

The thyroid made simple

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BMUS 

THE BRITISH MEDICAL ULTRASOUND SOCIETY

Aim

Thyroid Anatomy

Thyroid Function

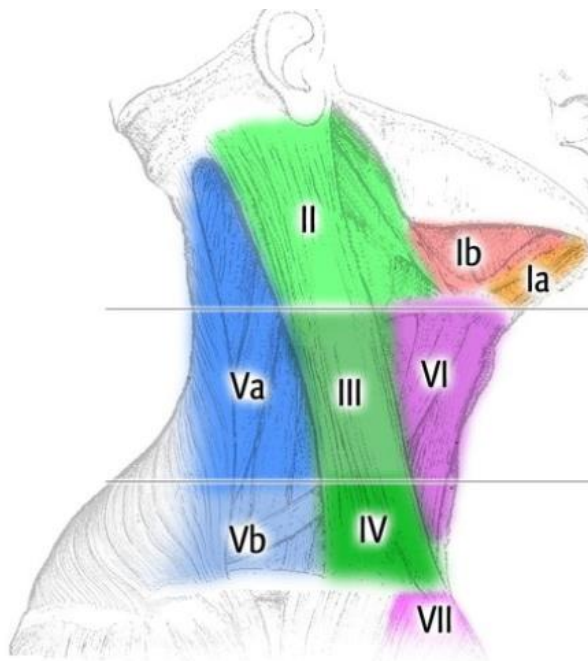
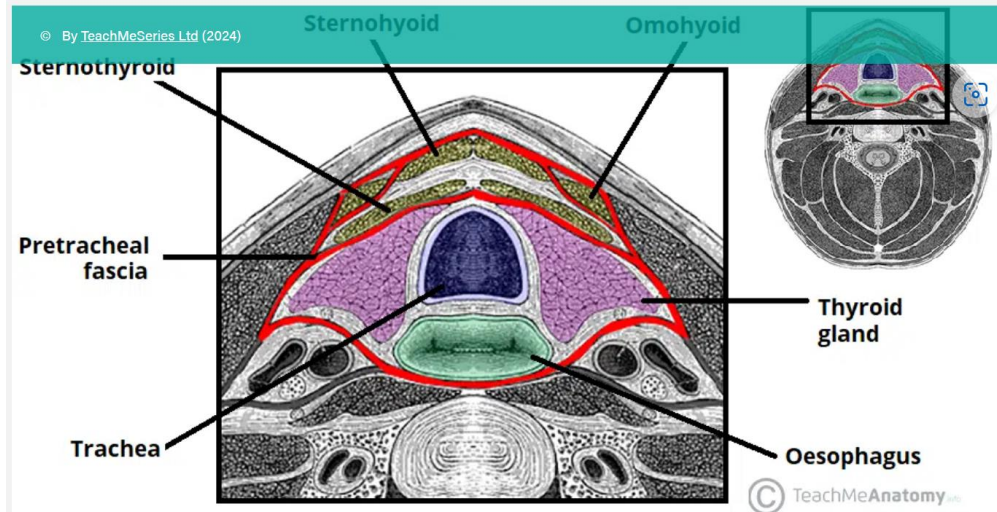
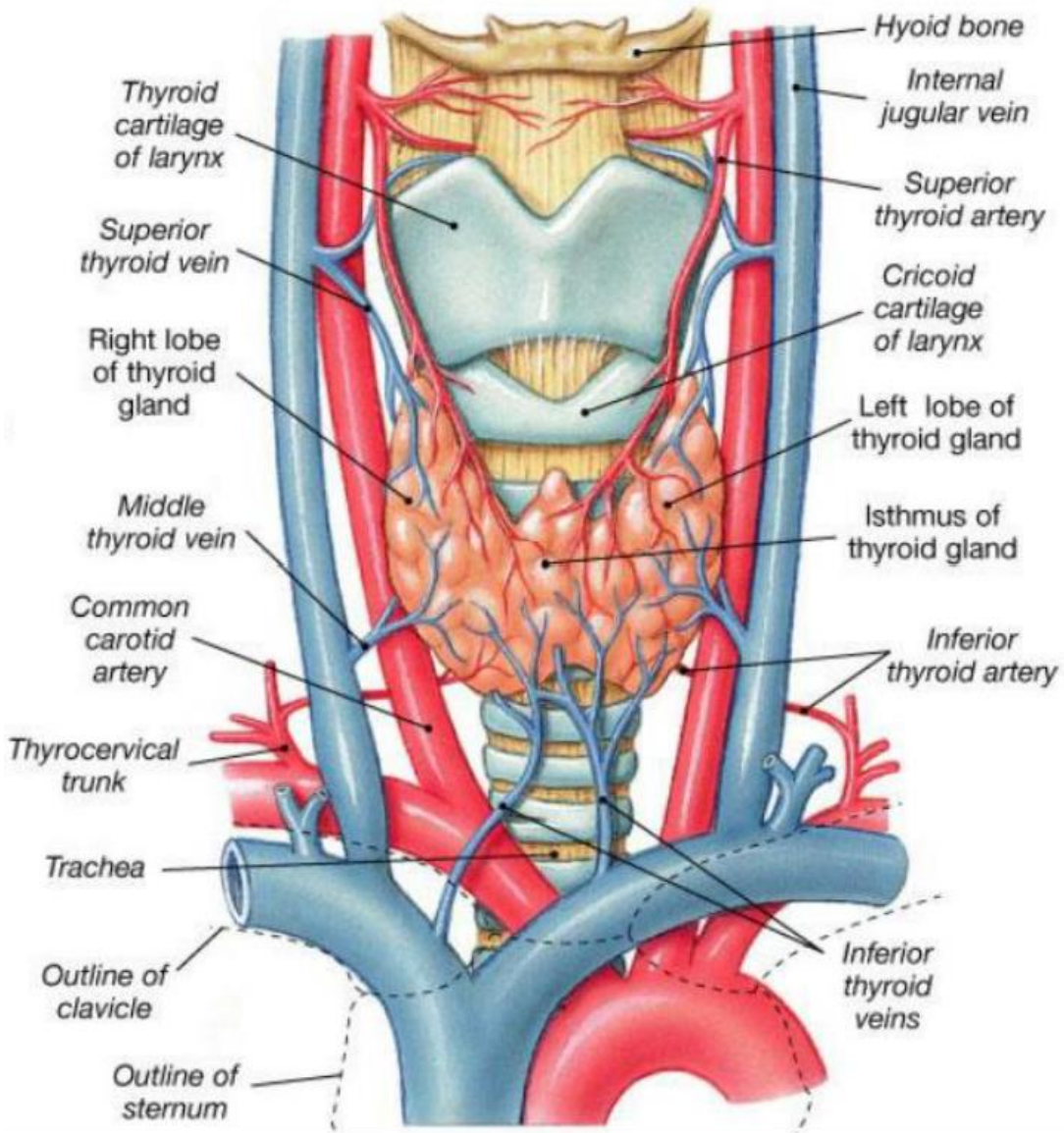
Approach to scanning

Risk stratification Systems / Sampling

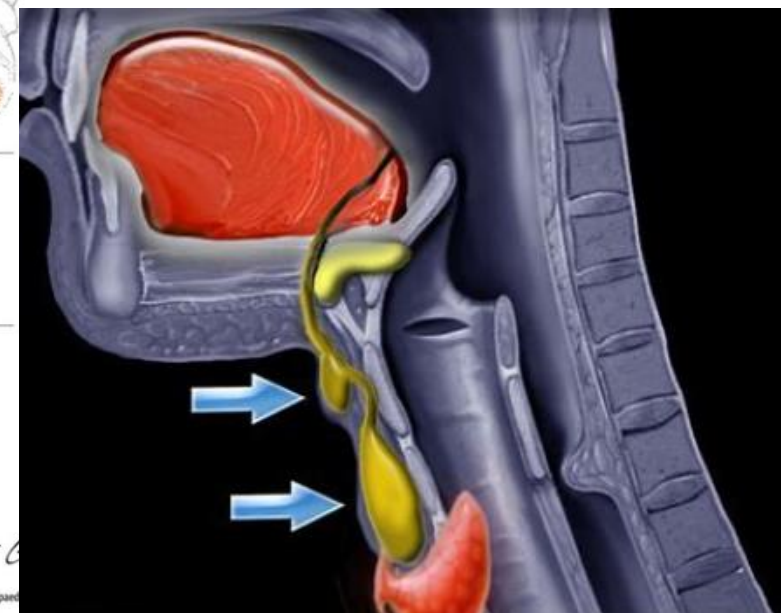
Pathology

Specimen Preparation

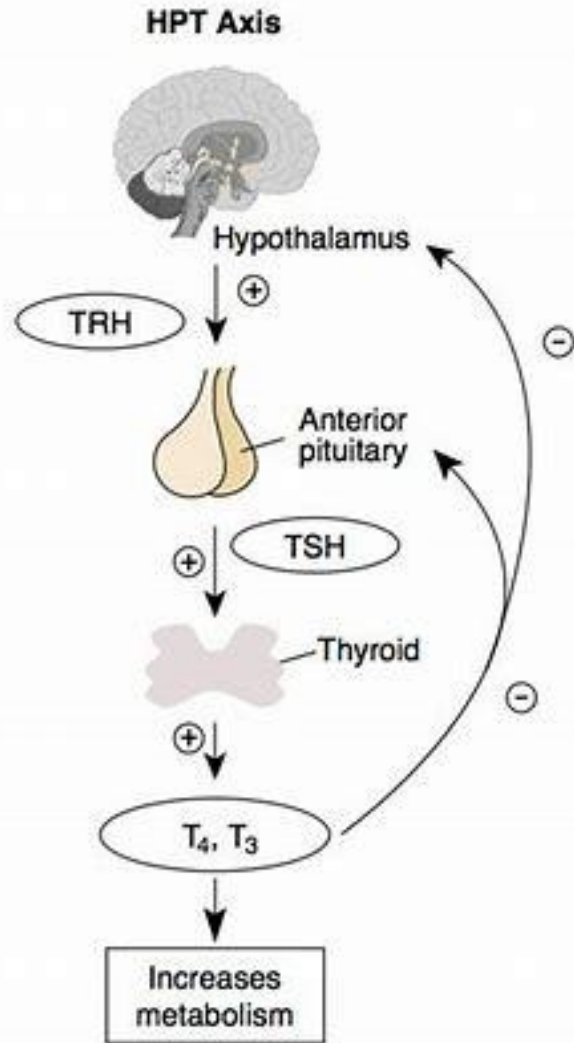
Thyroid Anatomy



Lymph node levels



Thyroid Function



Hypothalamus

Thyroid Releasing Hormone (TRH)



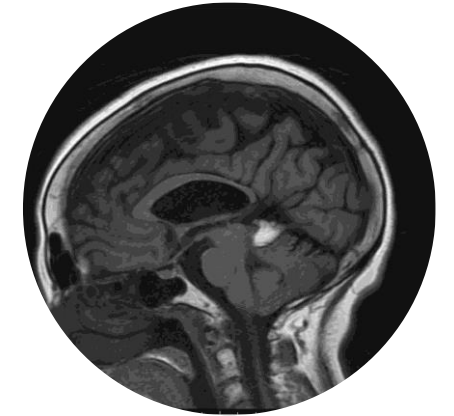
Pituitary

Thyroid Stimulating Hormone (TSH)

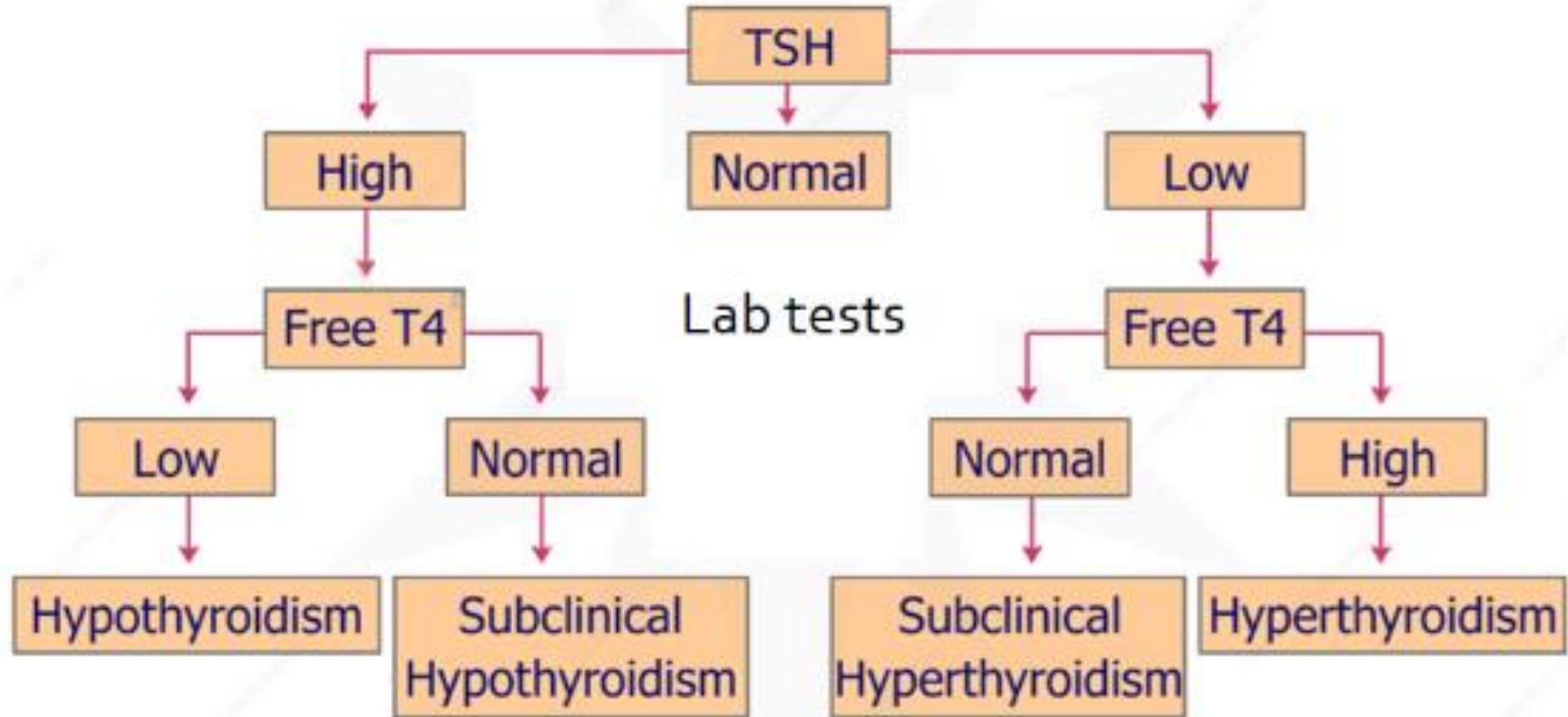


Thyroid

Thyroxine (T₄)
Triiodothyronine (T₃)



Thyroid Function Tests



Approach to scanning

Review previous imaging

Scan the entire neck

Always use a Risk Stratification System

Comment on retrosternal extension

Assess thyroid margins for extra thyroid extension

Assess the level VI / III/ IV lymph nodes

Mentor

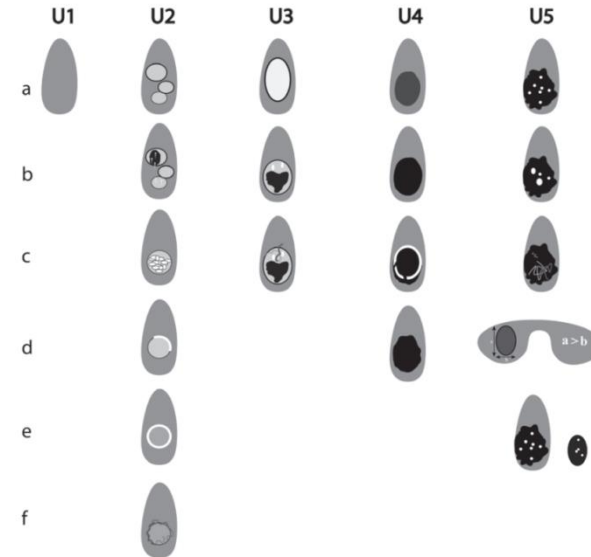
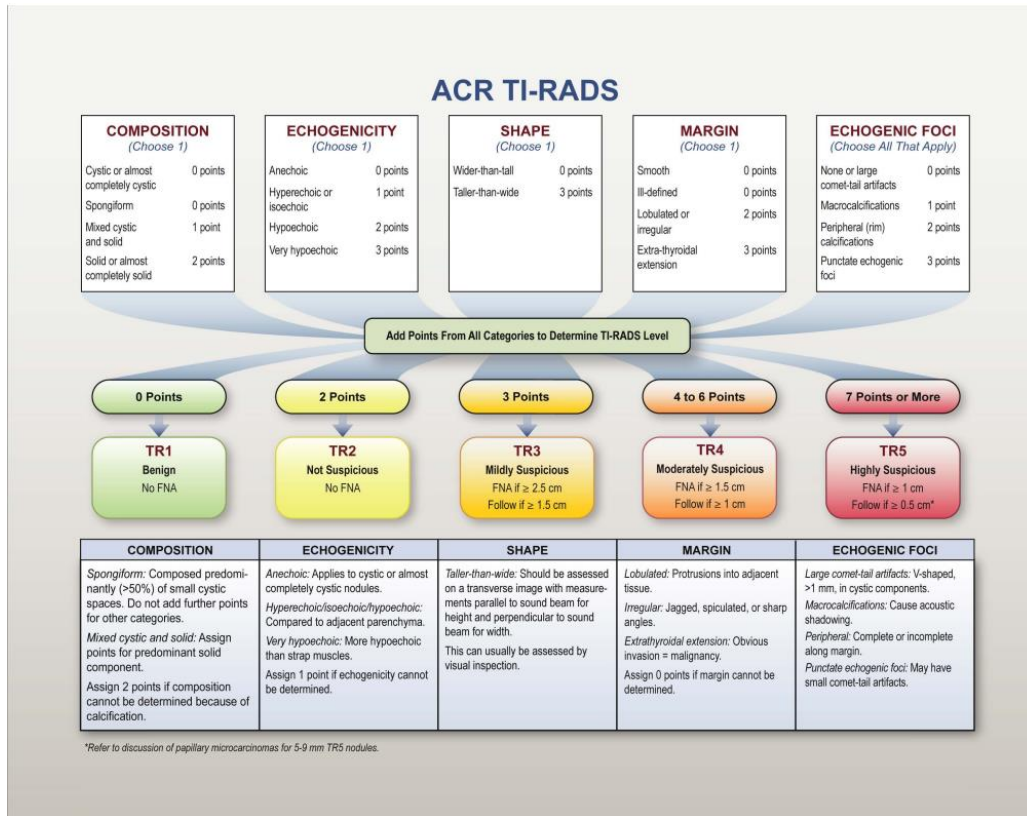
Keep a case log

Review pathology

Risk Stratification Systems

American College of Radiologists Thyroid Imaging-Reporting and Data Systems

British Thyroid Association Guidelines



U1. Normal

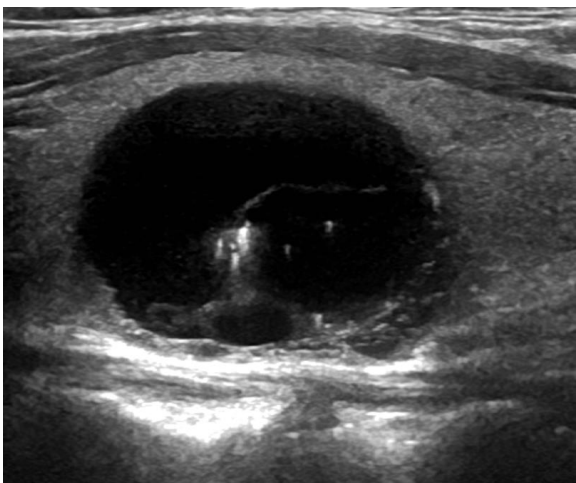
U2. Benign:
 (a) halo, iso-echoic / mildly hyper-echoic
 (b) cystic change +/- ring down sign (colloid)
 (c) micro-cystic / spongiform
 (d & e) peripheral egg shell calcification
 (f) peripheral vascularity.

U3. Indeterminate/Equivocal:
 (a) homogeneous, hyper-echoic (markedly), solid, halo (follicular lesion).
 (b) ? hypo-echoic, equivocal echogenic foci, cystic change
 (c) mixed/central vascularity.

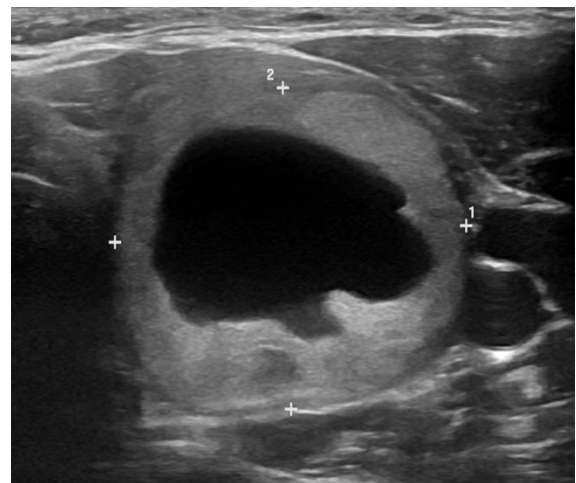
U4. Suspicious:
 (a) solid, hypo-echoic (cf thyroid)
 (b) solid, very hypo-echoic (cf strap muscle)
 (c) disrupted peripheral calcification, hypo-echoic
 (d) lobulated outline

U5. Malignant
 (a) solid, hypo-echoic, lobulated / irregular outline, micro-calcification (? Papillary carcinoma)
 (b) solid, hypo-echoic, lobulated/irregular outline, globular calcification (? Medullary carcinoma)
 (c) intra-nodular vascularity
 (d) shape (taller >wide) (AP-TR)
 (e) characteristic associated lymphadenopathy

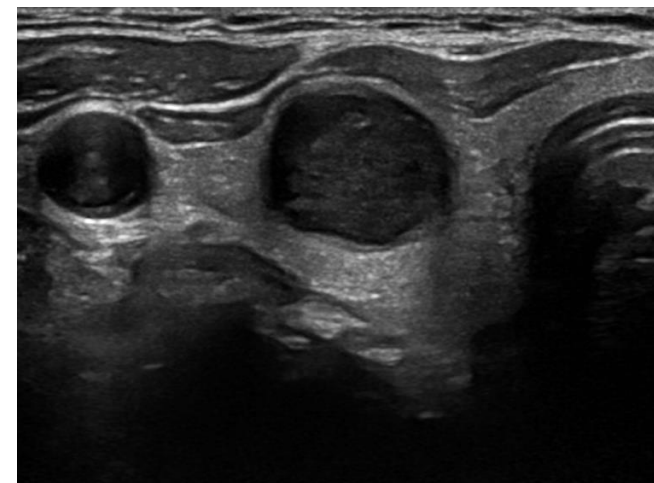
Risk Stratification in Practice



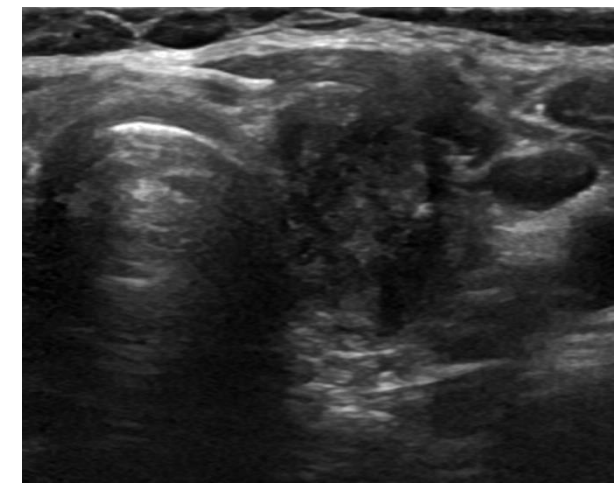
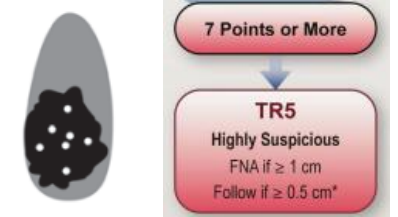
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Risk Stratification System Limitations

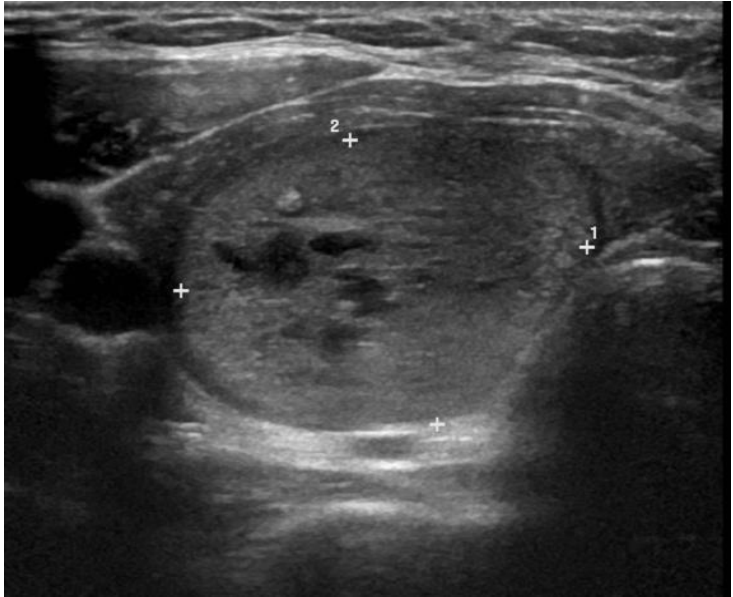
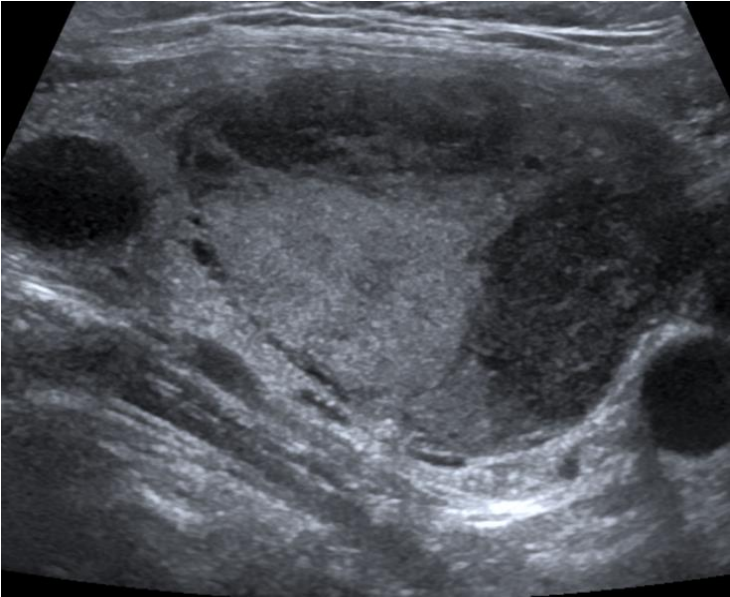
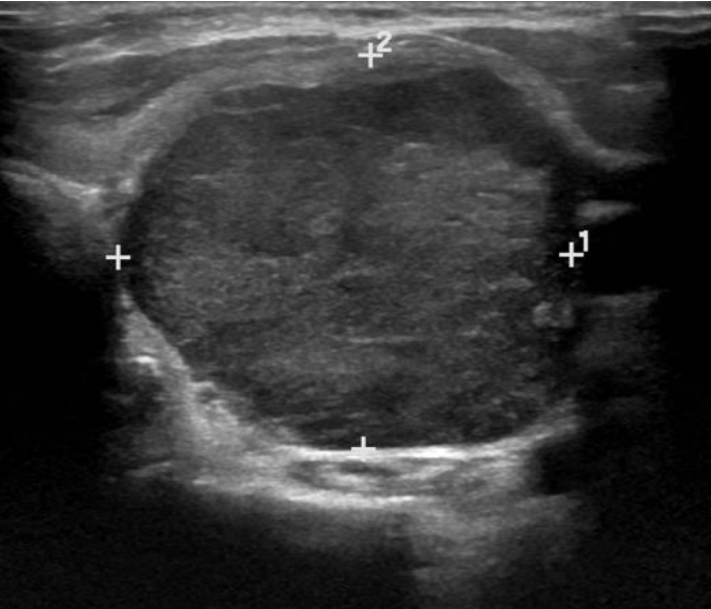
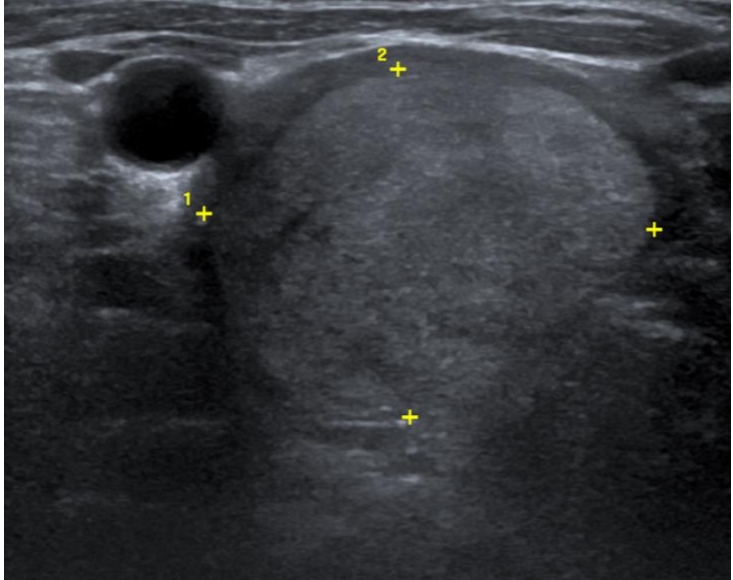
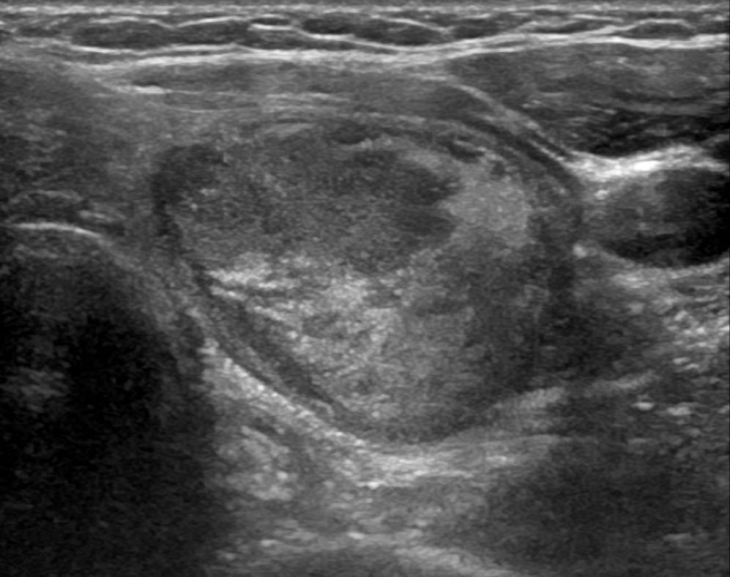
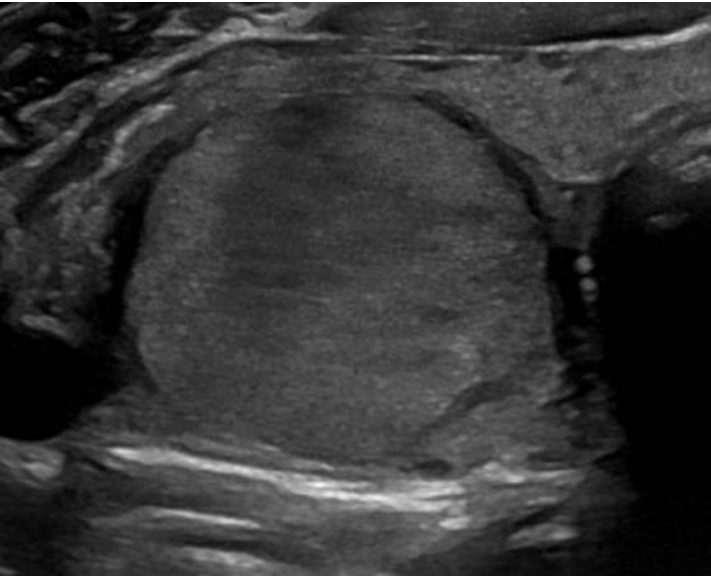
Inter-observer variability ↓ →

Sensitivity ↑

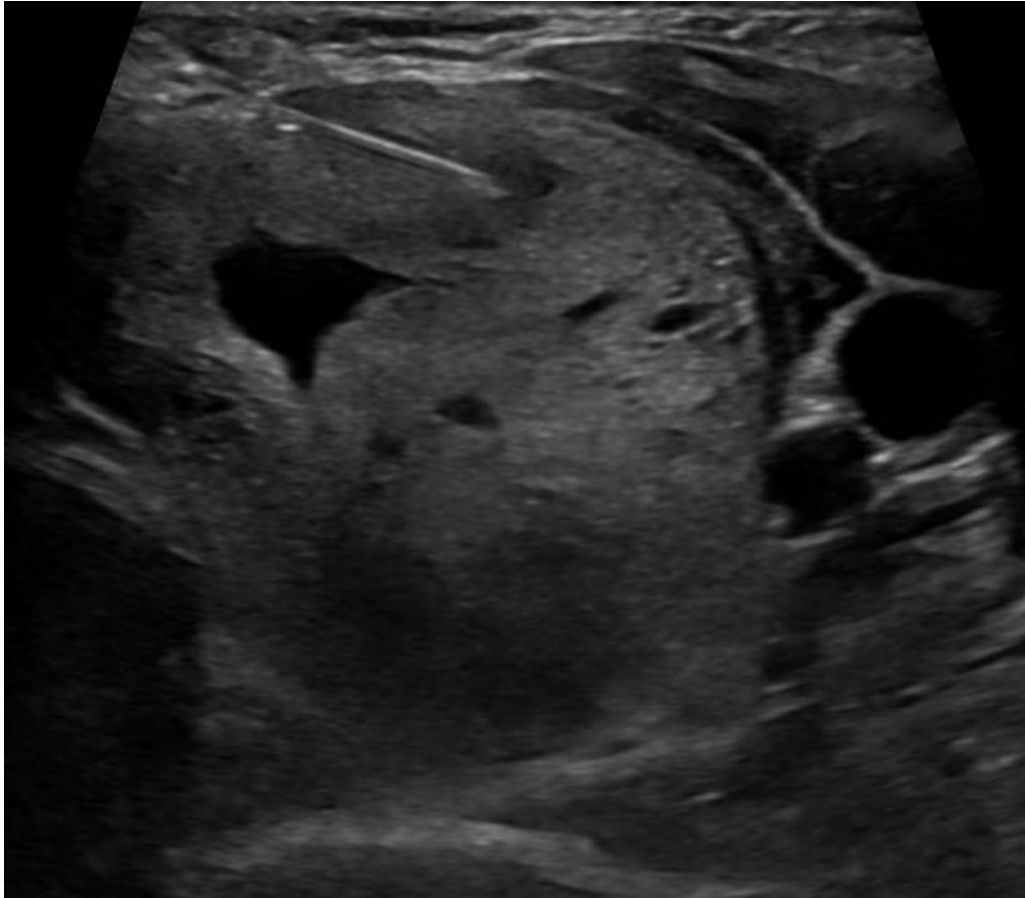
Specificity ↓ False Positive rate



Follicular Lesion



Sampling



	Cancer Prevalence, % (95% CI)
Thy1	12 (5-22)
Thy2	5 (3-9)
Thy3	22 (18-26)
Thy3a	25 (20-31)
Thy3f	31 (24-39)
Thy4	79 (70-87)
Thy5	98 (97-99)

Meta-Analysis > Cancer Cytopathol. 2020 Jan;128(1):36-42. doi: 10.1002/cncy.22201.

Epub 2019 Nov 13.

Risk of malignancy in the various categories of the UK Royal College of Pathologists Thy terminology for thyroid FNA cytology: A systematic review and meta-analysis

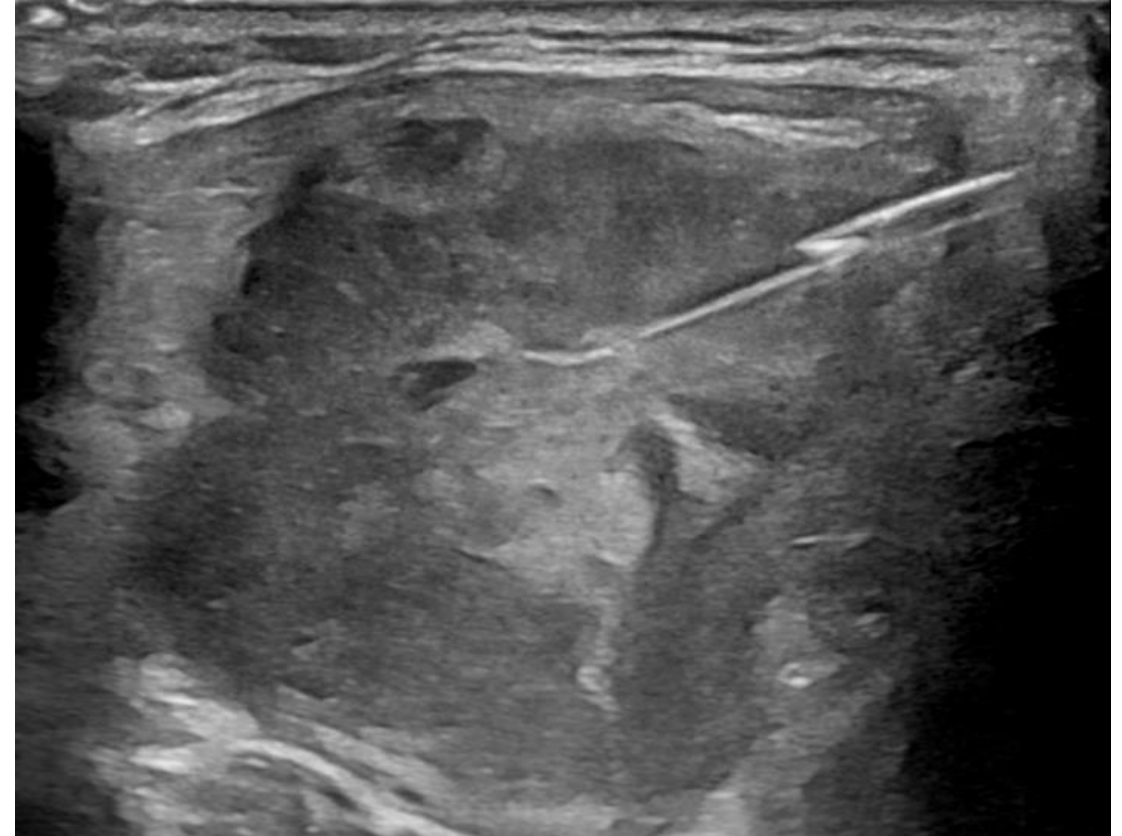
David N Poller ¹, Massimo Bongiovanni ², Pierpaolo Trimboli ³

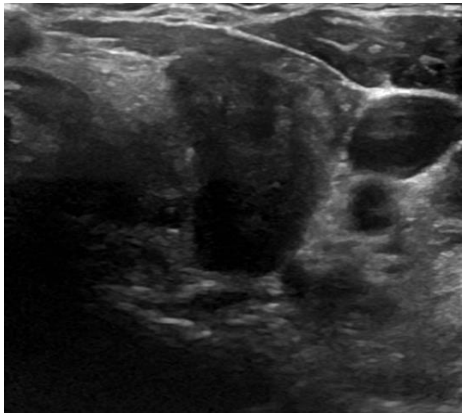
Diagnostic Accuracy

> [Ultrasonography](#). 2018 Apr;37(2):121-128. doi: 10.14366/usg.17066. Epub 2018 Jan 2.

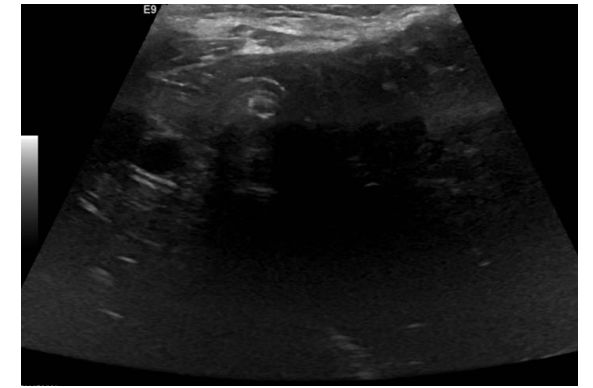
Reliability of core needle biopsy as a second-line procedure in thyroid nodules with an indeterminate fine-needle aspiration report: a systematic review and meta-analysis

[Pierpaolo Trimboli](#)¹, [Luca Giovanella](#)¹





Thyroid cancer

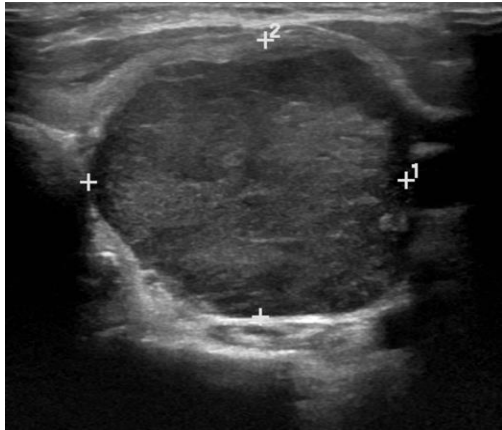


Papillary thyroid carcinoma

90% of all cancers

Indolent

Best prognosis



Follicular thyroid carcinoma

Diagnosed on surgical resection

Good prognosis

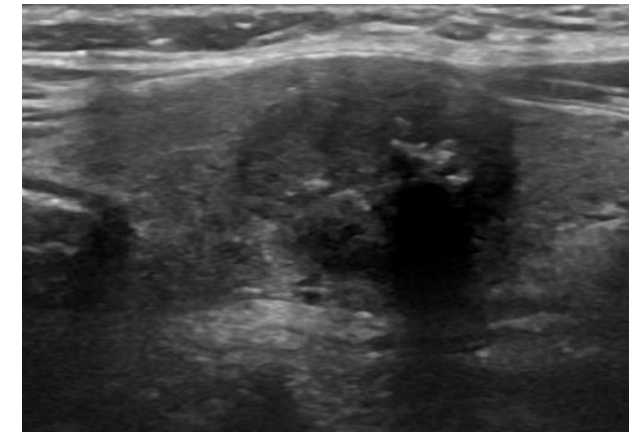
Distant metastatic disease

Anaplastic thyroid carcinoma

Only 70-90 cases annually

Existing goitre

Short prognosis



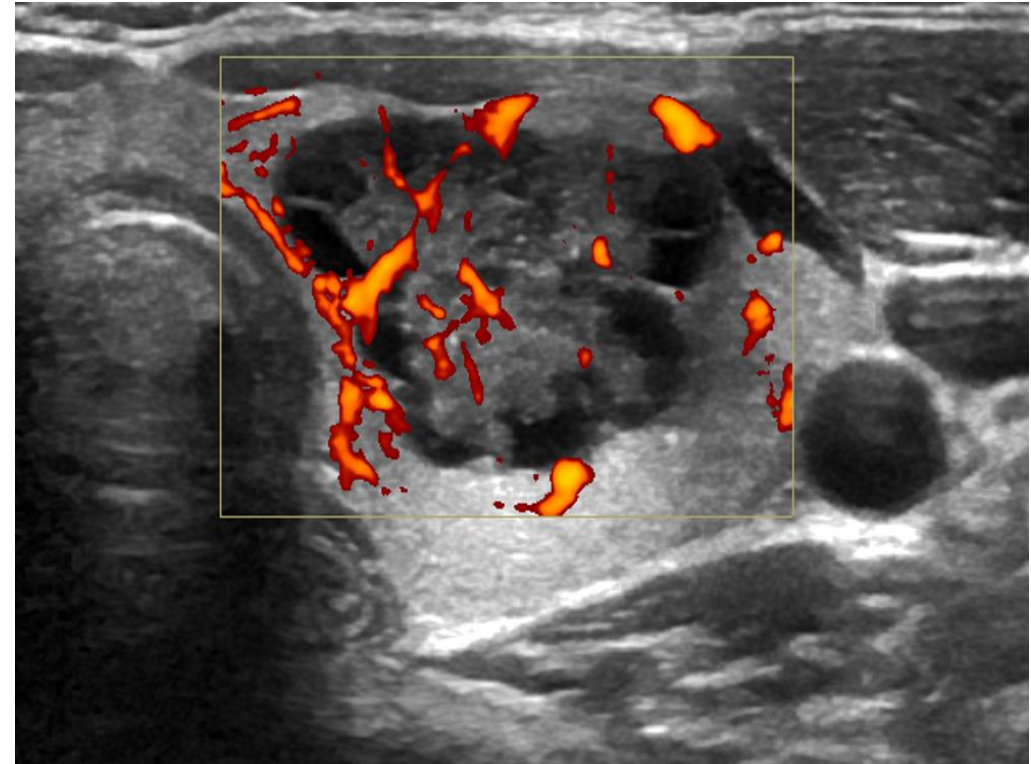
Medullary Thyroid Carcinoma

Rare

Associated with MEN2

Poor prognosis

Cystic Papillary Thyroid Carcinoma



[J ASEAN Fed Endocr Soc.](#) 2019; 34(2): 215–219.

Published online 2019 Nov 9. doi: [10.15605/jafes.034.02.14](https://doi.org/10.15605/jafes.034.02.14)

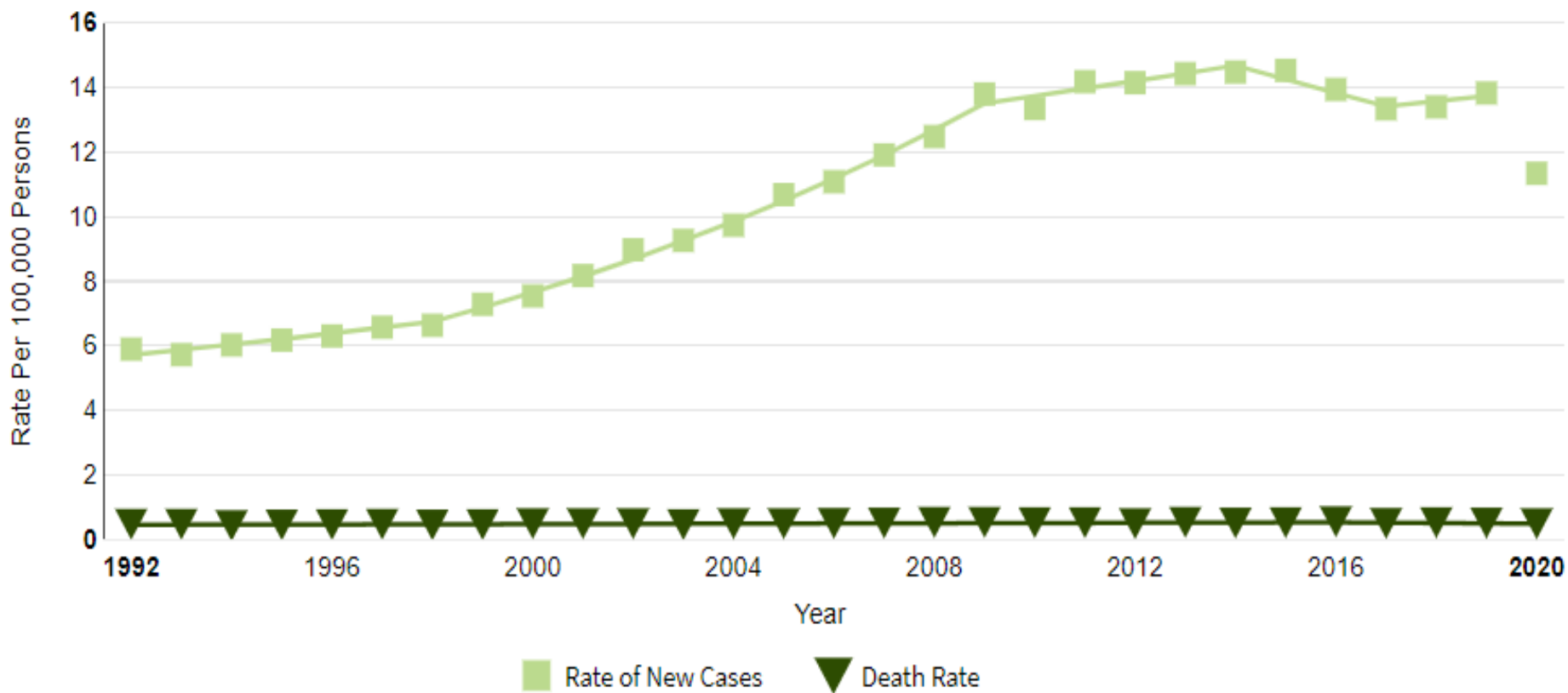
Cystic Papillary Thyroid Carcinoma: A Case Report

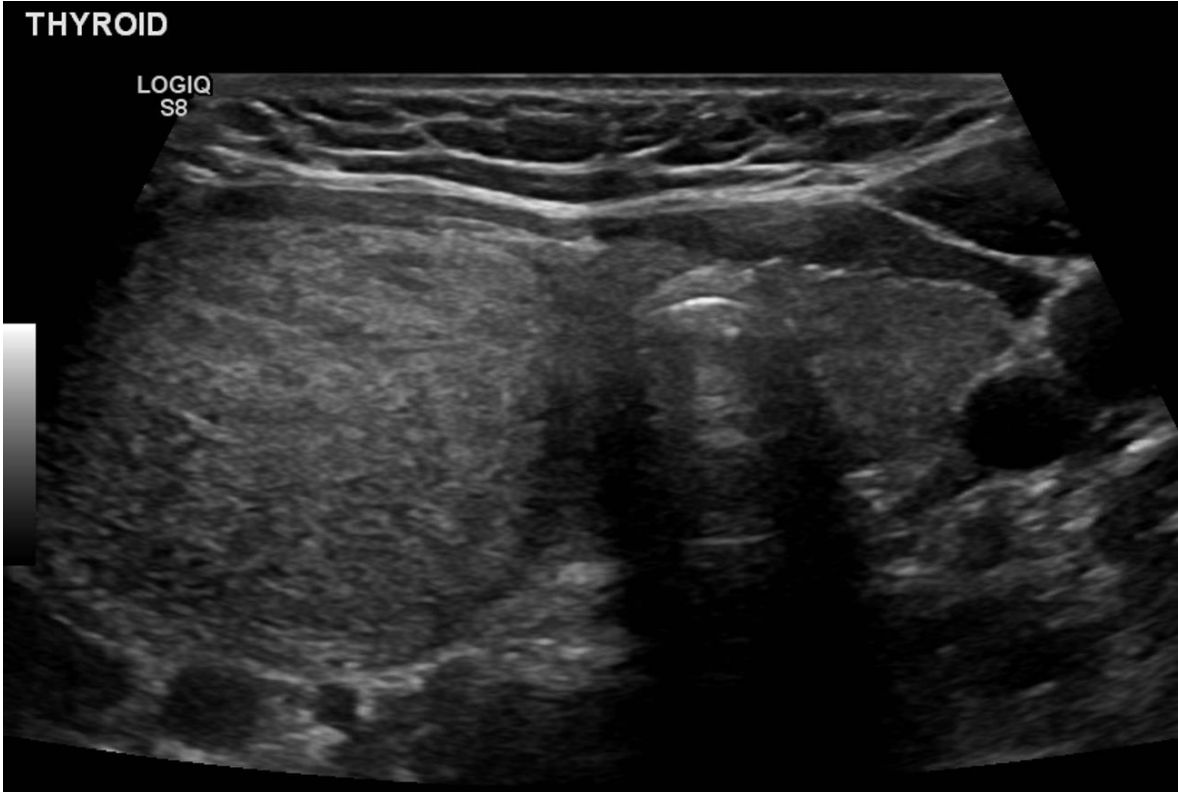
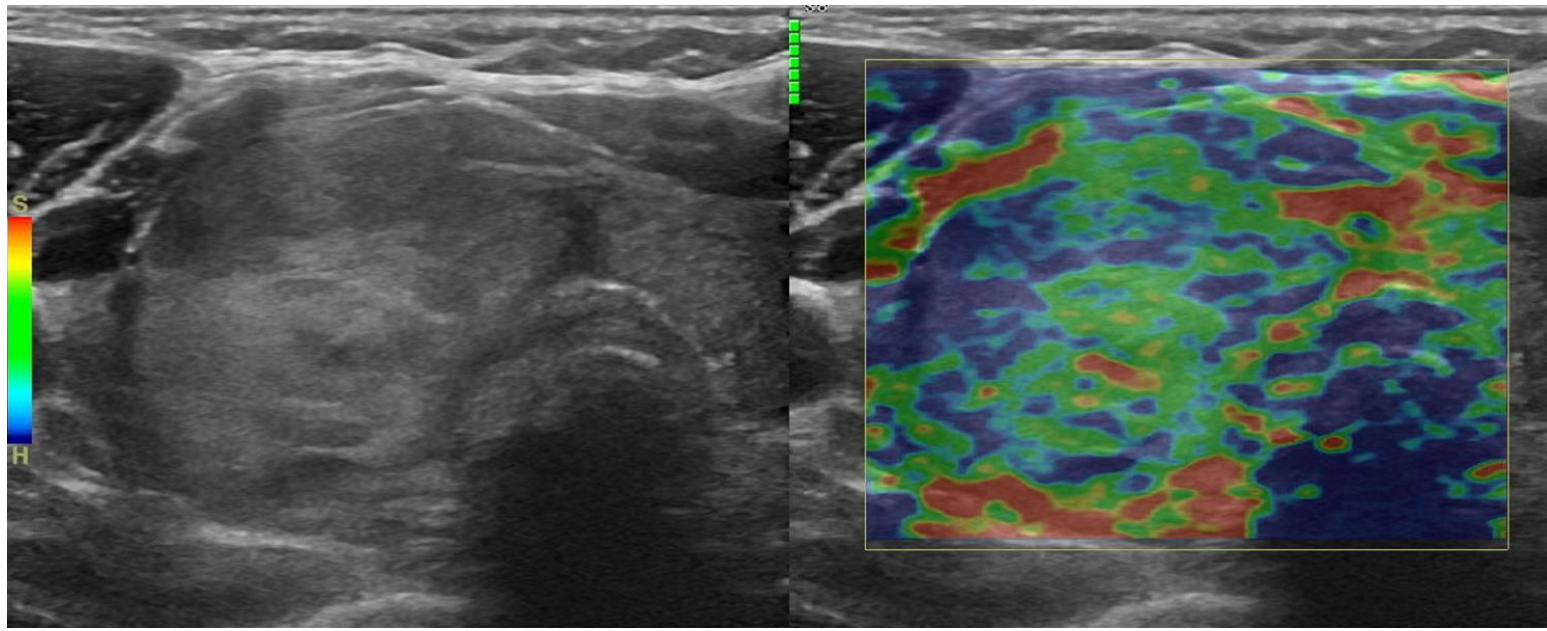
[Darwin Totesora](#)[✉] and [Ma. Theresa Chua-Agcaoili](#)

Thyroid Cancer Incidence



NATIONAL CANCER INSTITUTE
Surveillance, Epidemiology, and End Results Program





Nodule 1

2 Not Suspicious
No FNA
 2 pts = 3 pts - 1 3.8 cm

ACR TI-RADS® DESCRIPTORS

Solid Or Almost Completely Solid	2
Hyperechoic Or Isoechoic	1
Wider-Than-Tall	0
Smooth	0
None	0

Koios AI Adapter **-1**

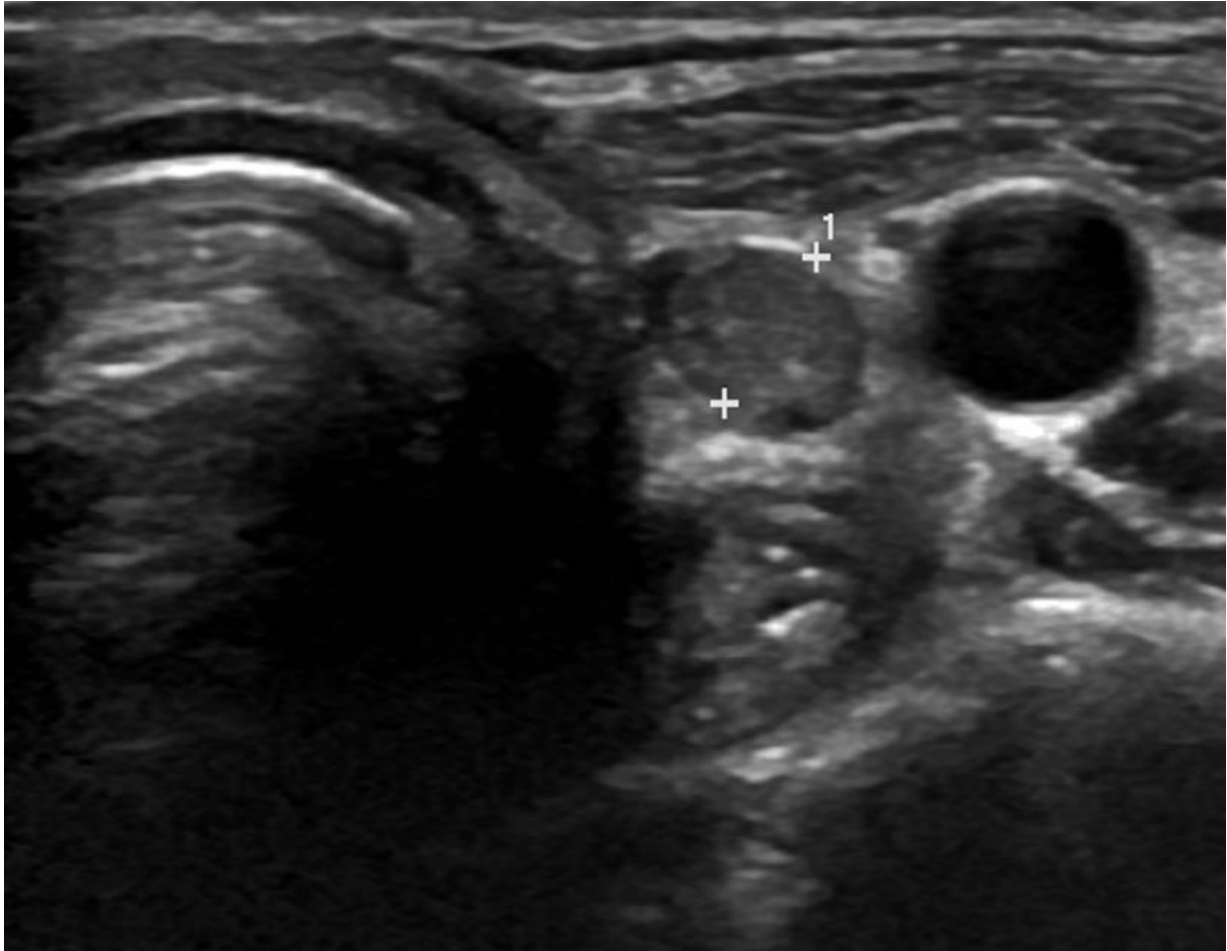
R **L**

-- position
 -- 3.8 x 3.6 x 2.9 cm

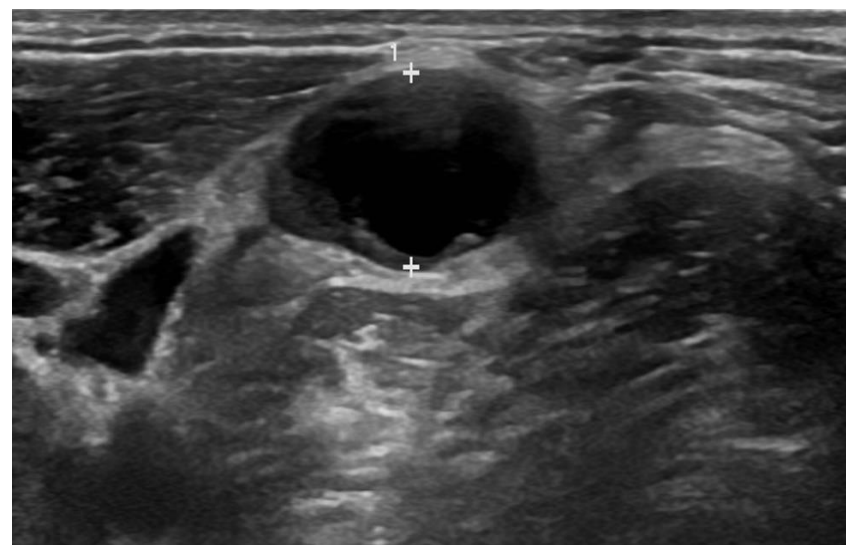
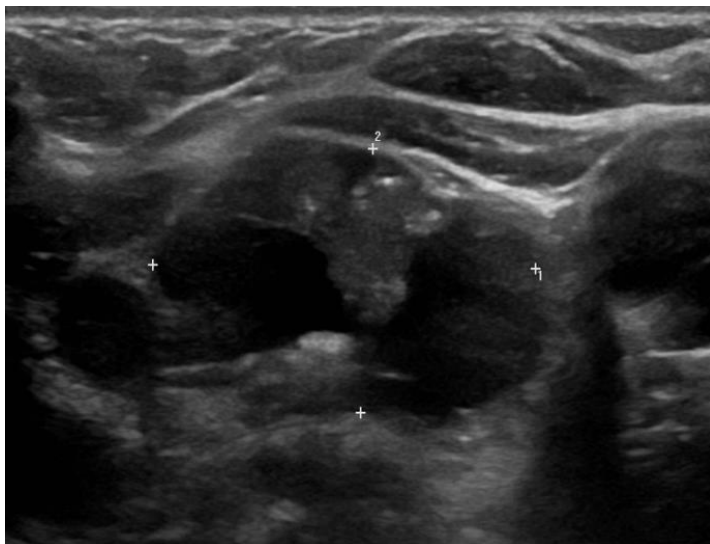
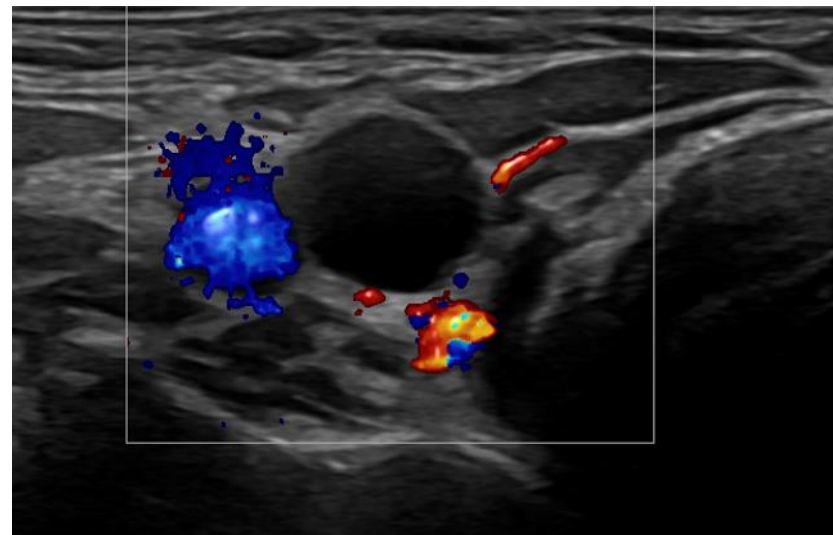
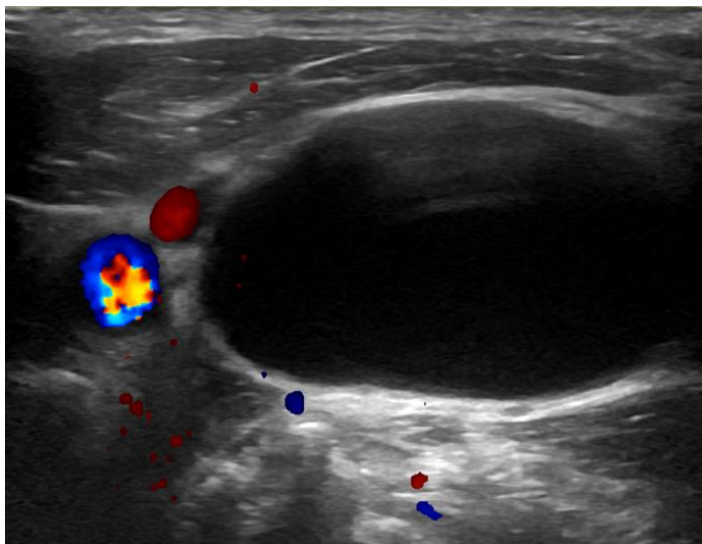
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Recurrent Disease

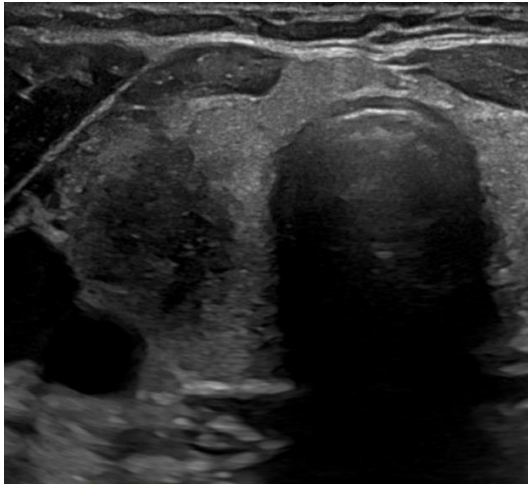


Cystic metastatic lymph nodes

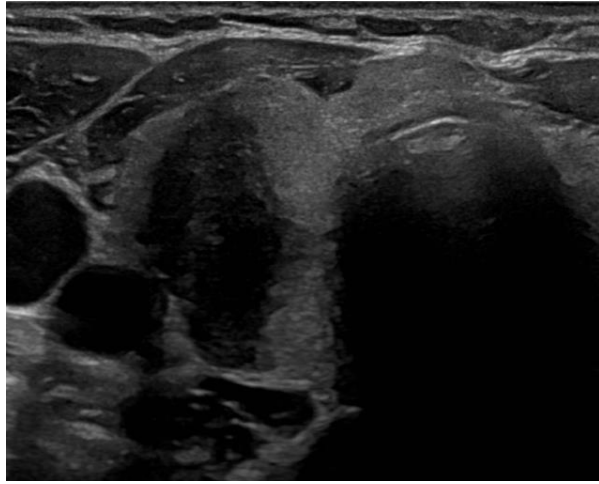


Thyroiditis

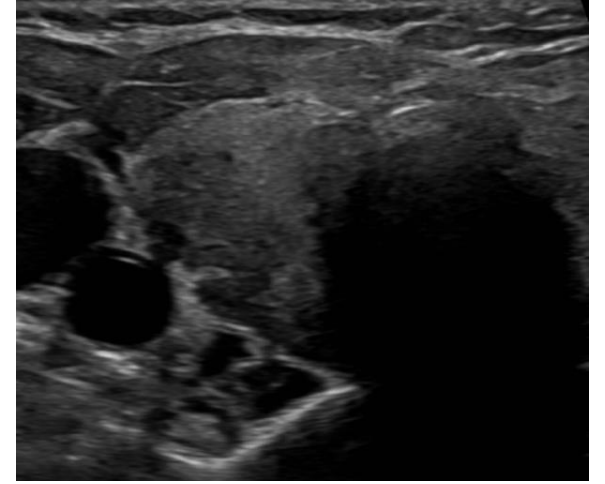
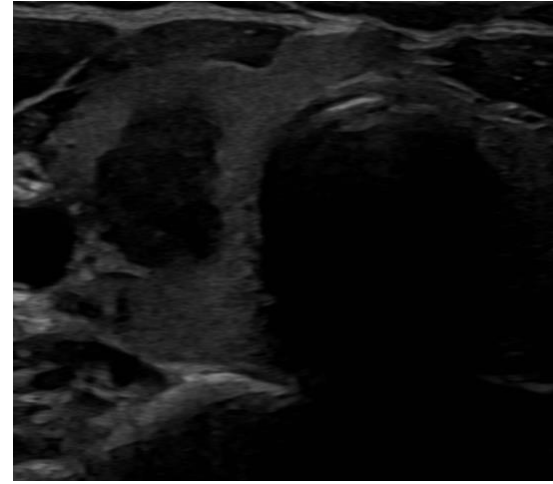
August
Thy1



August
Granulomatous thyroiditis Thy2

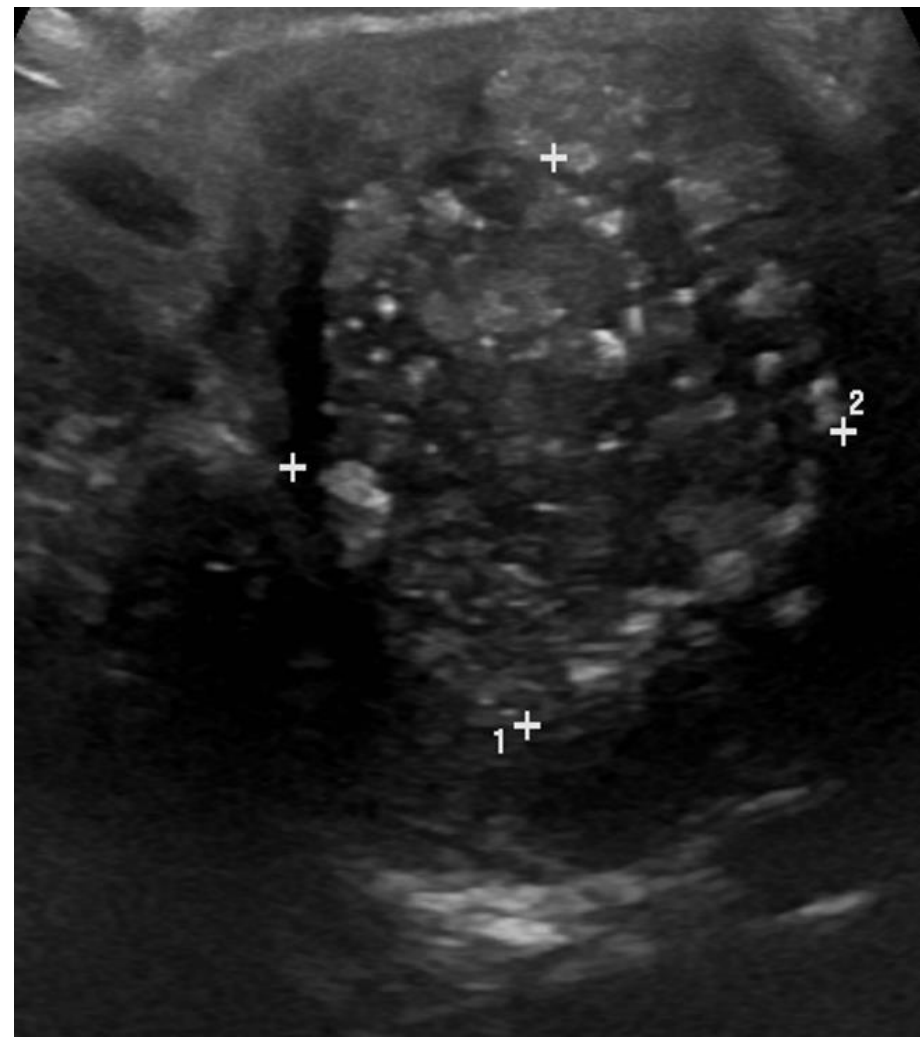


October

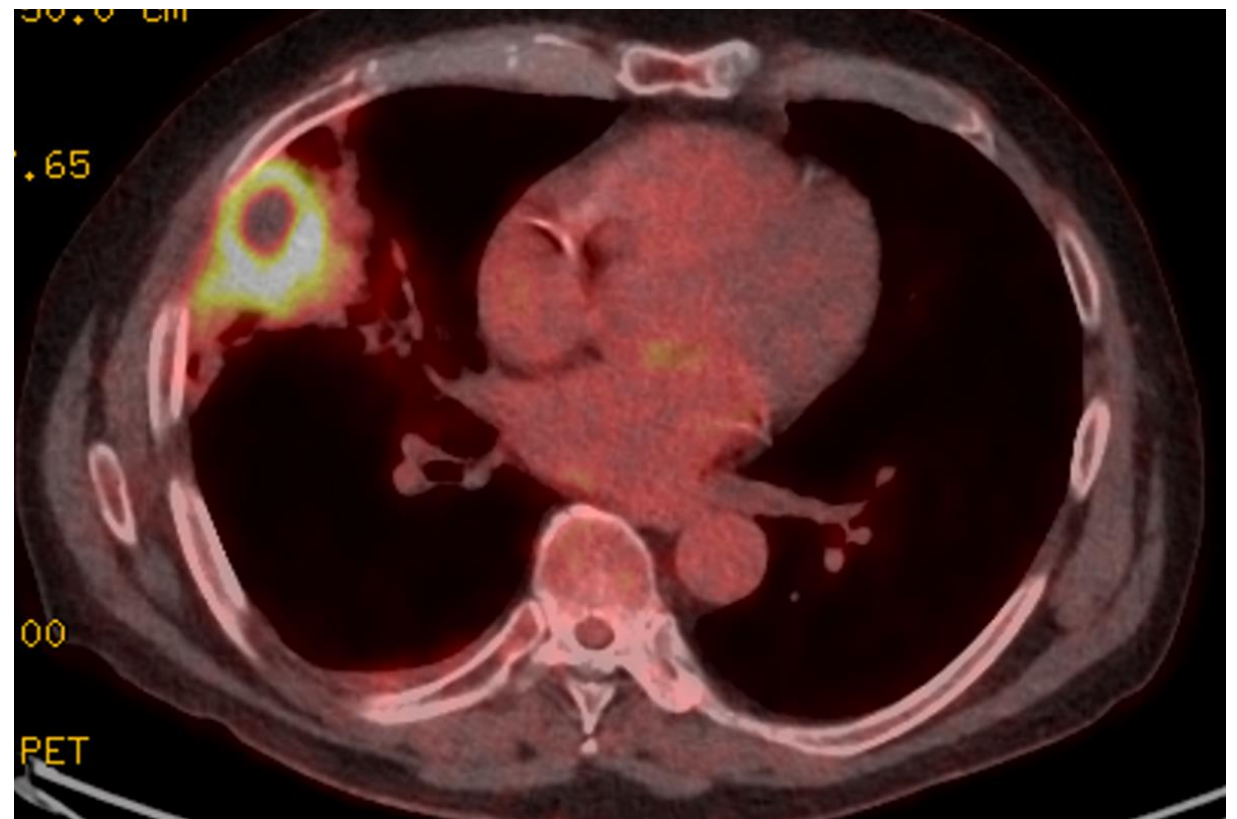
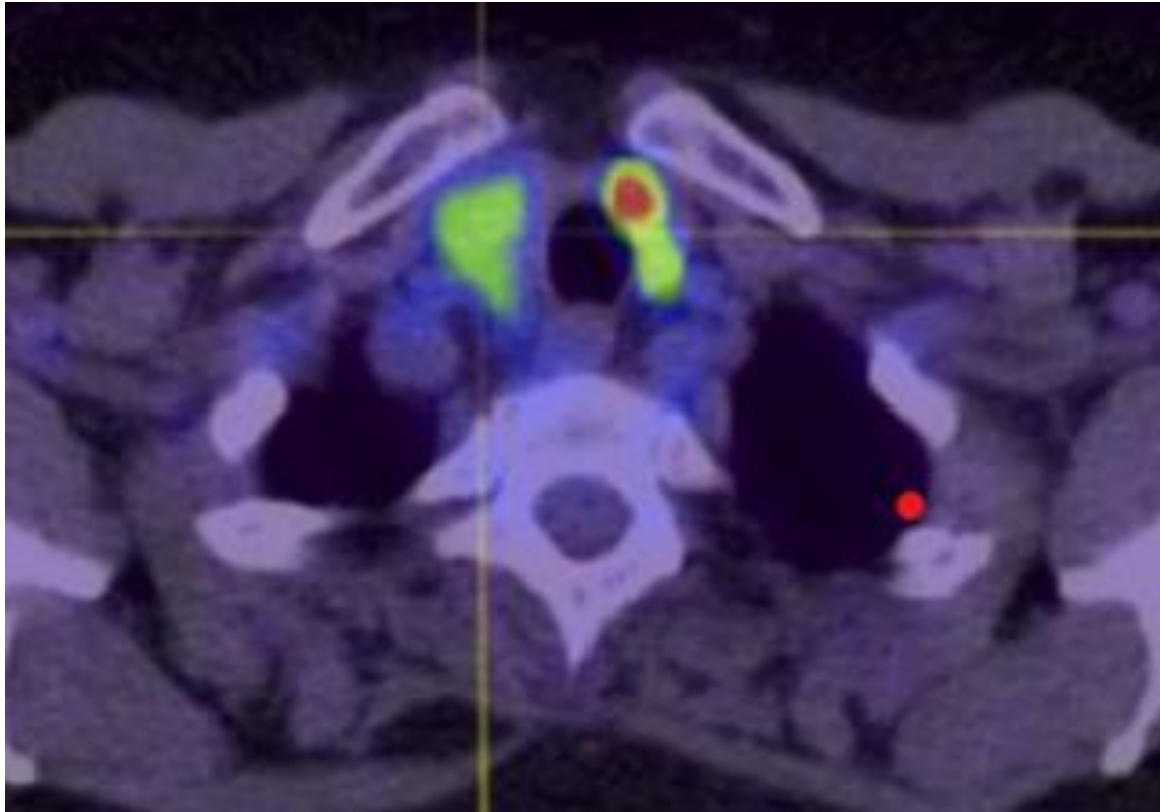


Free thyroxine 8.8pmol/L
TSH 6.2miu/L

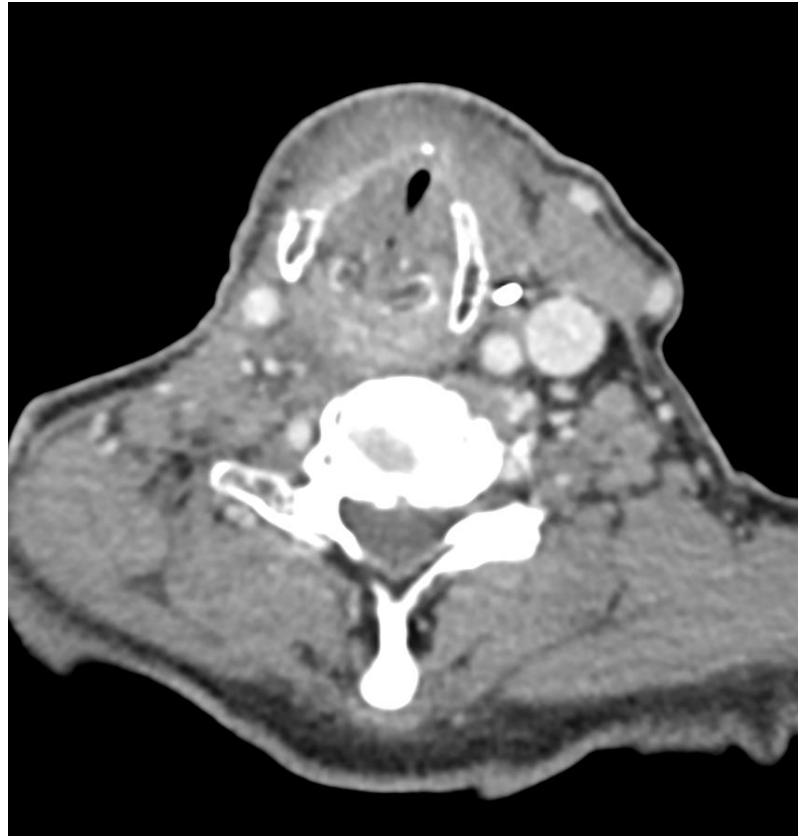
Benign cysts



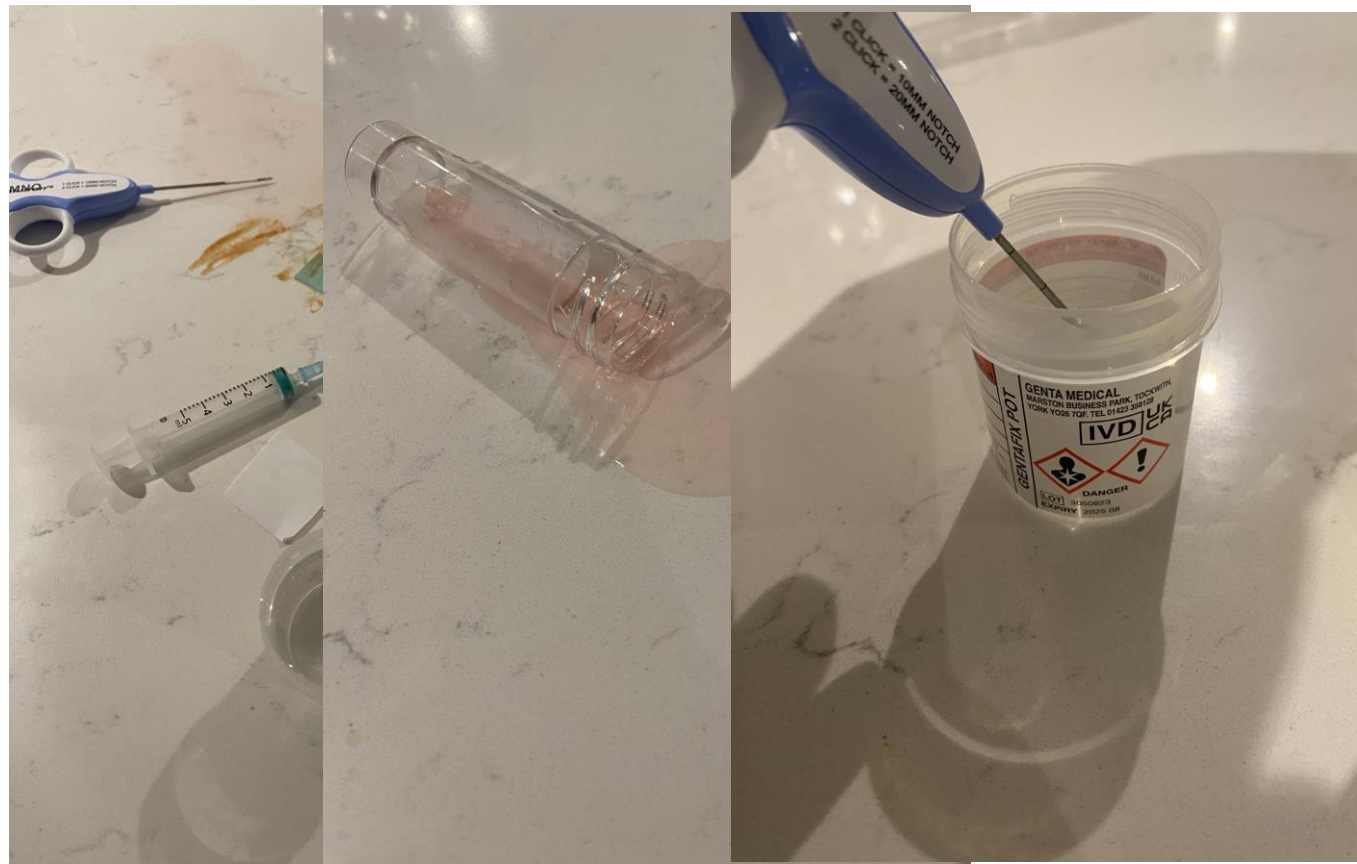
PET Incidentaloma!

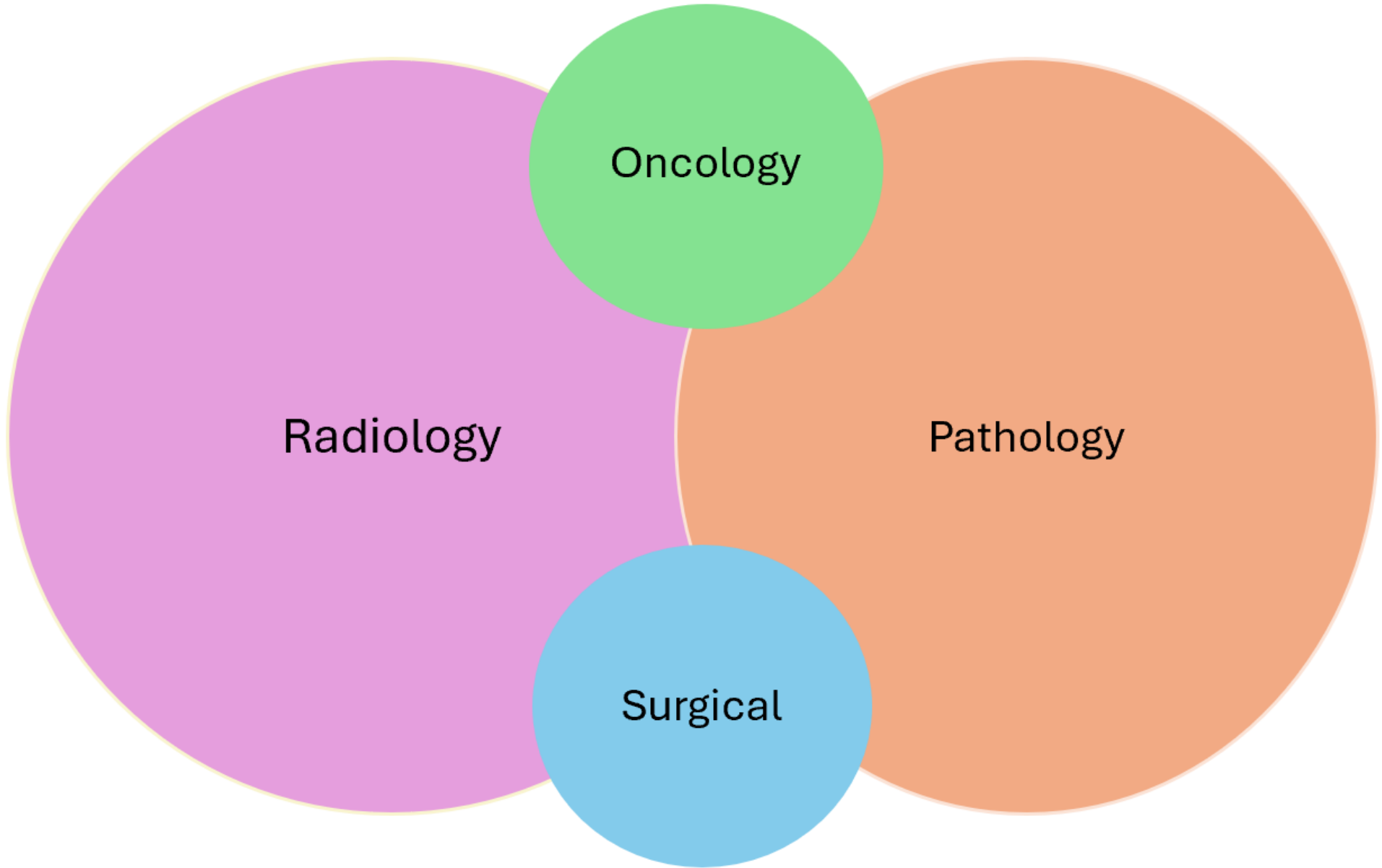


Cross Sectional imaging



Specimen Preparation





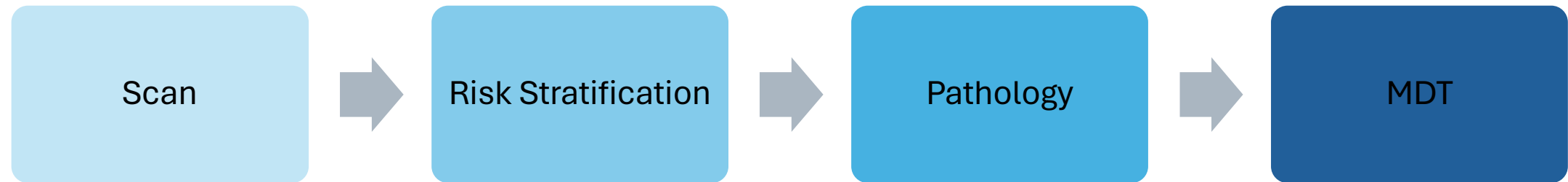
Radiology

Oncology

Pathology

Surgical

Summary



thank you!