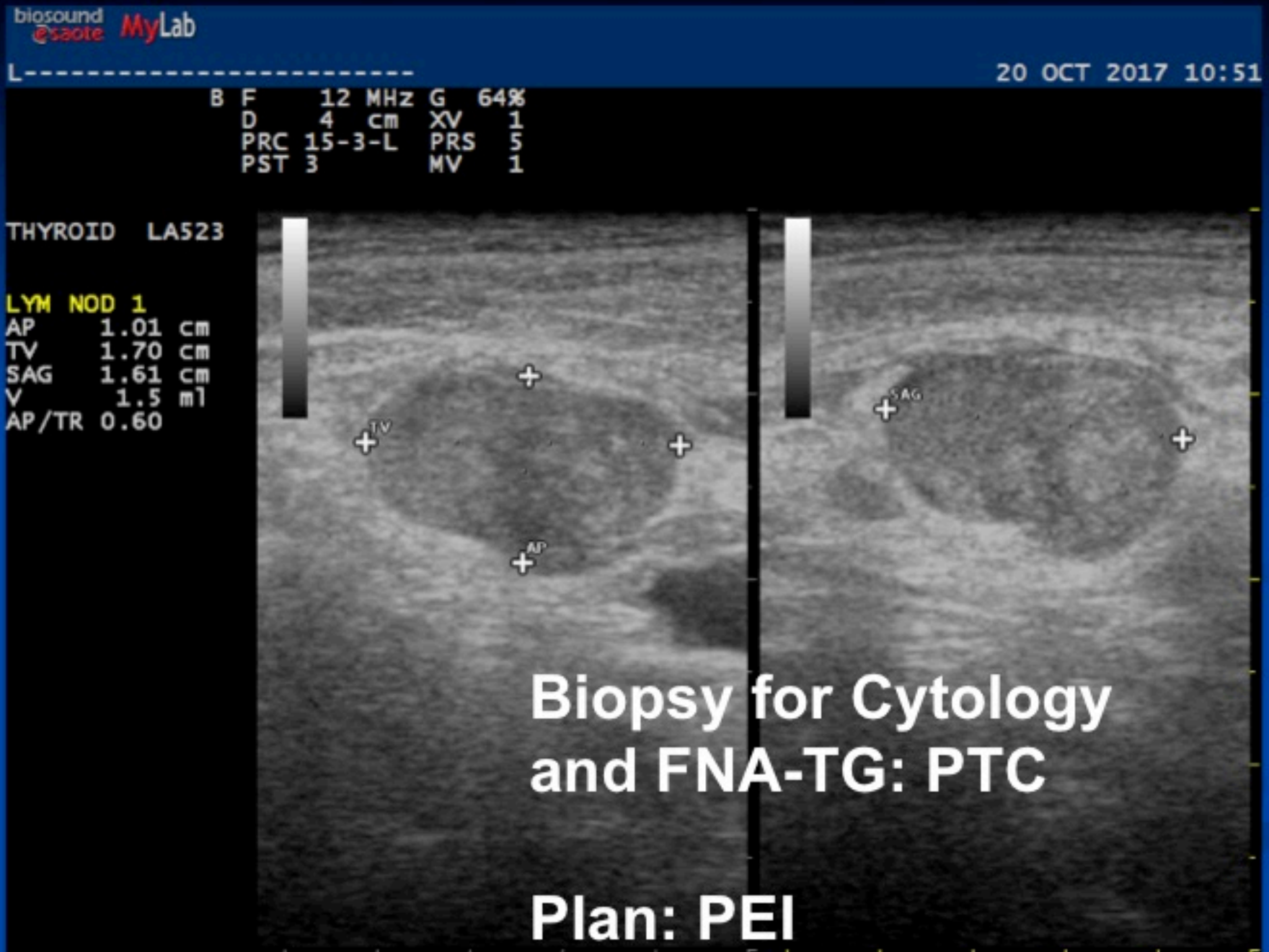
Monitoring LNs over time




biosound esaote MyLab
L----------
08 FEB 2016 13:08
B F 12 MHz G 64%
D 5 cm XV 1
PRC 15-3-L PRS 5
PST 3 MV 1
THYROID LA523
D1 0.56 cm
D2 0.94 cm
D3 0.85 cm
V 0.236 ml
RIII

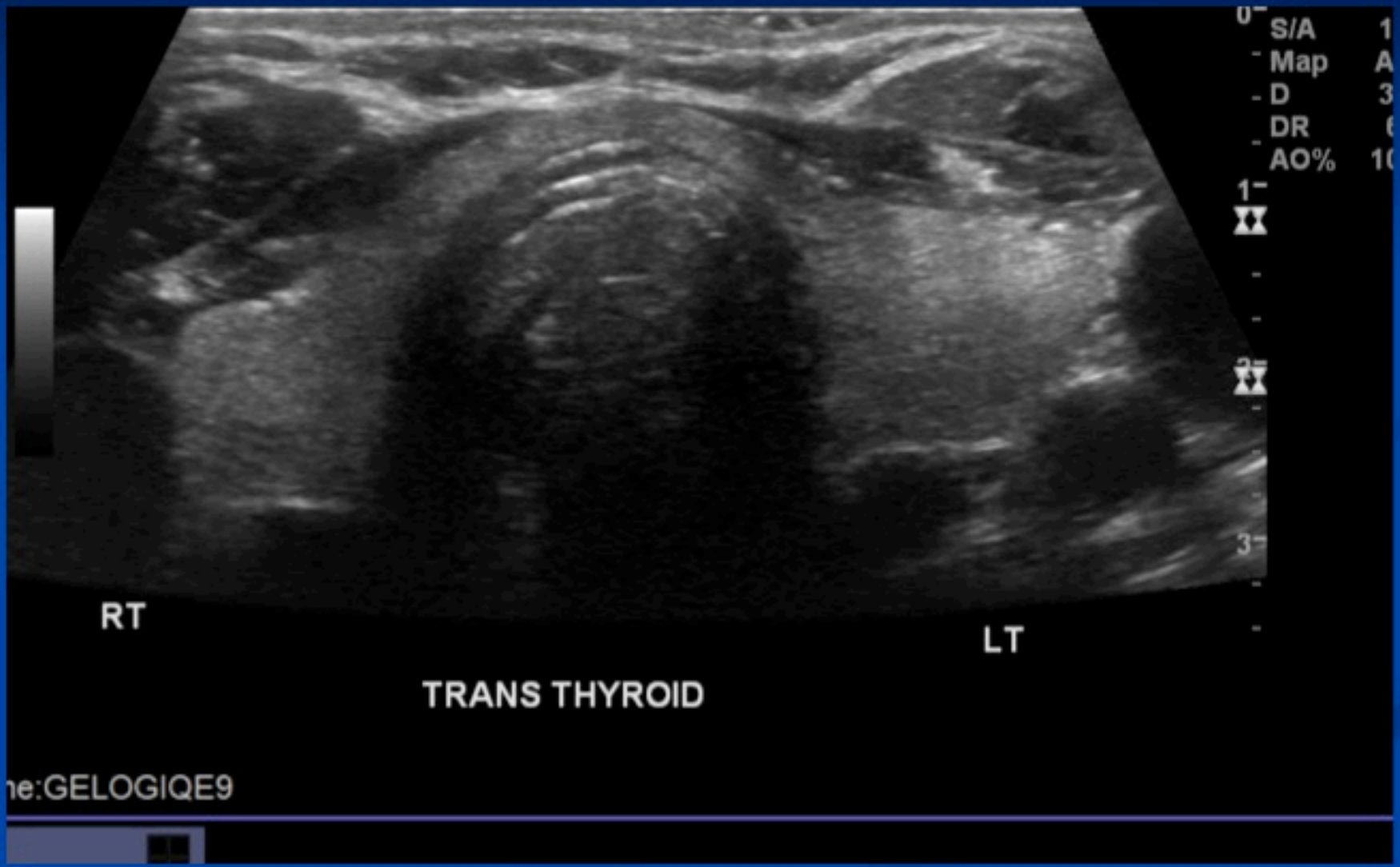

MyLab
L----------
18 JUL 2017 11:55
B F 12 MHz G 64%
D 4 cm XV 1
PRC 15-3-L PRS 5
PST 3 MV 1
THYROID LA523
LYM NOD 1
AP 0.83 cm
TV 1.53 cm
SAG 1.36 cm
V 0.901 ml
AP/TR 0.54
TV
AP
SAG
RIII/IV


biosound esaote MyLab
L----------
19 OCT 2017 10:53
B F R G 64% CFM F 6.6 MHz G 70% 0:00:00.67
TEI D 4 cm XV 1 PRF 1.0kHz
PRC 15-3-H PRS 5 PRC 3-L-H PRS 3
PST 3 WF L
THYROID LA523
RIII/IV

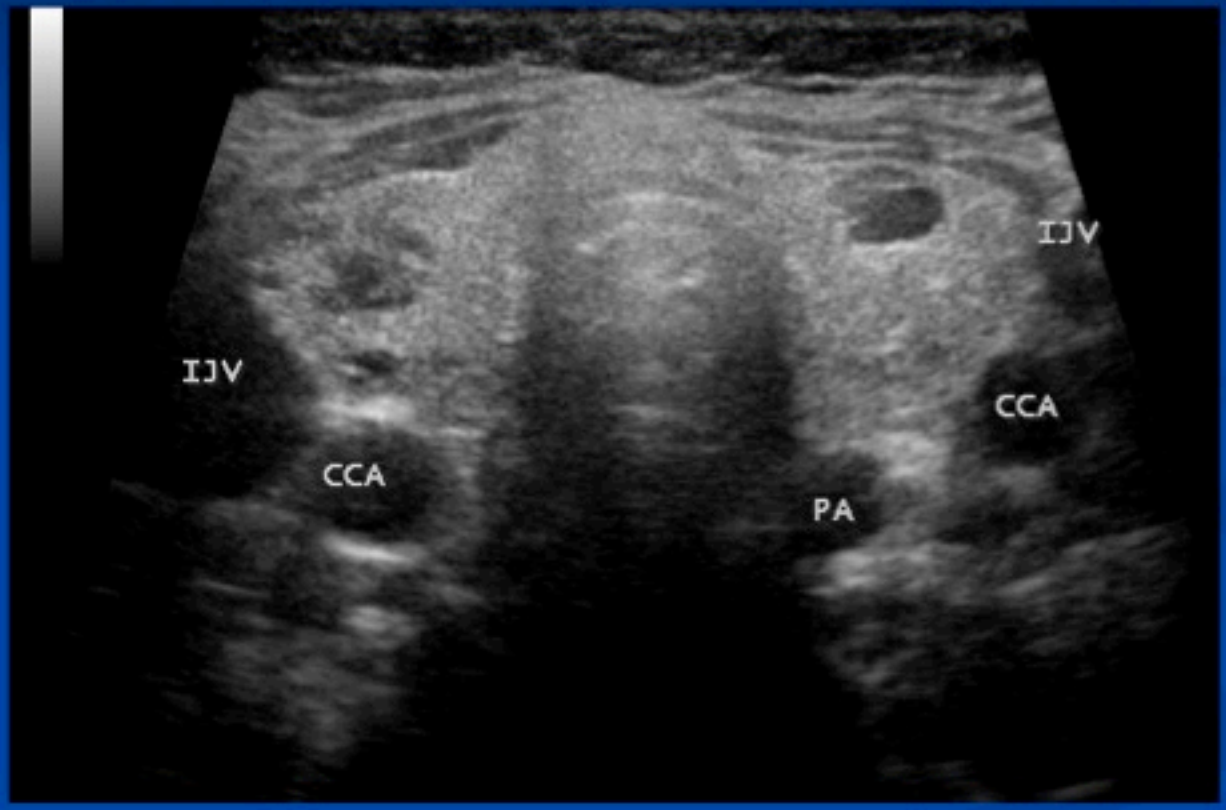

biosound esaote MyLab
20 OCT 2017 10:51
B F 12 MHz G 64%
D 4 cm XV 1
PRC 15-3-L PRS 5
PST 3 MV 1
THYROID LA523
LYM NOD 1
AP 1.01 cm
TV 1.70 cm
SAG 1.61 cm
V 1.5 ml
AP/TR 0.60
TV
AP
SAG
Biopsy for Cytology and FNA-TG: PTC
Plan: PEI

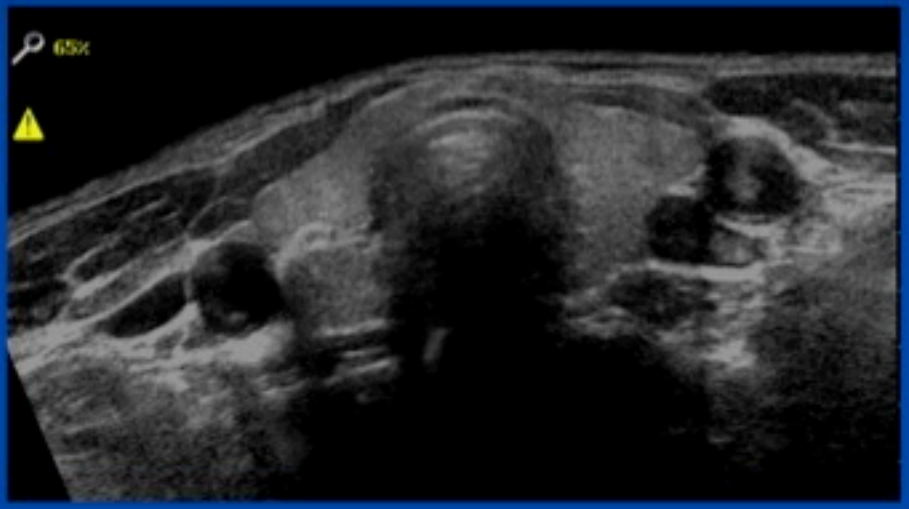
PARATHYROID ULTRASOUND

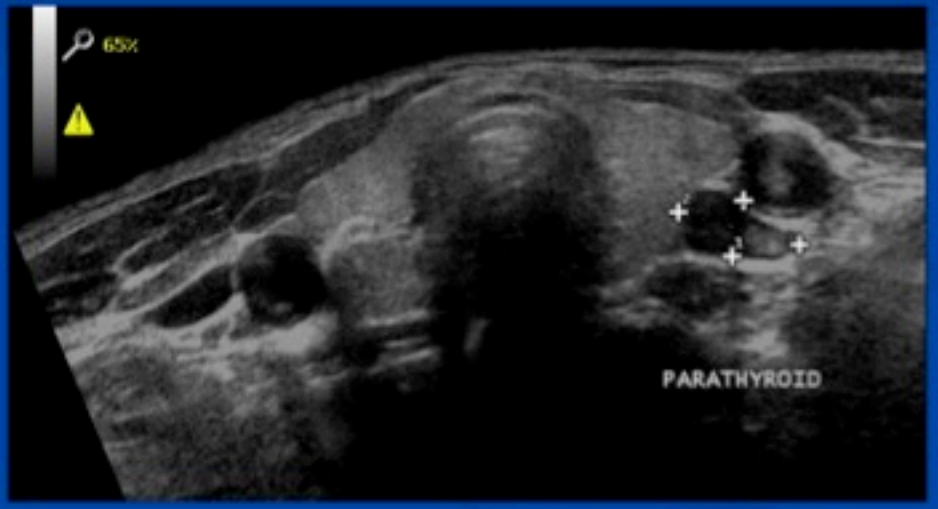
“No Parathyroid Adenoma”



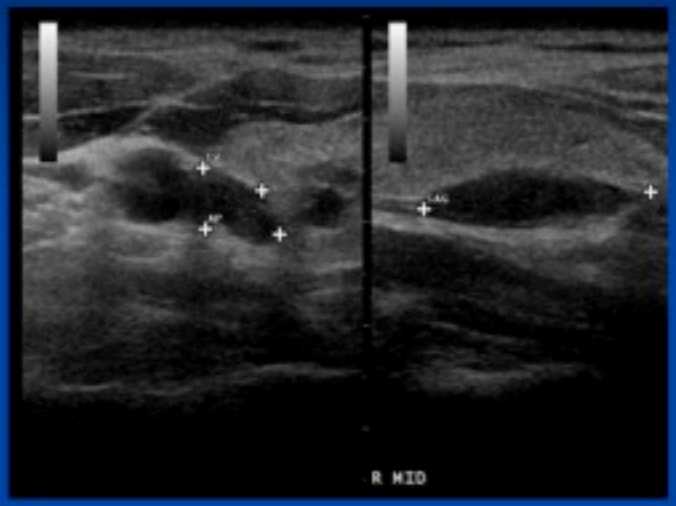
Transverse – both lobes



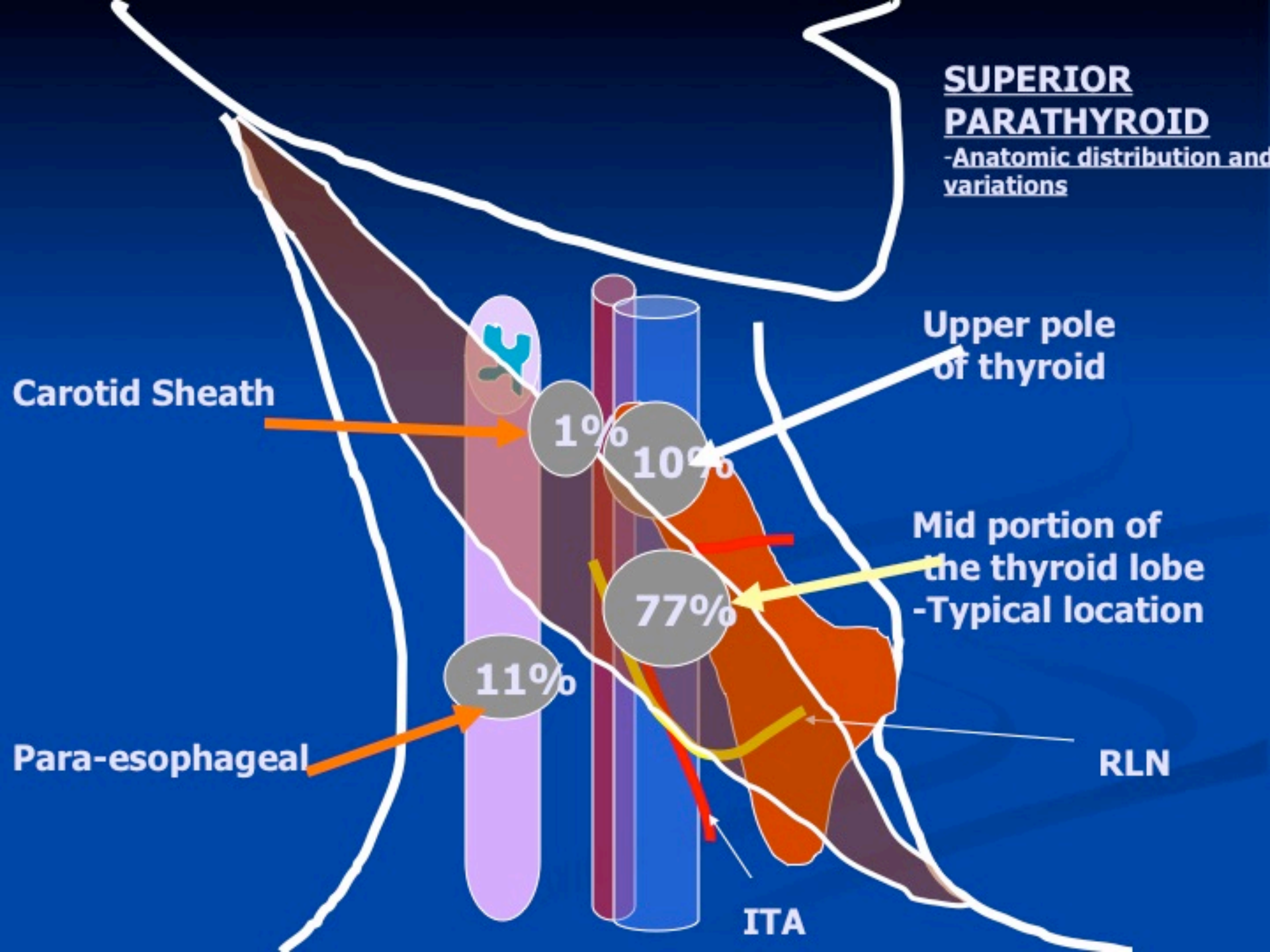

65%

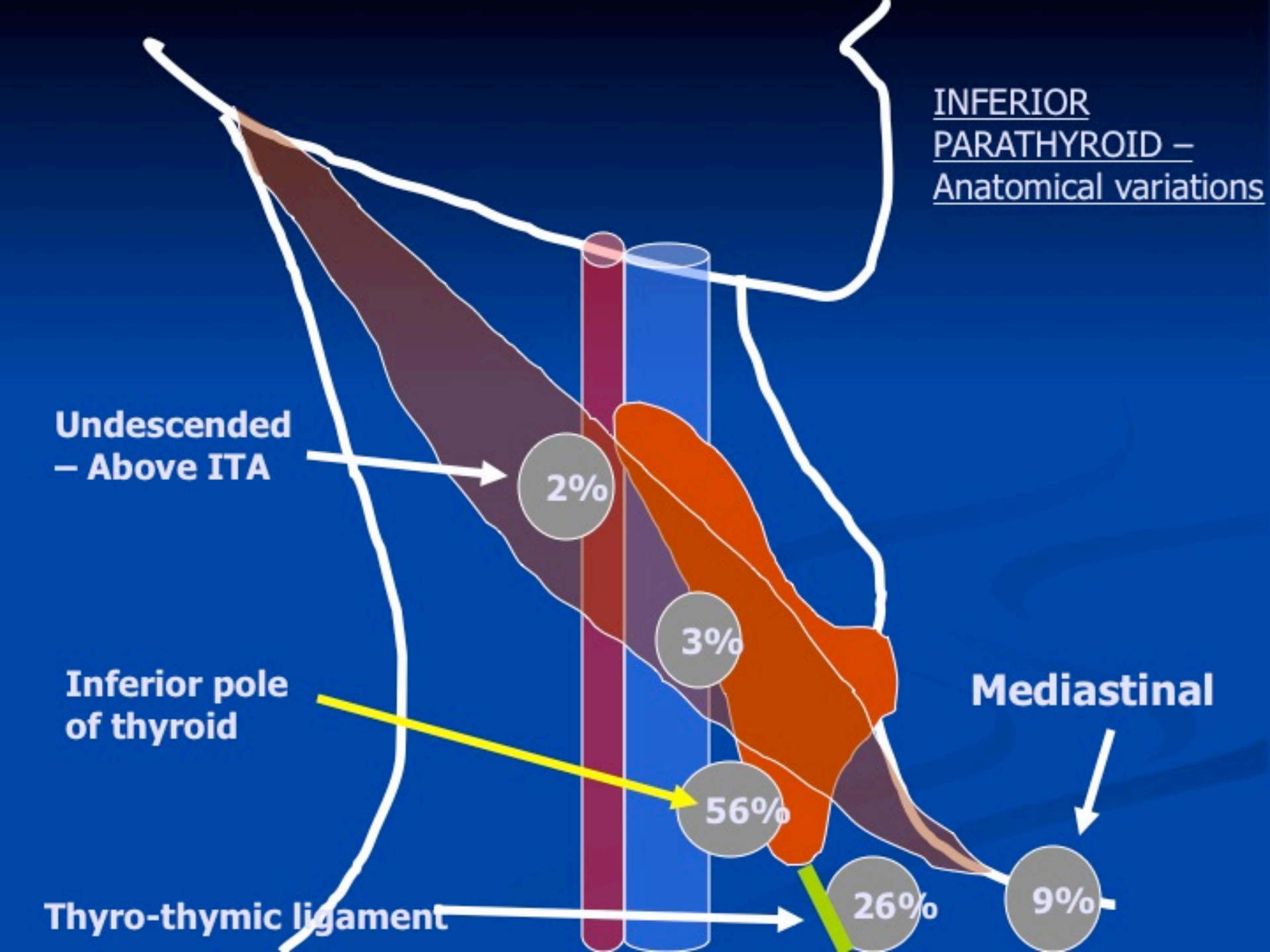

65%
PARATHYROID

Parathyroid

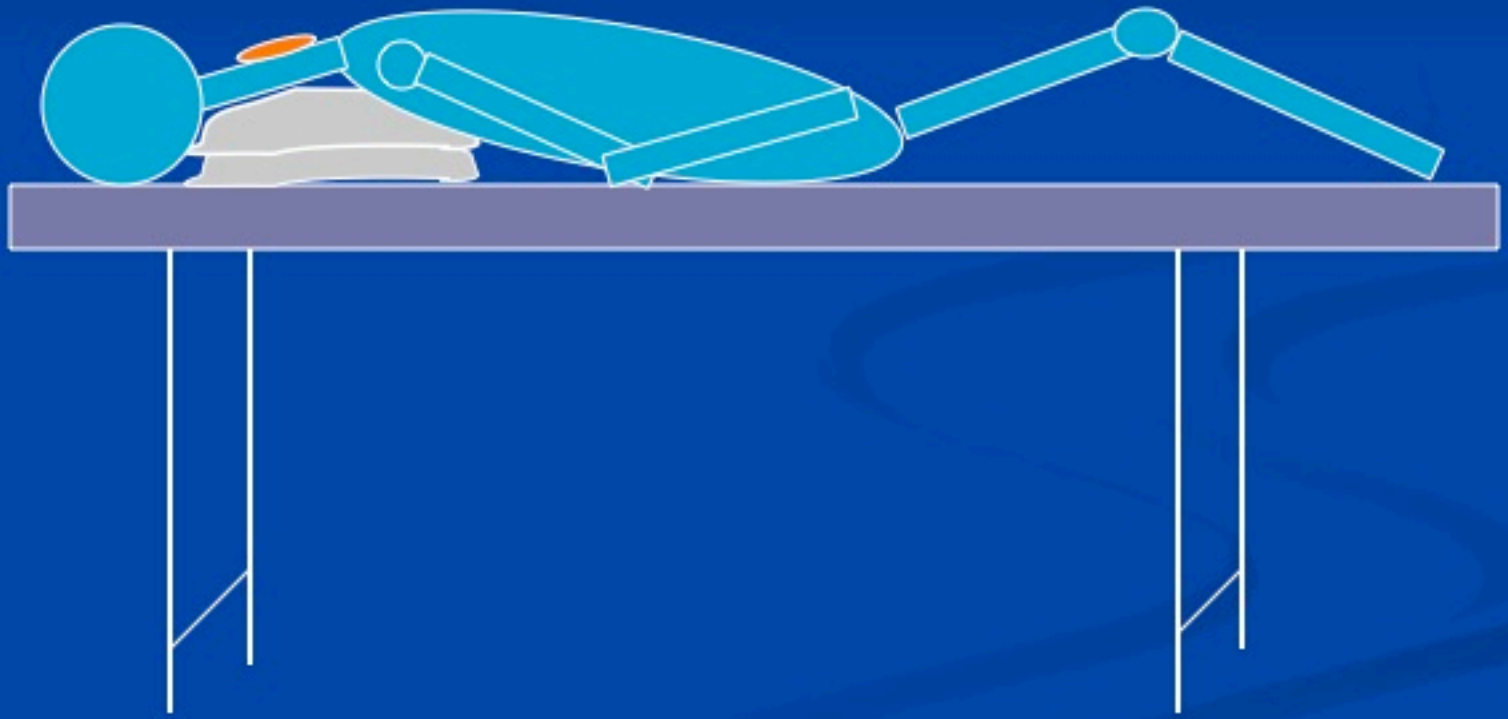


- Hypoechoic
- Polar feeding vessel
- Shape conforms to thyroid
- Often posterior-medial to CCA

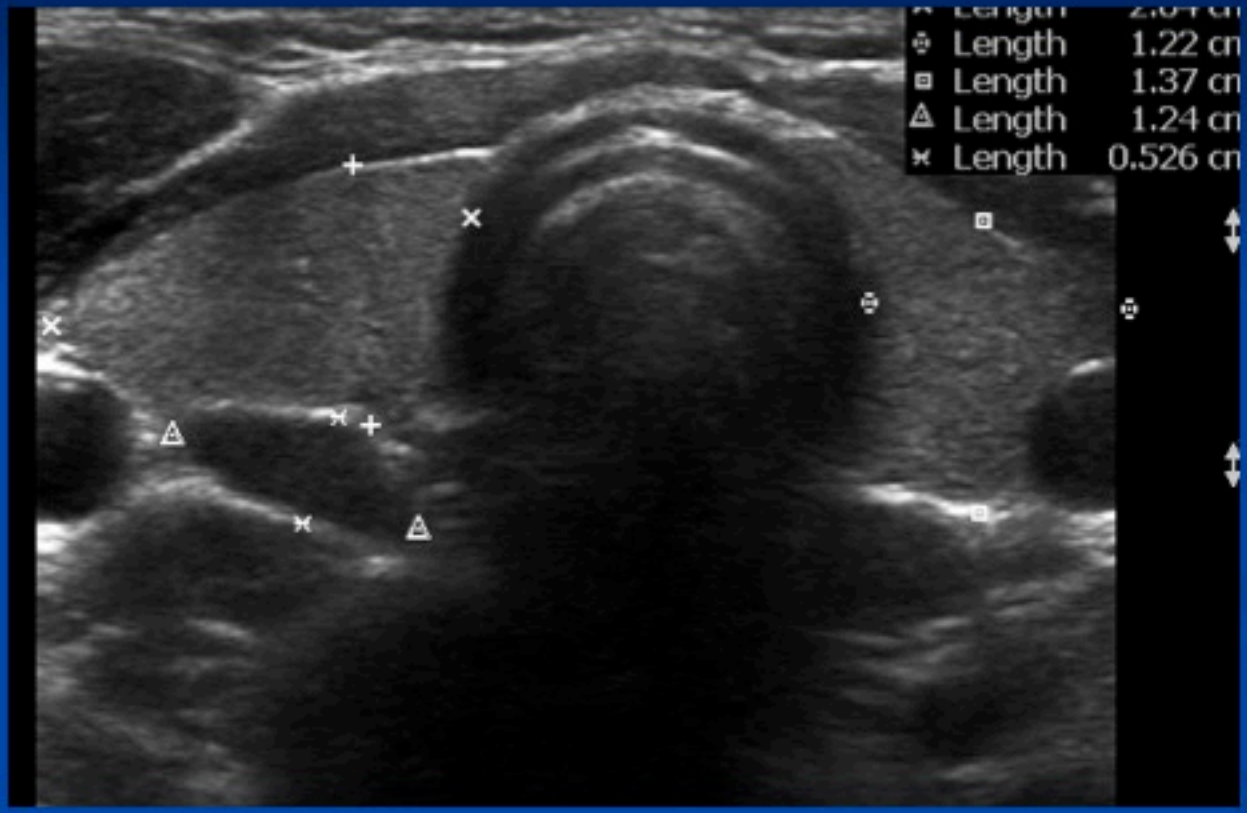

SUPERIOR PARATHYROID
-Anatomic distribution and variations
Upper pole of thyroid
Carotid Sheath
1%
10%
Mid portion of the thyroid lobe
-Typical location
77%
11%
Para-esophageal
RLN
ITA


INFERIOR PARATHYROID – Anatomical variations
Undescended – Above ITA
2%
3%
Inferior pole of thyroid
56%
Mediastinal
9%
26%
Thyro-thymic ligament

Proper patient positioning



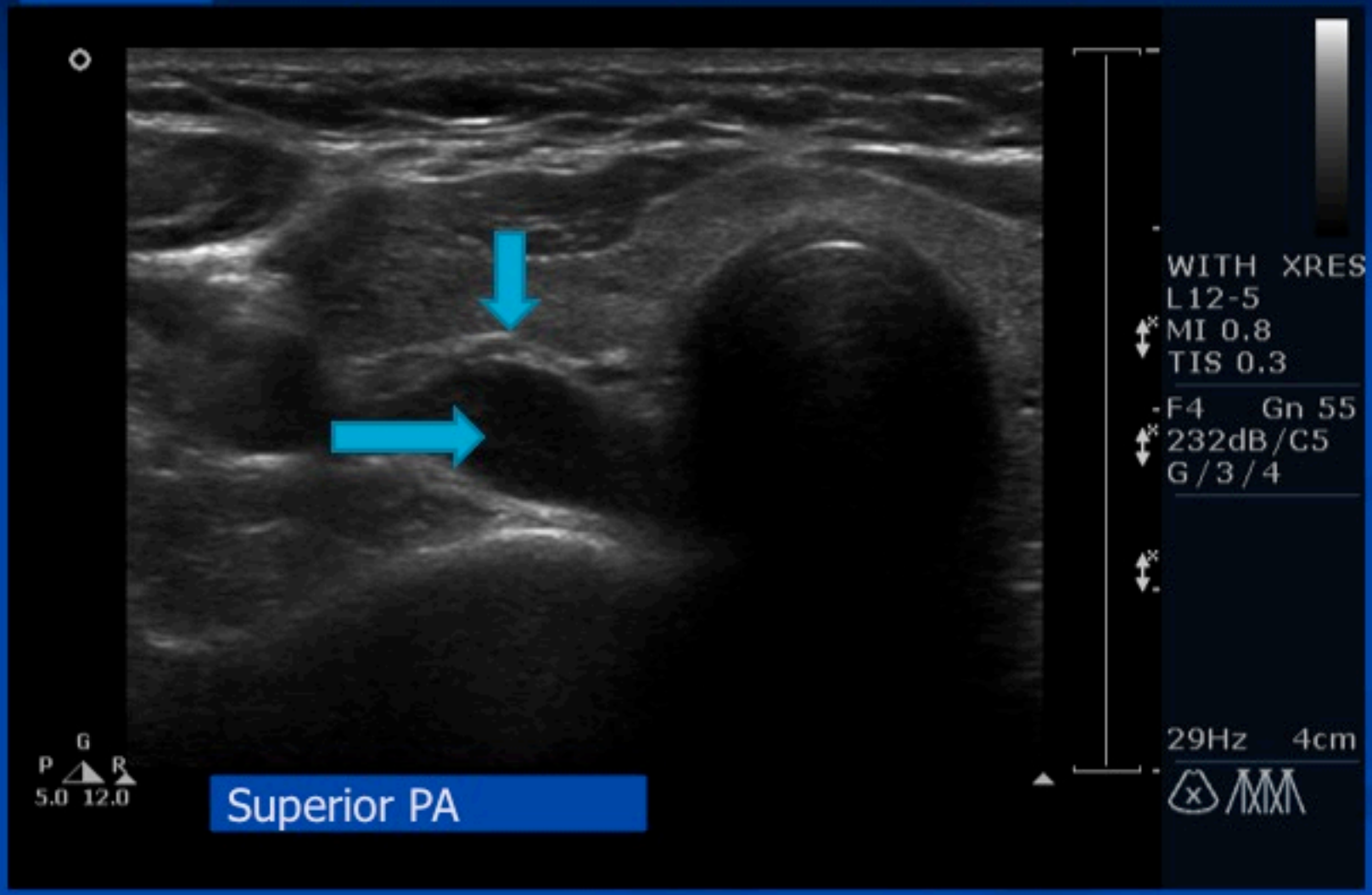
Adequate extension of the neck is essential with pillows placed under the shoulders


Length 1.22 cm
Length 1.37 cm
Length 1.24 cm
Length 0.526 cm

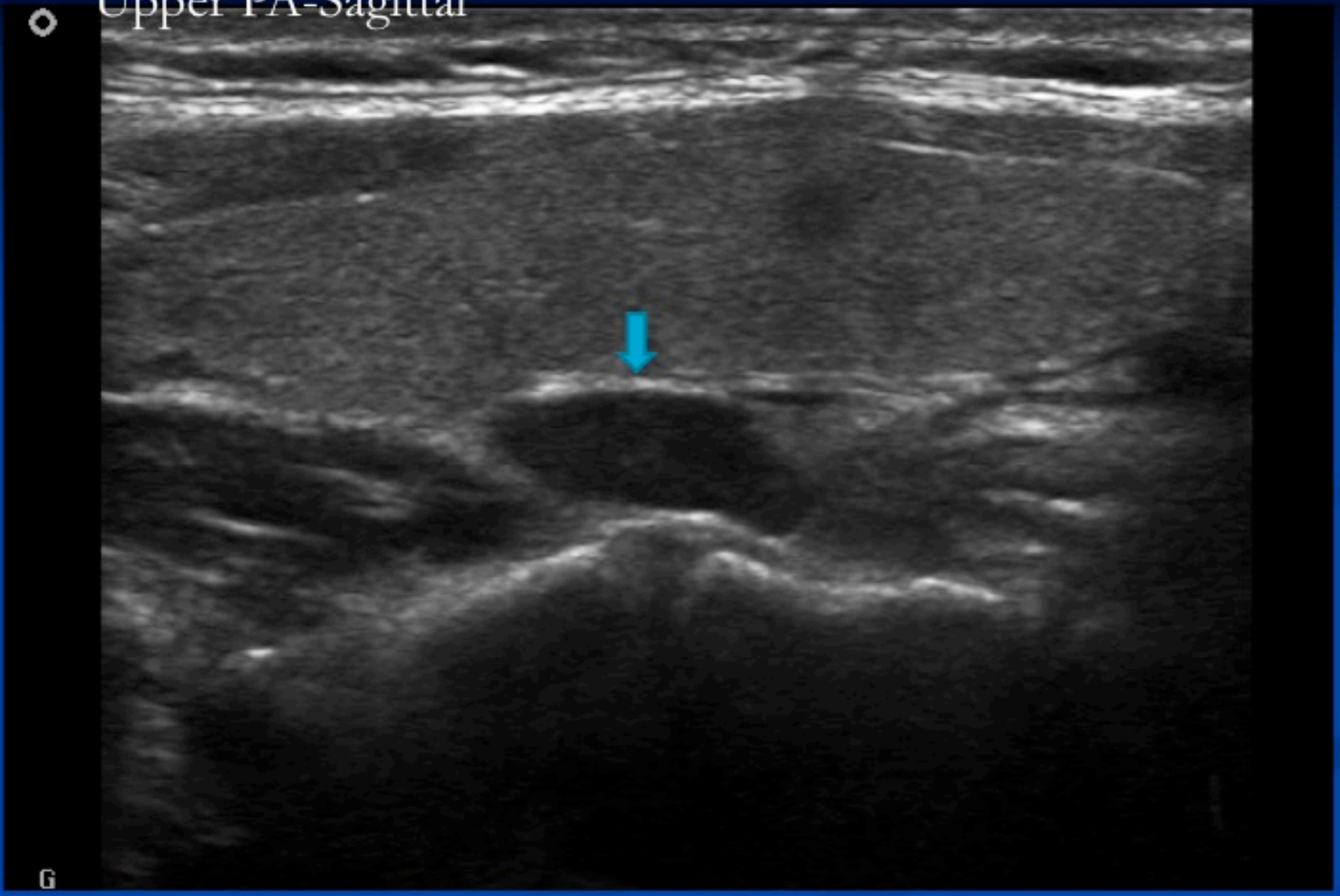
ECHOGENIC LINE

Cranio-caudal

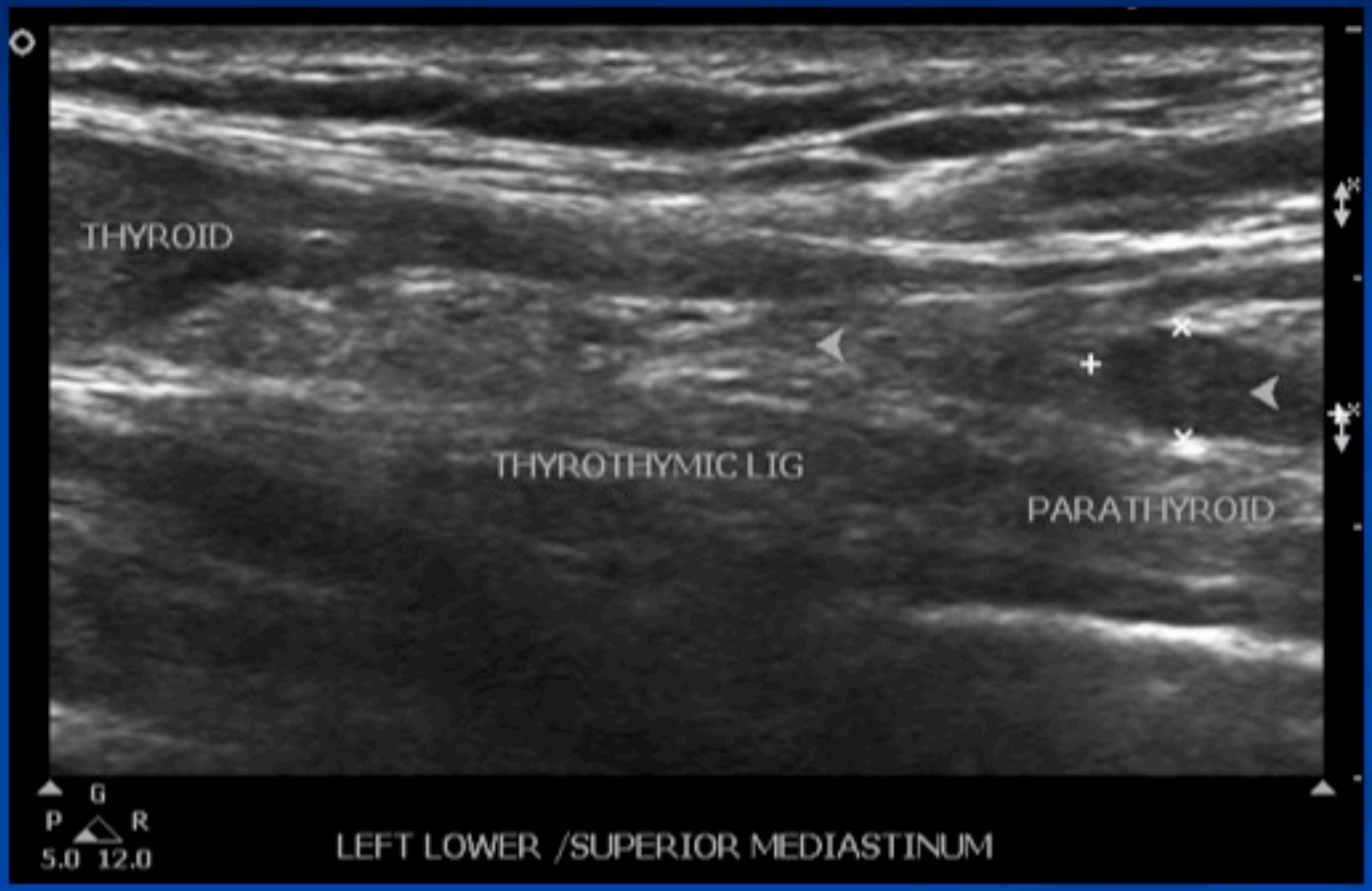
Extrathyroidal, hypoechoic – indentation and echogenic line of separation (capsule)



Upper PA-Sagittal

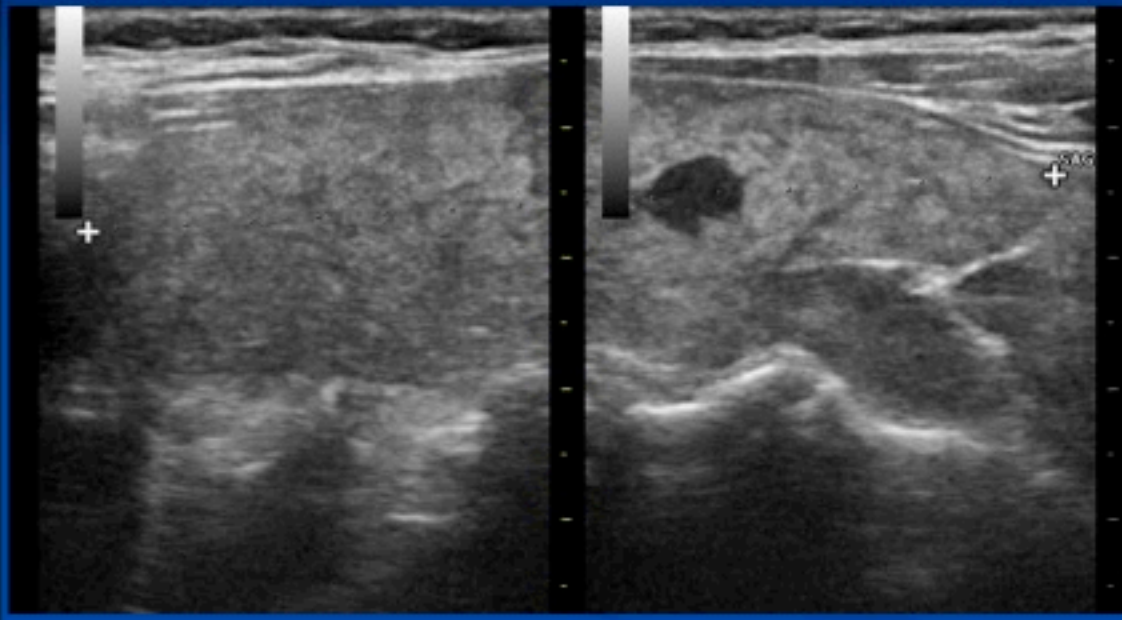


Thyro-thymic ligament – superior mediastinal



Parathyroid Adenoma?
Thyroid Nodule?

Pseudonodule in Hashimoto's Thyroiditis



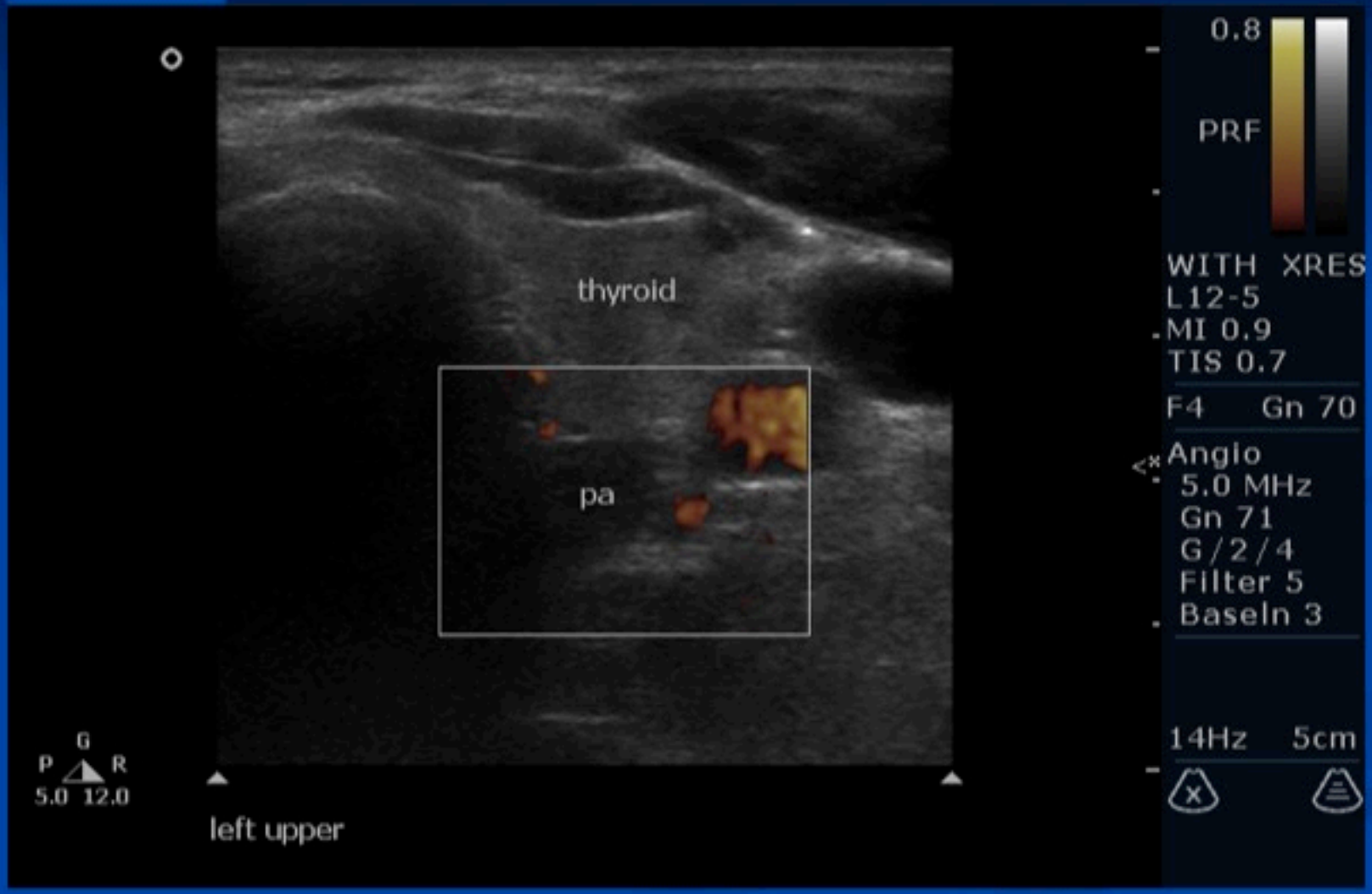
Tubercle of Zuckerkandl
CLEFT SIGN – Due to Fibrosis

Tracheal-Esophageal Groove Lesions

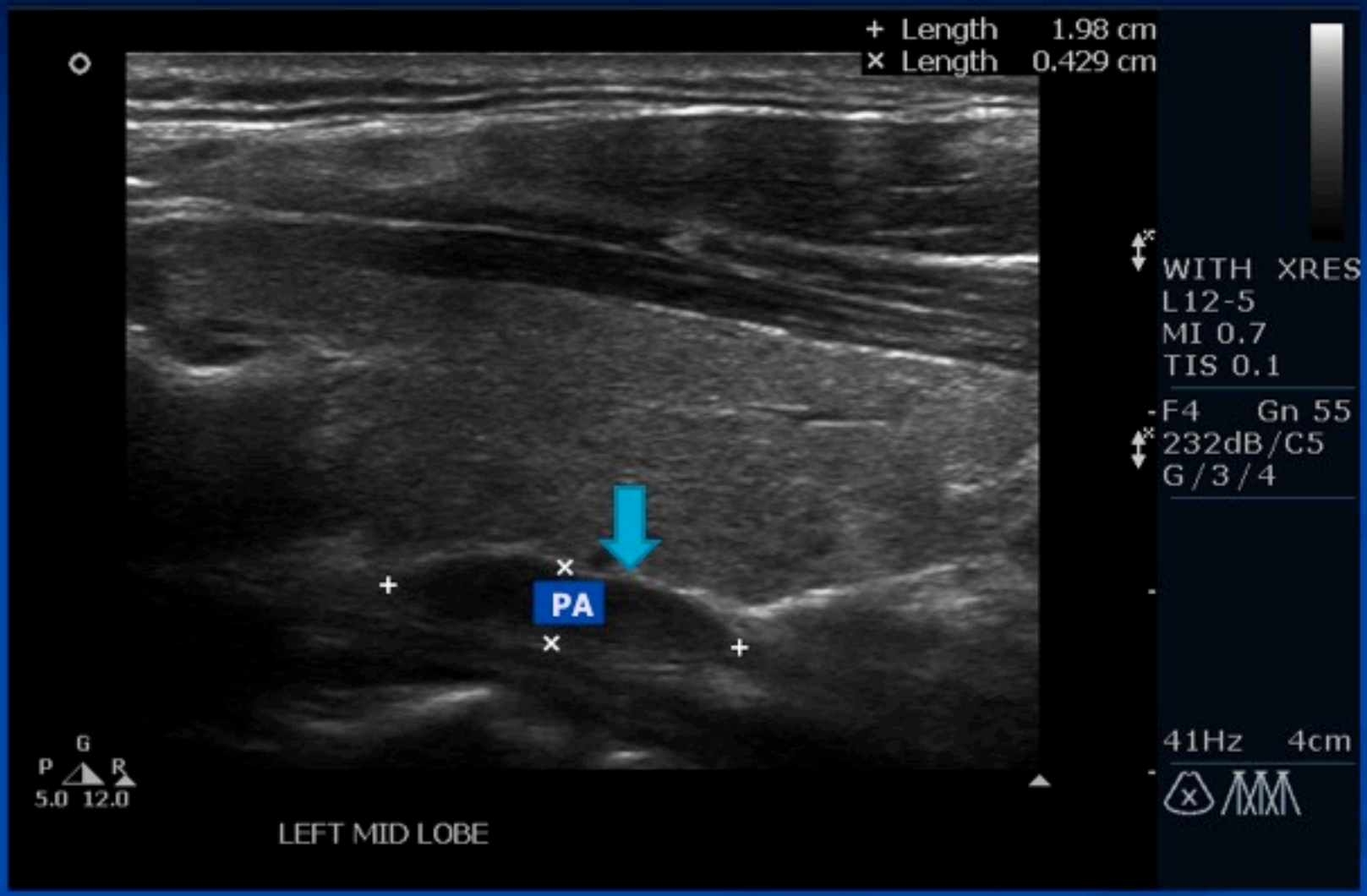
- Smaller, posterior located lesion is usually hard to be seen with US
- More mobile
- Valsalva, cough, movement of neck can also 'bring out' the lesion into vision

Mobile TE groove right upper adenoma

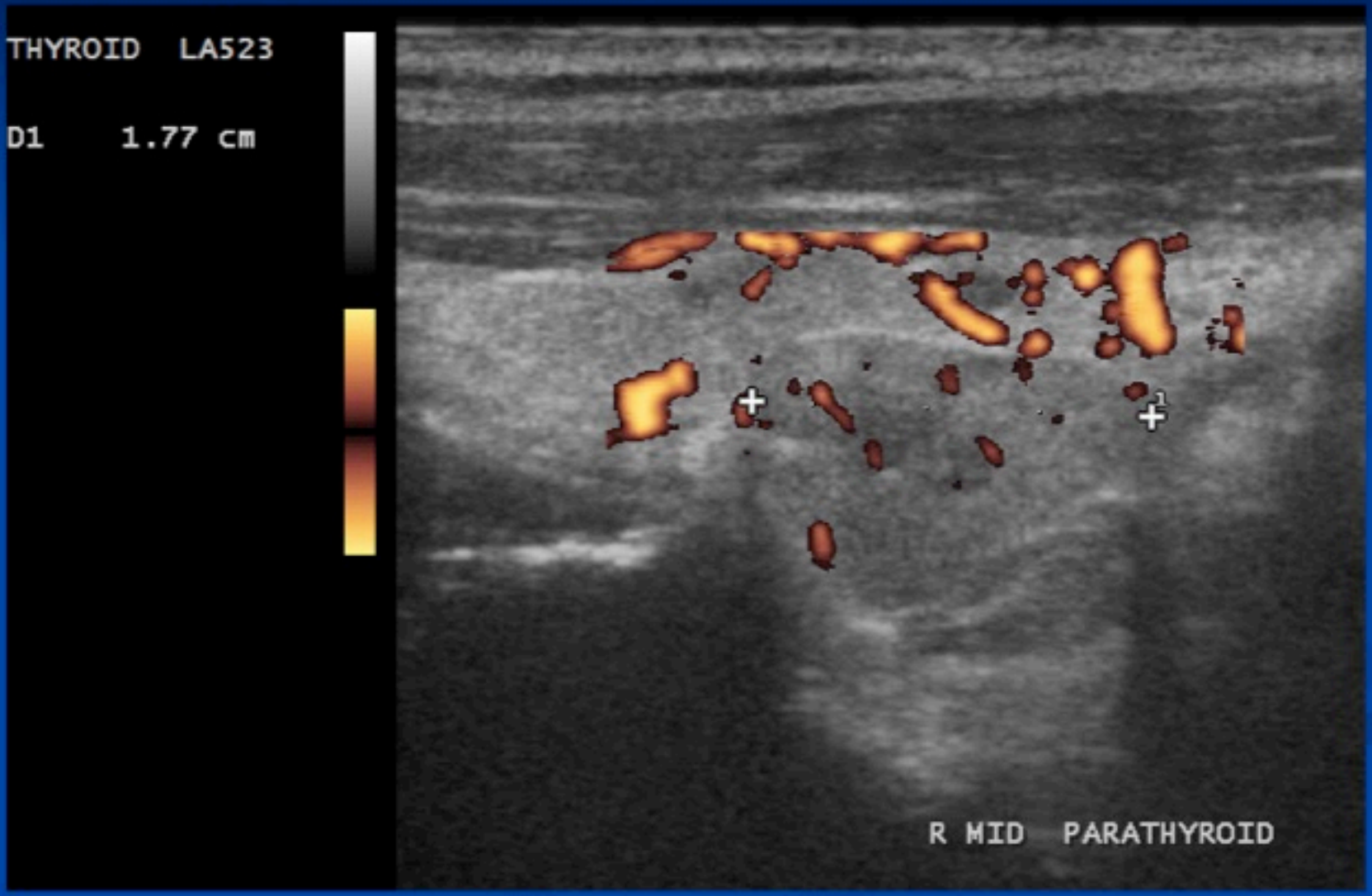
T-E groove left upper mimicking esophagus

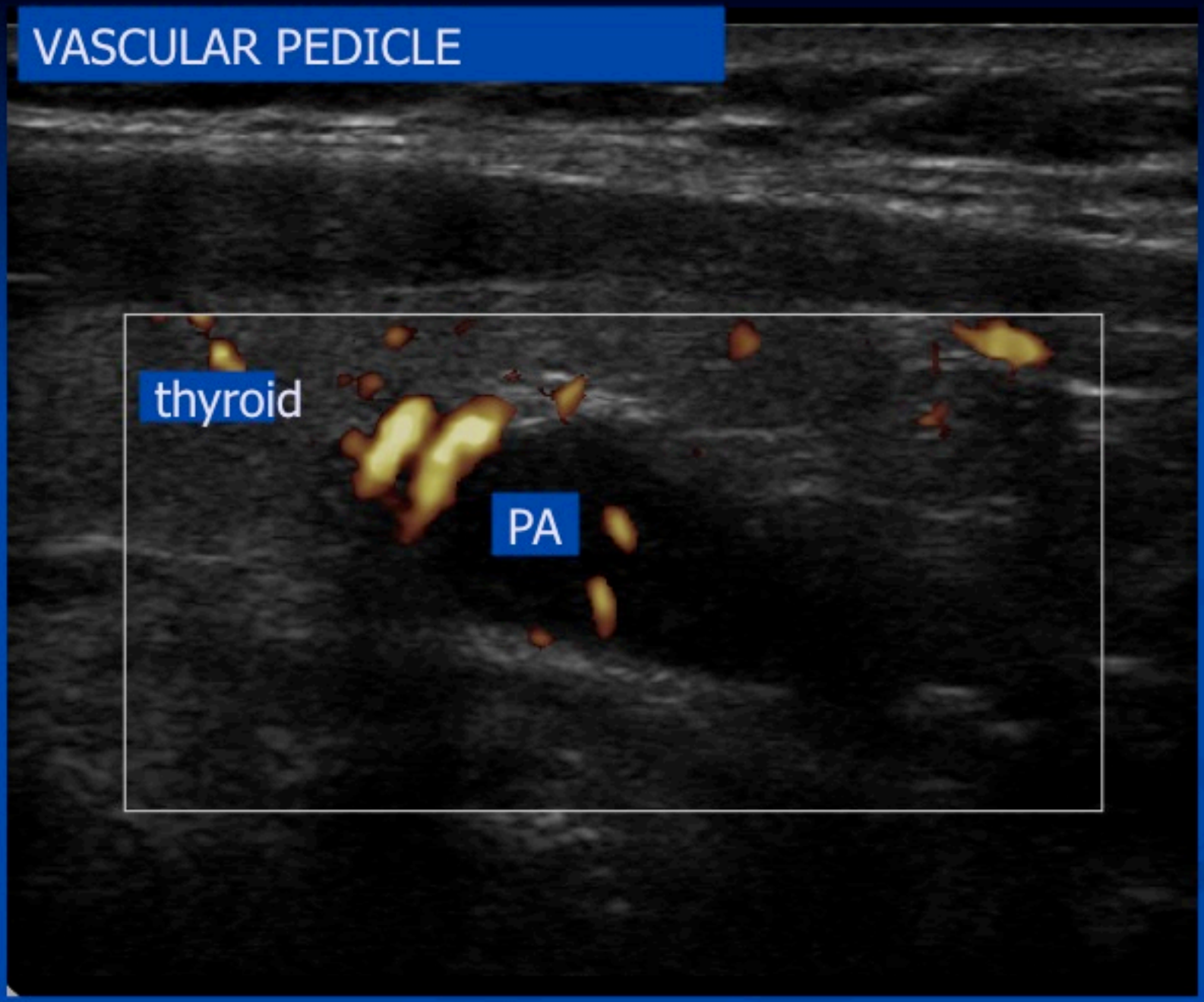


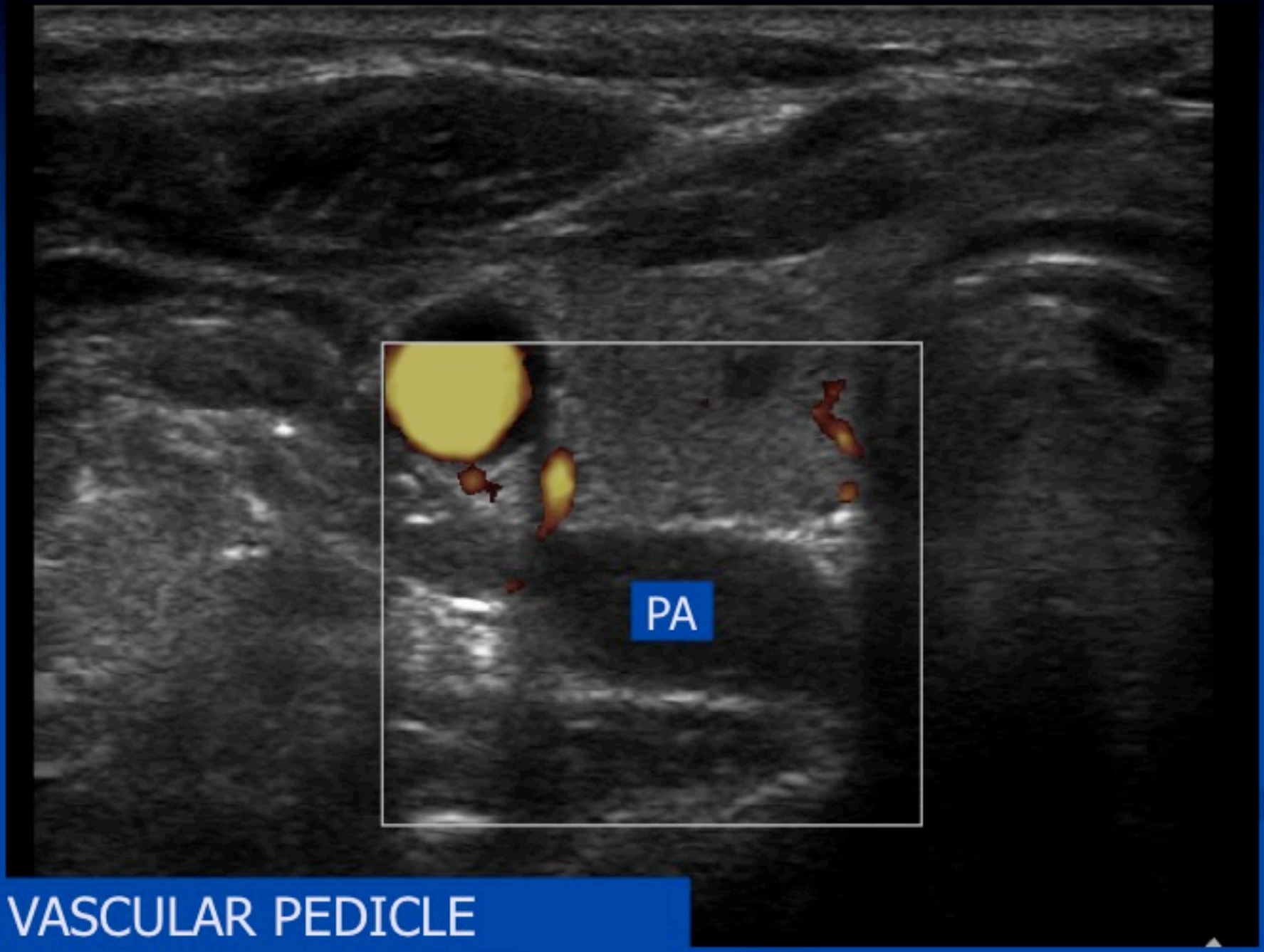
Linear lesions


+ Length 1.98 cm
× Length 0.429 cm
PA
WITH XRES
L12-5
MI 0.7
TIS 0.1
F4 Gn 55
232dB/C5
G/3/4
41Hz 4cm
G
P R
5.0 12.0
LEFT MID LOBE

Large Parathyroid Adenoma

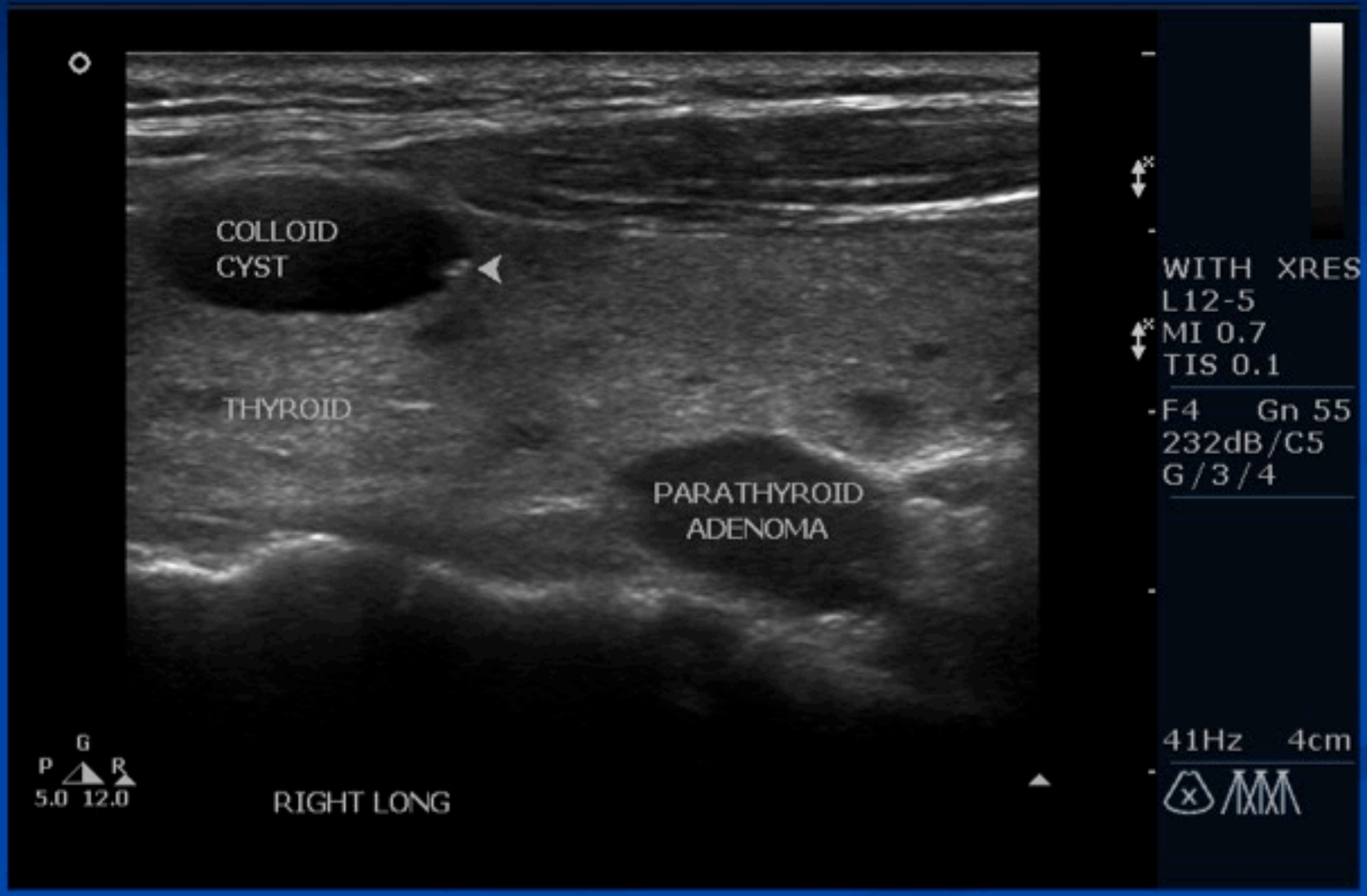


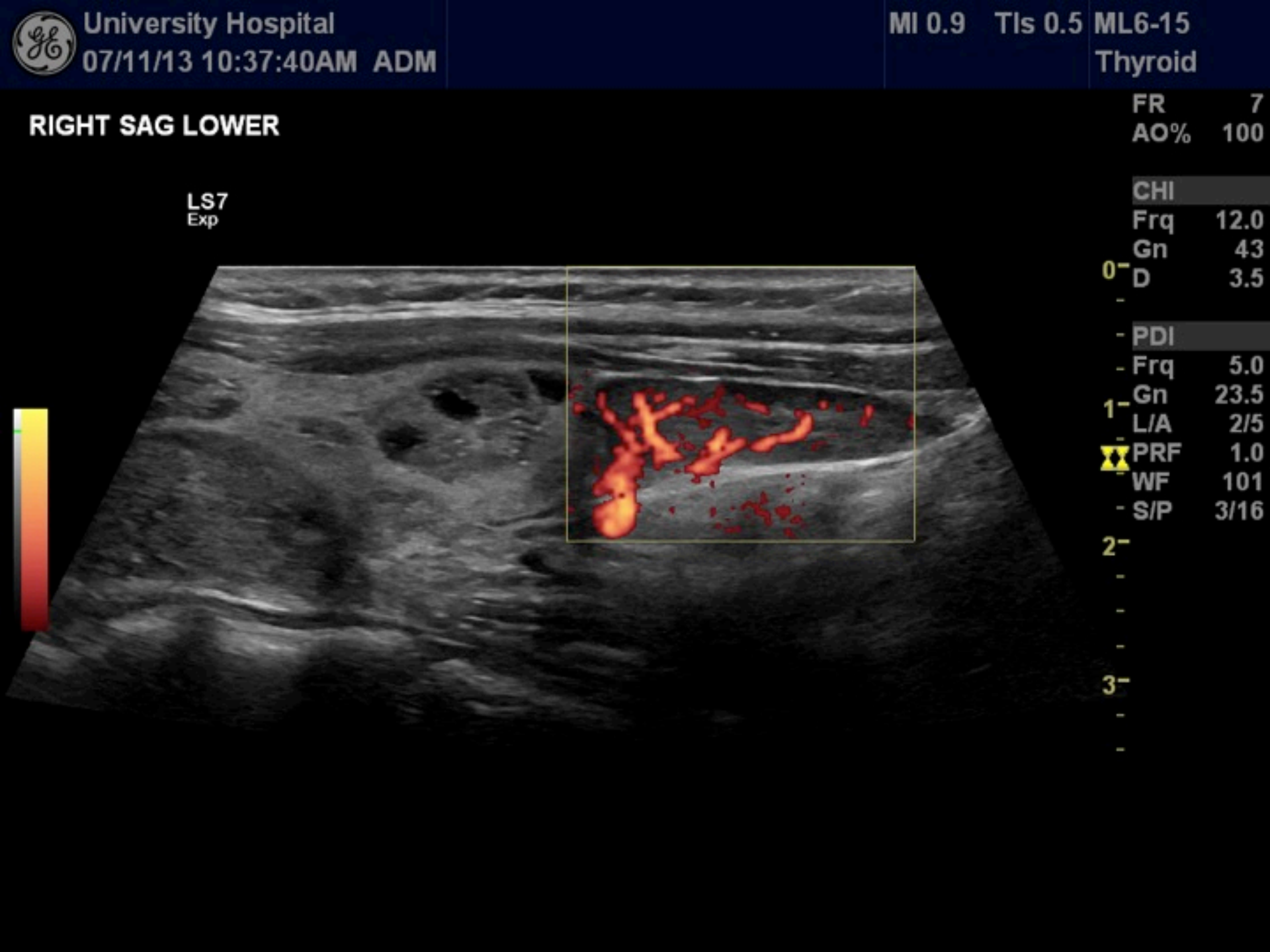

VASCULAR PEDICLE
thyroid
PA



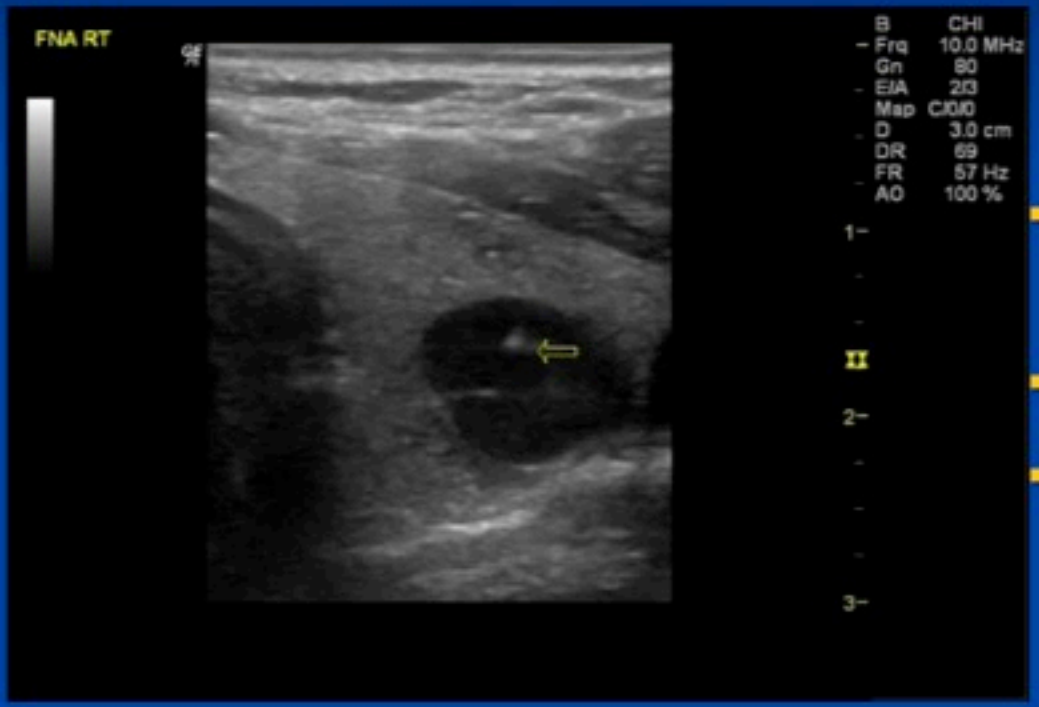
VASCULAR PEDICLE


PRC 12-3-H PRS 5
PST 3
PRC 3-L-H PRS 4
WF L
ROID LA523


COLLOID
CYST
THYROID
PARATHYROID
ADENOMA
RIGHT LONG
WITH XRES
L12-5
MI 0.7
TIS 0.1
F4 Gn 55
232dB/C5
G/3/4
41Hz 4cm
5.0 12.0


University Hospital
07/11/13 10:37:40AM ADM
MI 0.9 TIs 0.5
ML6-15
Thyroid
RIGHT SAG LOWER
LS7
Exp
FR 7
AO% 100
CHI
Frq 12.0
Gn 43
D 3.5
PDI
Frq 5.0
Gn 23.5
L/A 2/5
PRF 1.0
WF 101
S/P 3/16
0
1
2
3

When and how to biopsy



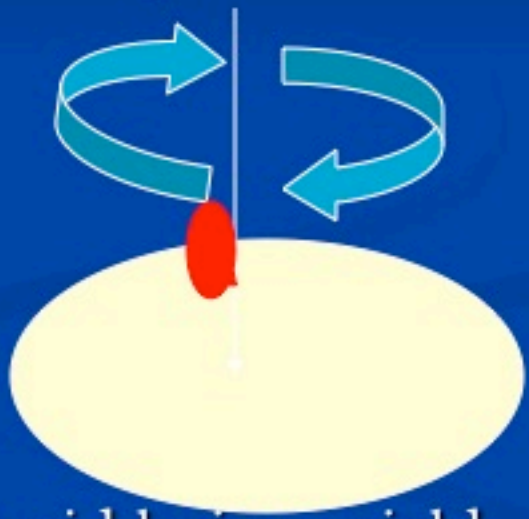
- The more typical a lesion appears, less the necessity for biopsy
- Caution in patients on warfarin or anti-platelet agents
- Use 27 g needles
- One or two attempts, using rotation of the syringe & aspiration
- Avoid jabbing technique

Parathyroid FNA

- Avoid vigorous jabbing and multiple passes

- Avoid puncture of posterior capsule

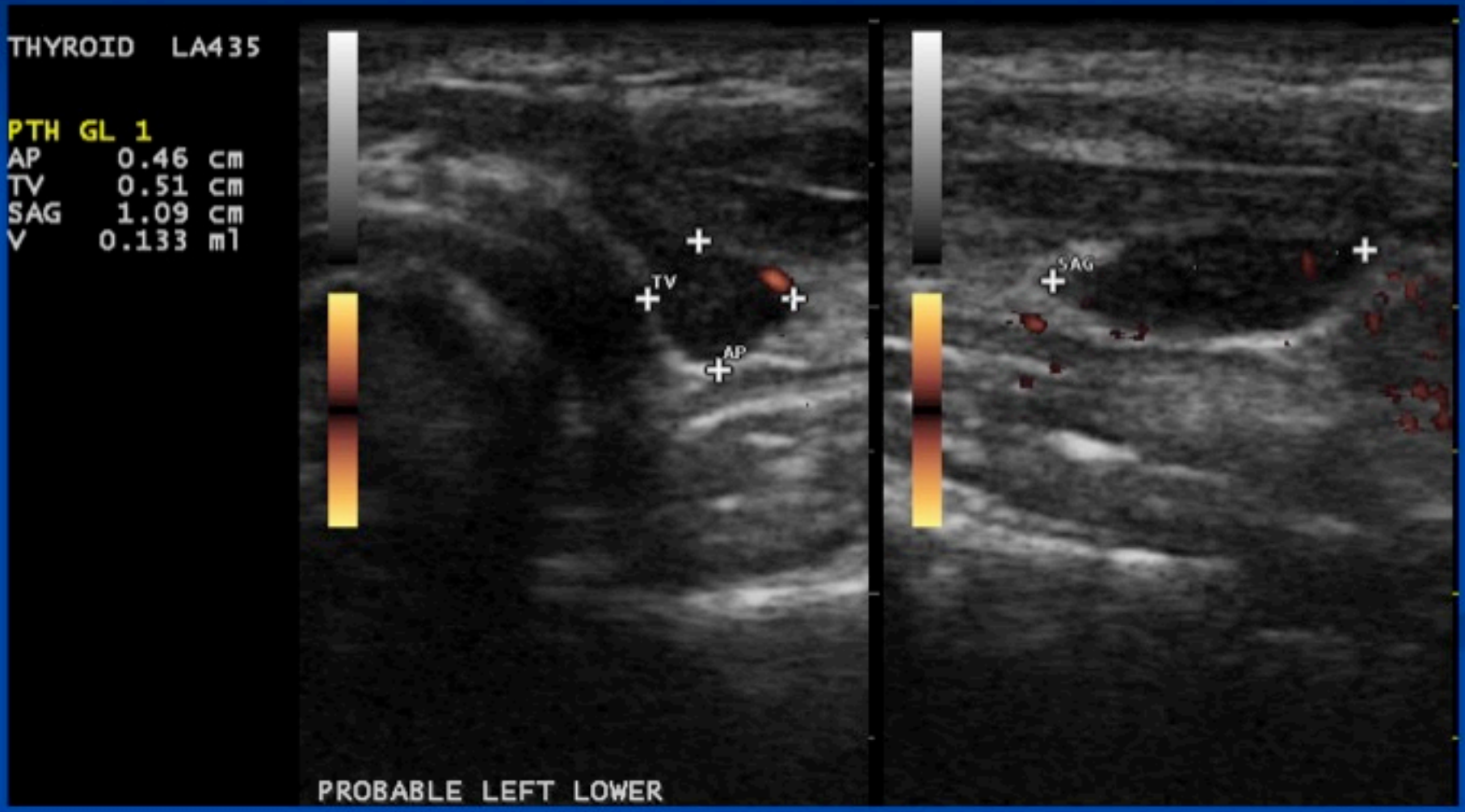
- Fewer passes, one to two - rotate and aspirate



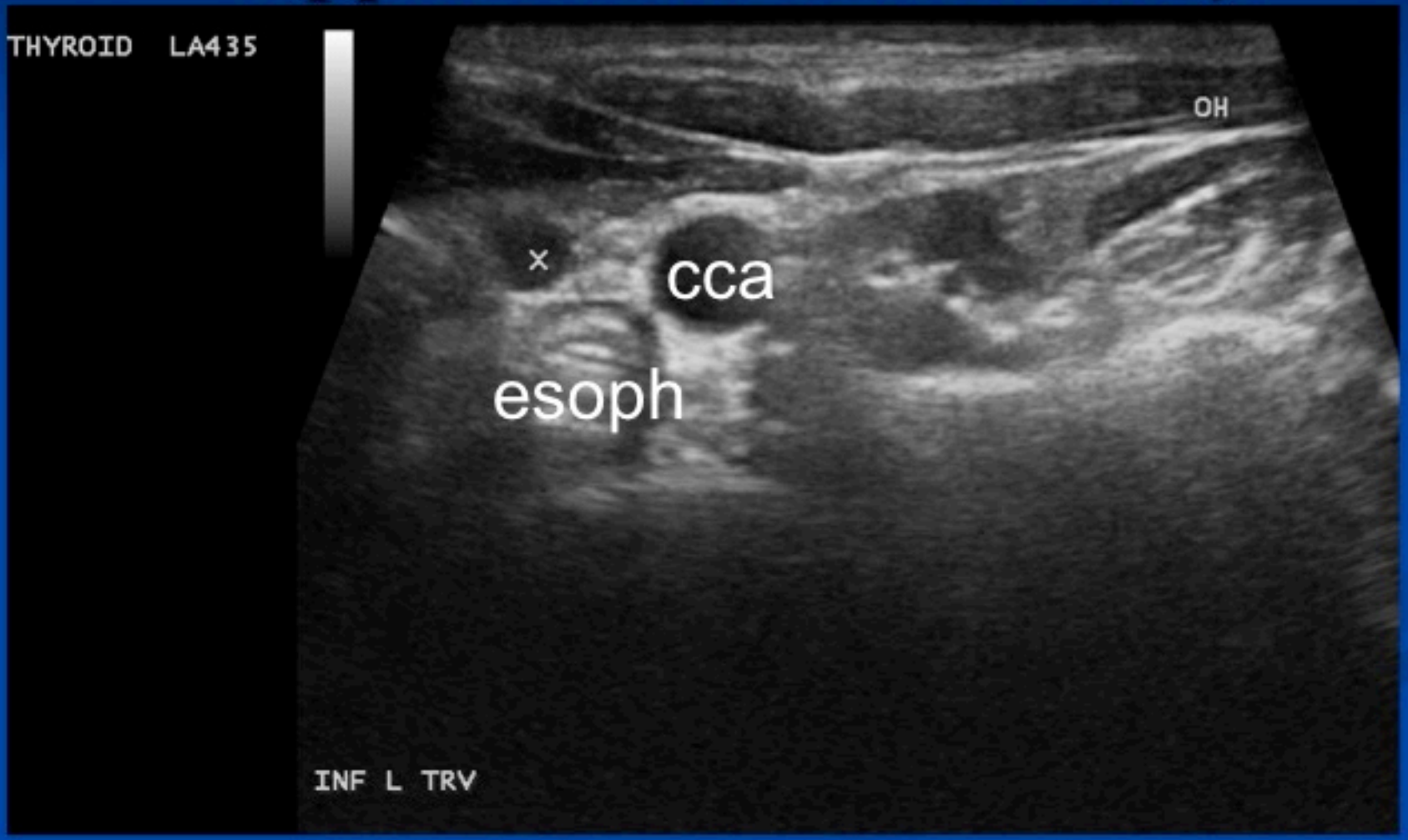
- Parathyroid lesions yield bloody tap
- 'Dry' tap – usually a LN

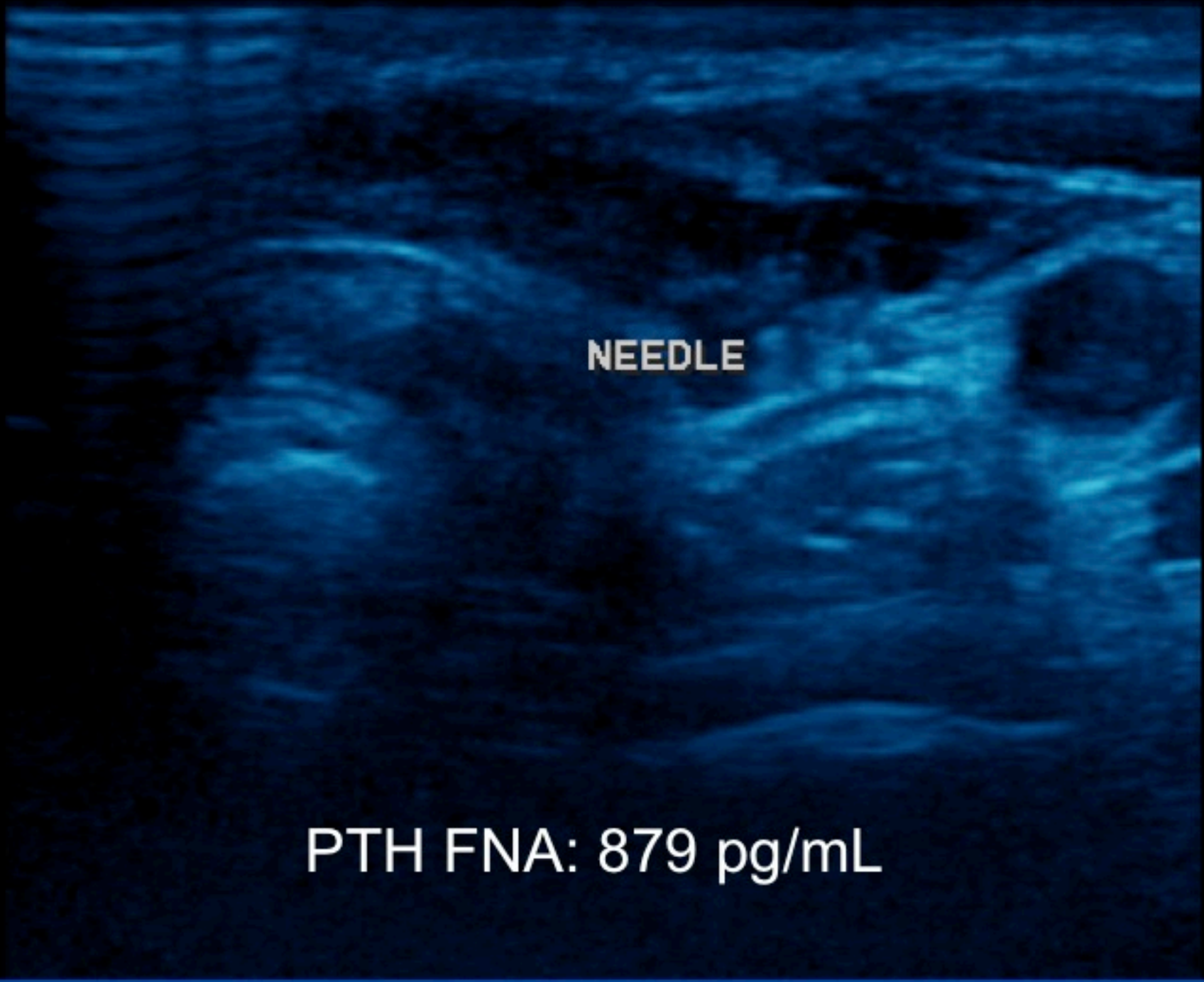
Slide courtesy of Dev Abraham, MD

38yo female, prior failed parathyroid surgery

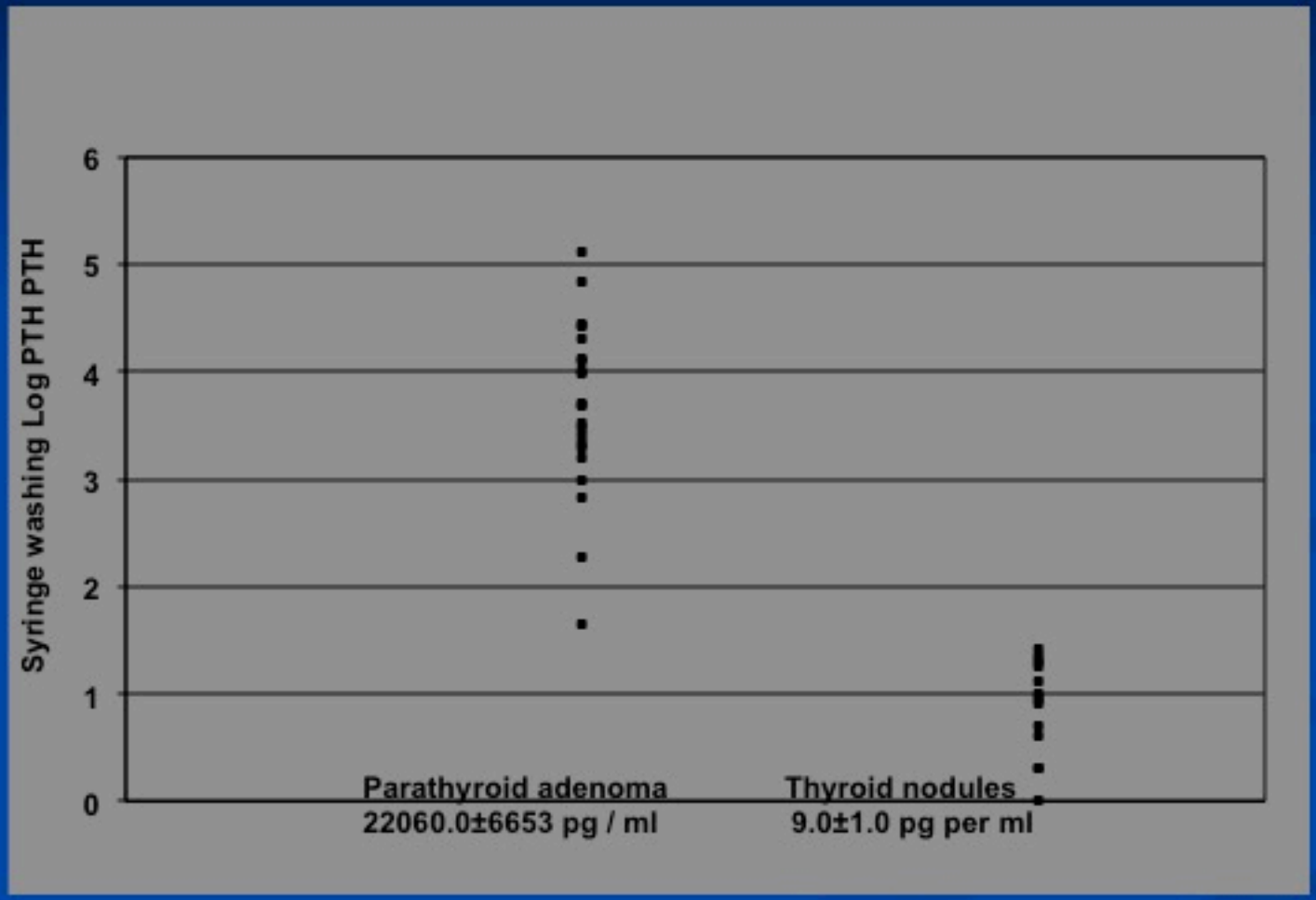


TRV view, x= PA, Omohyoid seen in lateral neck (for reference of position – approx 3cm inf to cricoid)





PTH FNA: 879 pg/mL



Abraham, et al. Endocrine Practice. 2007 Jul/Aug Volume 13, number 4: 333–337

Summary

- Lymph node assessment is a mandatory component of thyroid nodule evaluation
- Key US features of abnormal nodes:
  - Round Shape, Calcifications, Cystic, Peripheral Flow
- US is the Initial Imaging Tool in patients with Primary Hyperparathyroidism