

IN THE NAME OF GOD

Case presentation

Presentation By Dr. Ameneh Ahmadi

22nd Mordad 1402

Patient ID:

- ❖ Gender: man
- ❖ Age: 62-year-old
- ❖ Source of History: Patient, Reliable
- ❖ Married
- ❖ Born in Karaj
- ❖ Living in Karaj
- ❖ Occupation: Retired employee

Chief Complaint:

- A 62-year-old man with the history of PTC and total thyroidectomy.
- Refer for evaluation due to increasing of serum thyroglobulin level.

Present Illness

- A 62-year-old man
- One years ago (1401.04.02) he notices a lump in his neck.
- He refer to the doctor due to that lesion.
- The doctor recommended an ultrasound.

سونوگرافی تیروئید

تصویر لوب راست نسبتا بزرگ با اکوی نرمال مشاهده میشود .
علائمی از وجود ضایعات فضاگیر اعم از سولید یا کیستیک در آن مشاهده نمیشود .
تصویر لوب چپ بزرگ با اکوی کاملا هتروژن و غیر یکنواخت مشاهده میشود .

منطبق بر ناحیه قدامی داخلی لوب چپ و ناحیه چپ ایسم تصویر توده هیپواکو با حدود نامنظم و لوبوله به ابعاد 30×27 mm مشاهده میشود .

همین طور با توجه به شکل توده و اینکه با منشا خارج از نسج تیروئید ، MRI از گزردن توصیه میشود .
جهت بررسی بیشتر اسکن ایزوتوپ تیروئید و همین طور آزمایشات سرولوژیک توصیه میشود .
اندازه لوب راست 39×19 mm میباشد .
اندازه لوب چپ 40×20 mm میباشد .

سونوگرافی نسوج نرم گردن

غدد بزاقی تحت فکی و پاروتید دو طرف دارای ابعاد و اکوی نرمال میباشند .
علائمی از وجود ضایعات فضاگیر در آنها مشاهده نمیشود .
در سایر نواحی گردن نیز علائمی از ضایعات فضاگیر اعم از سولید یا سیستیک و
همین طور LAP مشاهده نمیشود .

1401.04.20

L.L nodule: hypoechoic,
irregular margin
Size: 30*27 mm

1401.05.09

FNA:

Negative for malignant cells

شماره سیتولوژی: C=01-1135 نام مراجعه کننده: سن: ۶۲ سال پزشک معالج: تاریخ پذیرش: ۱۴۰۱/۰۴/۲۸ تاریخ جوابدهی: ۱۴۰۱/۰۵/۰۹ ج: ۲

Thyroid F.N.A Report

Specimen
Thyroid left lobe , FNA

Clinical data
Not provided

Sonographic findings
- A hypoechoic mass in left lobe, with irregular borders and internal vascularity, 31x 23 mm in diameters. Extension to extrathyroid adjacent tissue is also reported.

Macroscopy
Specimen recieved as 2.0 ml of bloody fluid.Smears prepared after centrifugation.

Microscopy
Smears show high cellularity with benign thyroid epithelial cells; some as clusters, lymphocytes and PMNS in a hemorrhagic background.

Diagnosis
Thyroid left lobe FNA:

• Negative for malignant cells.

1401.07.12

شماره پذیرش: ۰۷-۲۲۵ تاریخ پذیرش: ۱۴۰۱/۰۷/۱۲ تاریخ جوابدهی: ۱۴۰۱/۰۷/۱۶ پزشک معا: [Redacted]
نام مراجعه کننده: [Redacted] سن: ۶۱ سال شماره پاتولوژی: C-01-1744

Cytology Report

Clinical History: Thyroid gland, isthmus lobe nodule.
Sonography: A nodule measuring 36x25 mm in size in left side of isthmus thyroid lobe in normal thyroid background. (TIRADS 4).
Radiologic diagnosis: R/O PTC

Material received:
Seven unstained slides (2 air dried and 5 alcohol fixed) designated as "Thyroid gland, left side of isthmus lobe nodule" are received, stained by Wright and PAP methods, respectively for cytopathological study.

Microscopy:
Smears are hypercellular and show many isolated and clusters of thyroid follicular cells, some with papillary configuration, enlarged nuclei, smooth chromatin, nuclear grooves, and pseudoinclusions as well as some multinucleated giant cells in a bloody and colloid background.

Diagnosis:
Designated as "Thyroid gland, left side of isthmus lobe nodule, FNA":
-Positive for papillary thyroid carcinoma.

Comment:
Clinico-radiologic correlation is recommended.

Age : 61 Y Date : 12/07/1401

Dear Colleague : HABIBI

FNA :

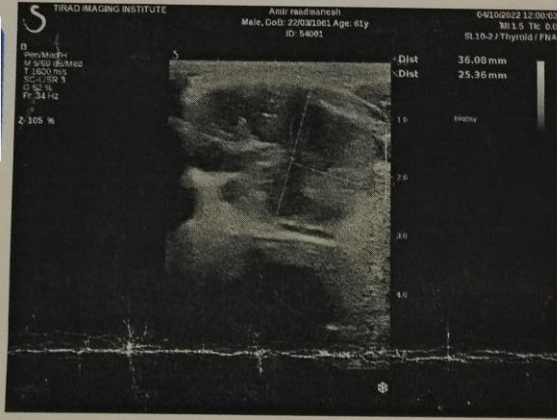
Under sonography control percutaneous **FNA biopsy** of left side of isthmus nodule (TIRADS IV , 36x25 mm) has been done.

Thyroid background: Normal thyroid

Radiologic diagnosis: R/O PTC

[Redacted] Radiologist-Interventionist

[Redacted] Radiologist-Interventionist



TIRAD IMAGING INSTITUTE
Amir rezaresh
Male, DOB: 22/03/1941 Age: 61y
ID: 54001
04/10/2022 12:00:00
MI 1.5 TR: 0.0
SI 16.2 / Thyroid / FNA

Dist 36.00 mm
Dist 25.36 mm

2.105 %

FNA: Positive for PTC

1401.08.01

1. Total thyroidectomy
2. Modified radical neck dissection

بیمارستان مهر
برگ خلاصه پرونده
FILE SUMMARY SHEET

شماره پرونده: 54-40-67
40113814

Attending Physician: [Redacted]	Ward: [Redacted]	Room: [Redacted]	Bed: DC, 1	Date of Birth: [Redacted]	Father's Name: [Redacted]
Date of Admission: ۱۴۰۱/۰۸/۰۱	Date of Discharge: [Redacted]	Occupation: [Redacted]	Marital Status: Single <input checked="" type="checkbox"/> Married <input type="checkbox"/>	Sex: Male <input type="checkbox"/> Female <input type="checkbox"/>	

Address & phone Number: [Redacted]

Chief Complaint of the Patient & Primary Diagnosis: Papillary Thyroid Carcinoma

Final Diagnosis: Papillary Thyroid Carcinoma

Medical & Surgical Procedures: 1) Total Thyroidectomy
2) Modified Radical Neck Dissection

Results of Paraclinical Examination: [Redacted]

Disease Progress (Cause of Death): [Redacted]

Patient's Condition on Discharge: [Redacted]

Recommendations after Discharge: [Redacted]

Attending Physician's Name & Signature: [Redacted]

برگ خلاصه پرونده

Laboratory exam after surgery in 1401/08/02

test	result	Normal range
WBC	7.32 *10 ⁹ /L	4.4-11
Hemoglobin	15.8 g/dl	14-18
Hematocrit	46.2%	42-52
platelet	283 *10 ⁹ /L	150-450
Urea	35 mg/dl	< 50
Creatinine	1.2 mg/dl	<1.5
Calcium	9.9mg/dl	8.5-10.3
Ph	3.3 mg/dl	2.7-4.5
FBS	114mg/dl	70-99

Pathology

Clinical data :

Left thyroid lobectomy with frozen section

Macroscopic :

The specimens received in fresh status consist of left thyroid lobectomy weight :20 gr and Measuring 4.5x3.5x3 cm external surface is unremarkable . On sections show one creamy nodule 3.5x2 cm with necrotic changes and some attached nodules. M/6

Microscopic :

Supported by following diagnosis .

Diagnosis :

LEFT THYROID LOBECTOMY WITH FROZEN SECTION AND PERMANENT REPORT :

- Classic papillary carcinoma (size: 3.5 cm).
- The tumor invades to perithyroid skeletal muscle with safe margin .
- Positive for lymphovascular invasion .
- Attached metastatic lymph nodes x5 .

Clinical data :

- A) Right thyroid lobe , right lobectomy
- B) Left neck lymph node , excision
- C) Left pre-tracheal lymph node , excision

Macroscopic :

The specimens received in formalin consist of :

- A) Left lobectomy specimen weight :14 gr and Measuring 4x3x2cm external surface & cut sections are unremarkable . M/3
- B) Multiple fibrofatty tissue 5x5x1.5cm . M/10
- C) Multiple fibrofatty tissue 4x3x1cm . M/5

Microscopic :

Supported by following diagnosis .

Diagnosis :

A) RIGHT THYROID LOBE , RIGHT LOBECTOMY:

- Normal thyroid tissue (Weight 14gr).
- Negative for malignancy .

B) LEFT NECK LYMPH NODE , EXCISION:

- Lymph node x22, ten of them are metastatic .

C) LEFT PRE-TRACHEAL LYMPH NODE , EXCISION :

- Lymph node x6, five of them are metastatic .
- One ectopic parathyroid gland .
- One ectopic thymic tissue.

1. The tumor invades to perithyroid skeletal muscle with safe margin
2. L.Neck lymph node 10/22 are metastatic
3. L.PRE- Tracheal lymph node 5/6 are metastatic

Present Illness

1401.09.24

- RAI \longrightarrow 150 mic

Test	Result
TSH	28 miu/l
Tg	239 mg/dl
Anti-Tg	< 5

Present Illness

Patient Name :

Ref Physician :

Age : 61 Y

Date of exam : 1401/10/01

Whole body scan I-131

Procedure :

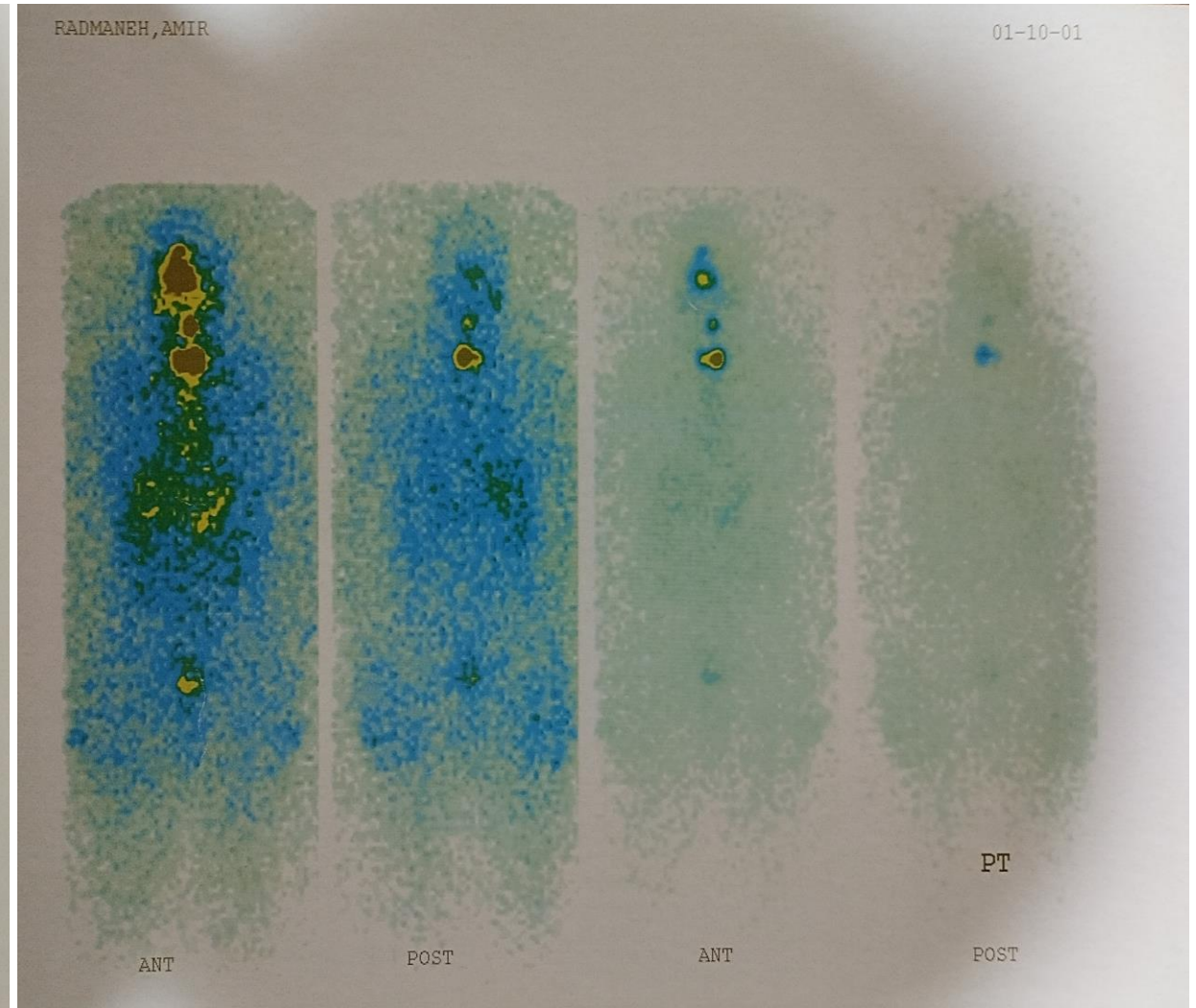
One week after treatment with 150 mCi I-131 whole body imaging performed in anterior and posterior projections.

Description :

The scan shows two foci of radioiodine uptake in the cervical region. No other remarkable abnormal activity is noted in the rest of the body.

Interpretation :

- Post surgical remnant thyroid tissue in thyroid bed.
- No evidence of distant metastasis.

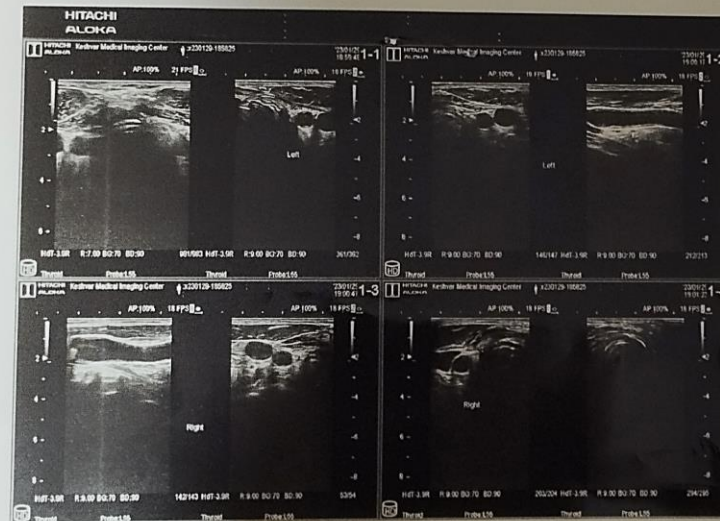


Present Illness

1401.11.09

Sonography: Normal

بیمار رادیکال تیروئیدکتومی شده است.
در بررسی اولتراسونیک بعمل آمده از بستر تیروئید و نواحی قدامی گردن با پروب 10 MHz، رزیدوی
باقث تیروئید، ضایعه فضاگیر Solid یا Cystic و یا نمای پاتولوژیک اختصاصی در بستر تیروئید و
قدام گردن مشاهده نمیگردد.
لنفادنوپاتی نیز در نواحی قدامی گردن دیده نمیشود.

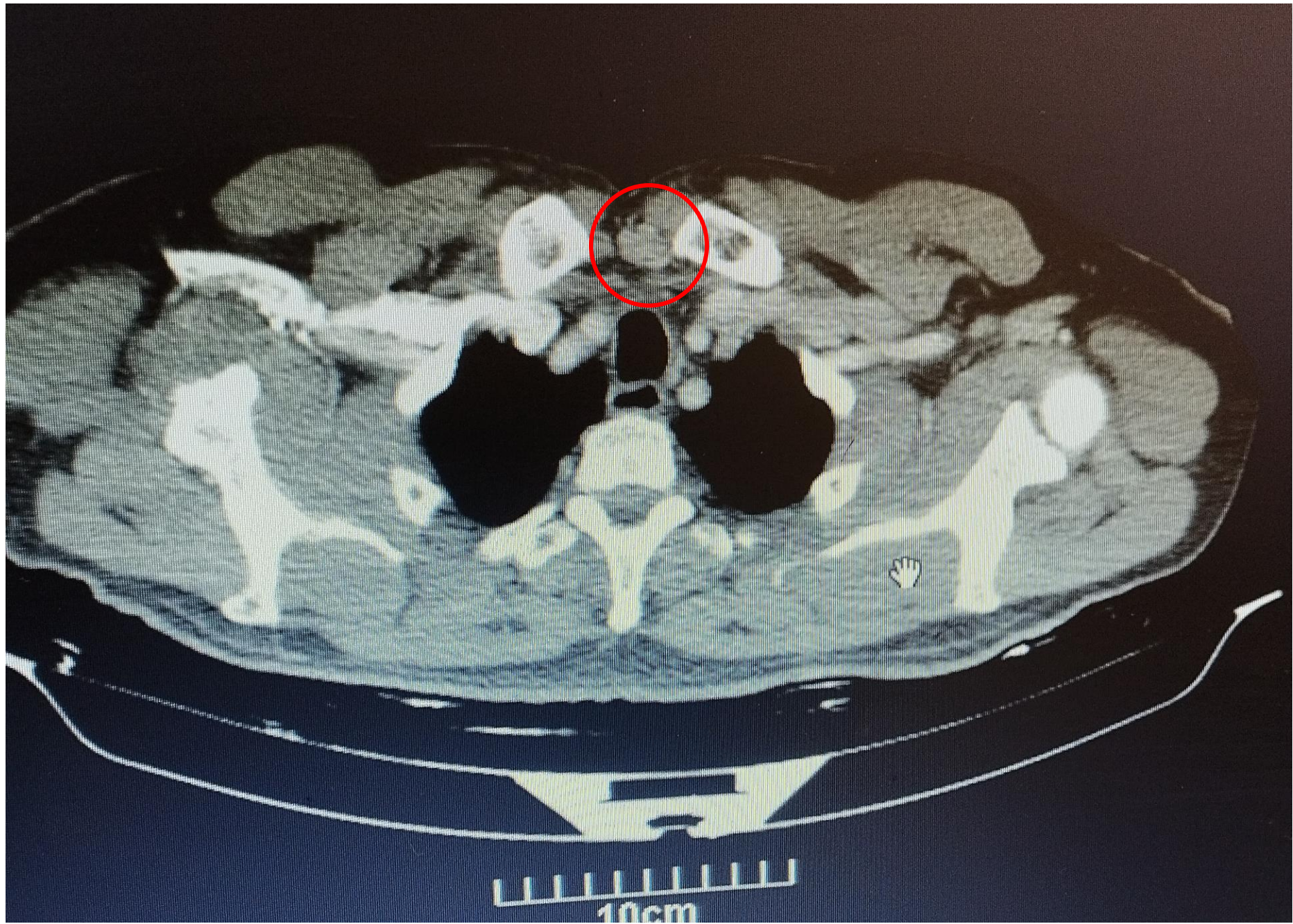


Present Illness

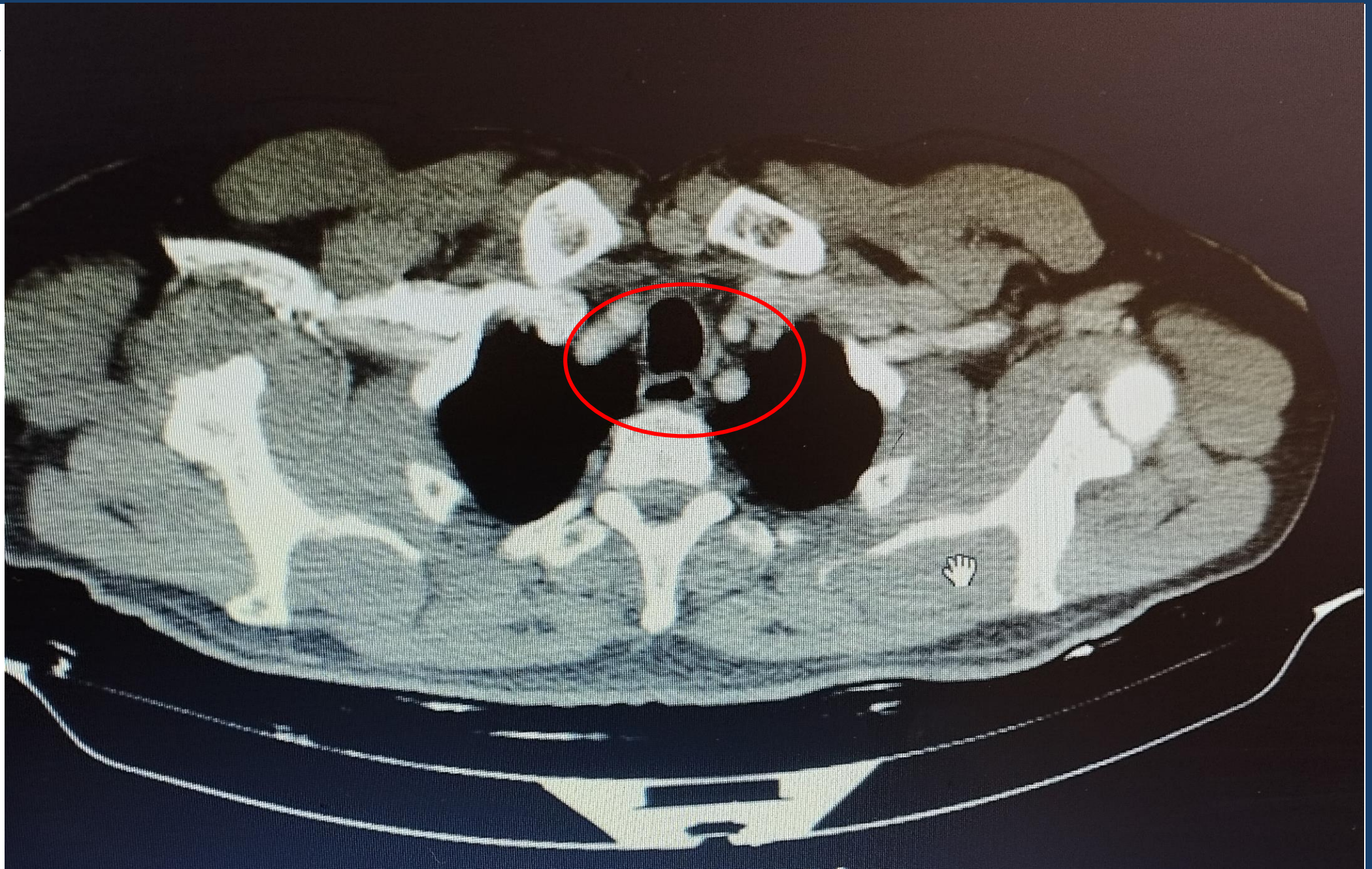
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Test	Result
TSH	0.2 miu/l
Tg	11.3 mg/dl
Anti-Tg	6

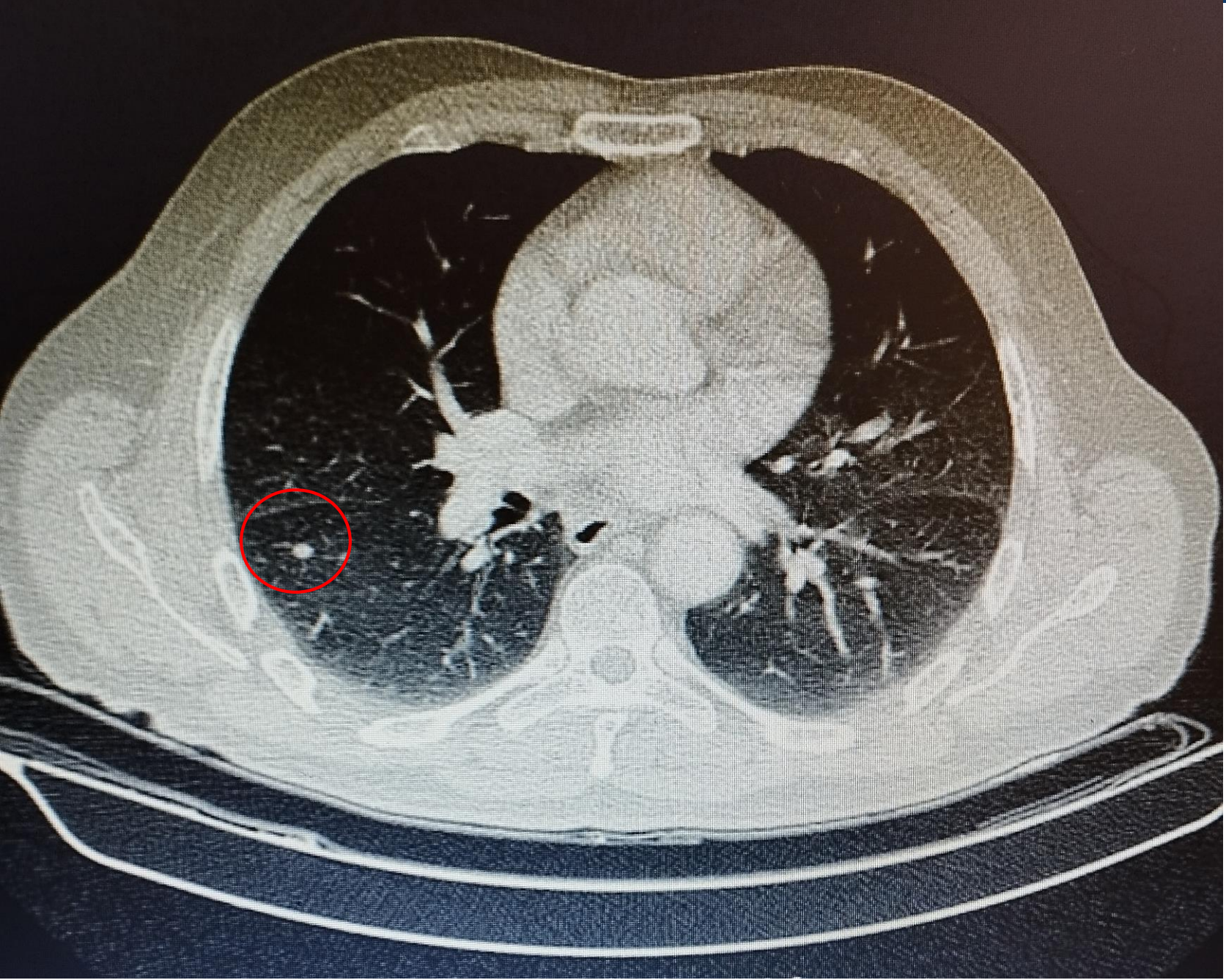
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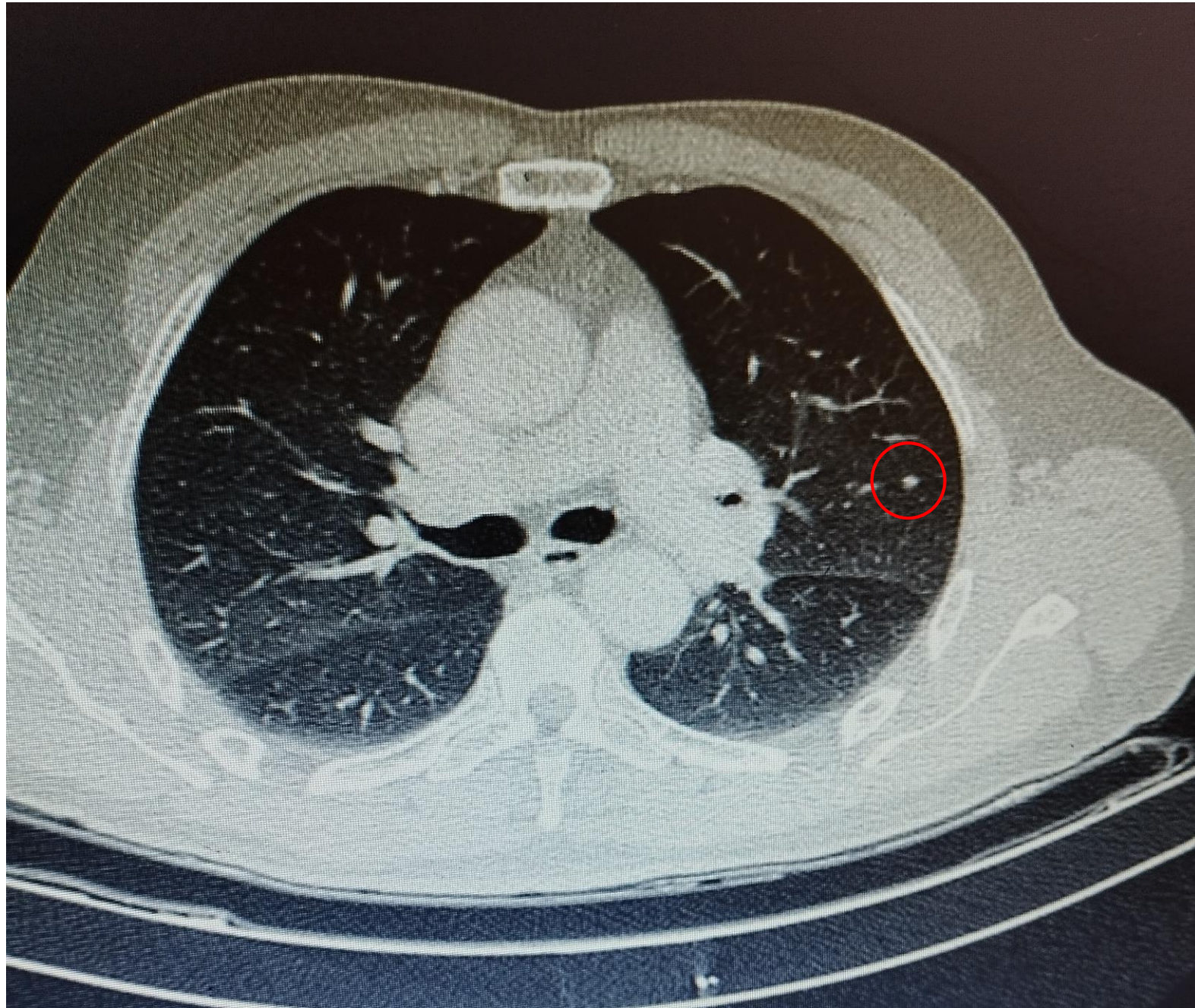
1401.12.01



1401.12.01



1401.12.01



1401.12.01

Neck CT:

LAP 16*13mm at
suprasternal notch

A few prominent lymph nodes
at left paratracheal region
inferior to the anatomical
location of thyroid gland SAD
of 6 mm

Chest CT:

Few fibrotic-appearing
subpleural nodules at LLL
with maximum diameter of
4 mm

Spiral Neck CT Scan (with & without contrast):

Evidence of previous total thyroidectomy is noted. Grossly no solid or cystic lesion is depicted at bed of operation.

There is a 16*13mm LAP at suprasternal notch.
There are also a few prominent lymph nodes at left paratracheal region inferior to the anatomical location of thyroid gland with maximum SAD of 6mm.

Muscular structures have normal shape and configuration.

Vascular structures are intact with smooth walls.

There is no abnormal post contrast enhancement.

Spiral Chest CT Scan (with & without contrast):

There are few fibrotic-appearing subpleural nodules at LLL with maximum diameter of 4mm.

No pleural effusion is seen.

No significant mediastinal LAP is noted.

Heart & great vessels size are within normal limits.

There is no abnormal post contrast enhancement.

Spiral Abdominopelvic CT scan (with & without IV & Oral contrast):

Small sliding hiatal hernia is evident.

Liver is within normal limits in diameter and density.

No intrahepatic focal mass lesion is noted.

Gall bladder & bile ducts are normal.

Spleen has normal size with homogeneous density.

Both kidneys show normal size and shape with proper excretion.

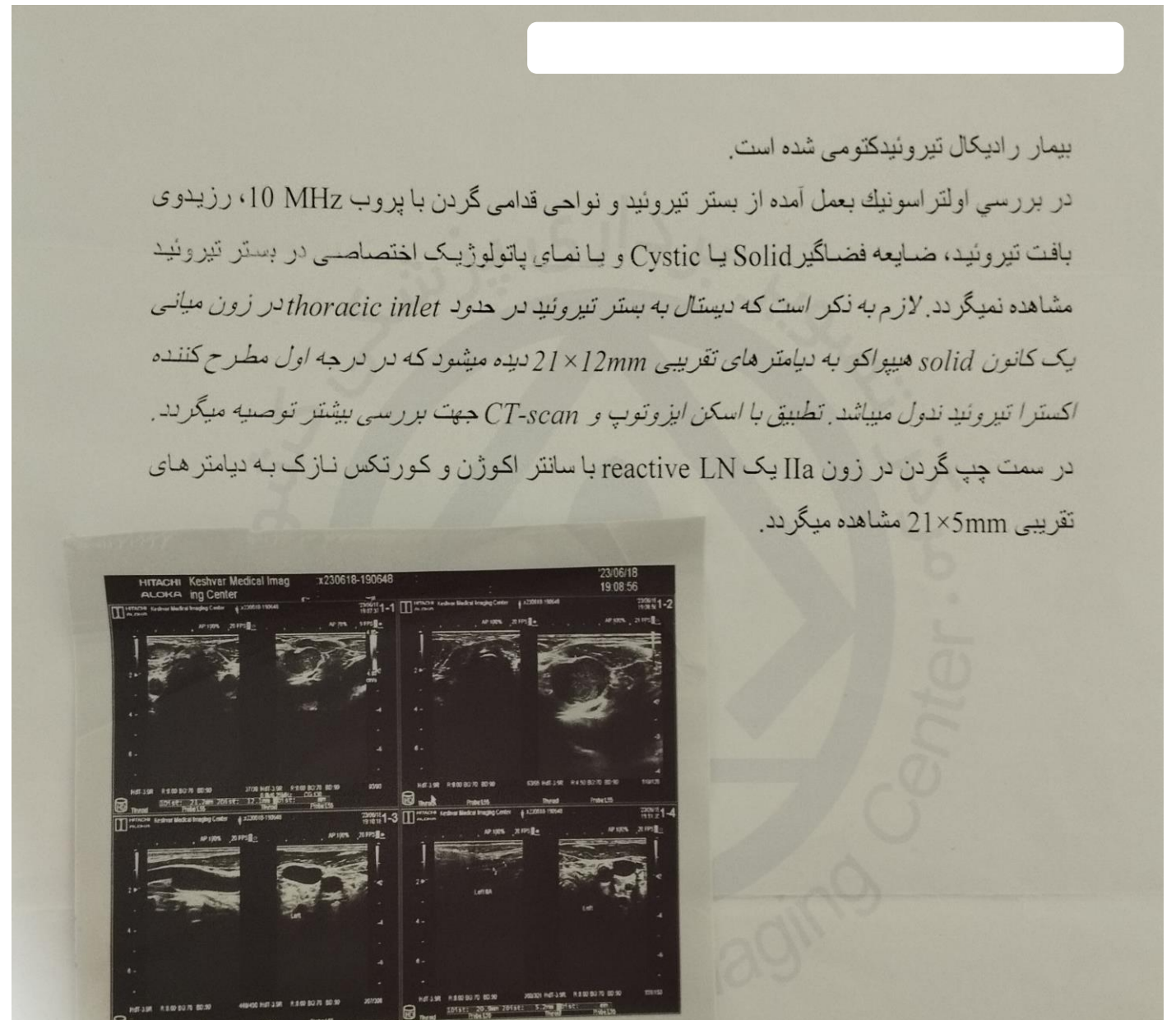
Pancreas appears unremarkable. MPD is not dilated.

There is no evidence of ascites or significant paraaortic LAP.

No obvious intrapelvic abnormality is found. /b

1402.03.28

- In thoracic inlet in middle zone a solid and hypoechoic lesion: 21*12 mm
- In left side of the neck in zone IIa a reactive LN: 21*5 mm



Present Illness

1402.04.01

- Diagnostic WBS → 5 mic

Test	Result
TSH	>100 miu/l
Tg	324.7 mg/dl
Anti-Tg	< 20

Present Illness

1402.04.01

Whole body scan I-131

Procedure :

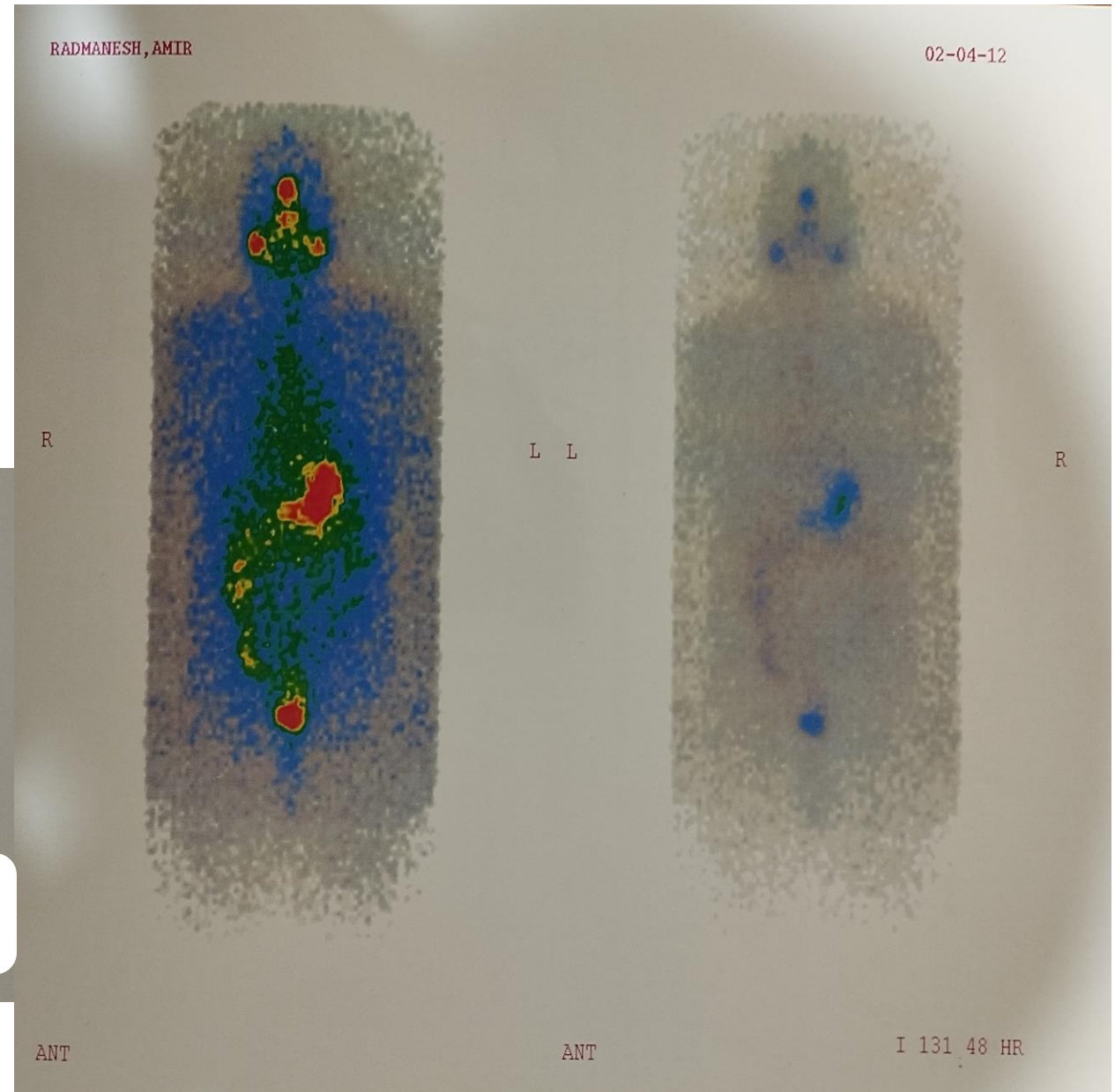
48 hours after oral administration of 5 mCi I-131 whole body imaging performed in anterior and posterior projections.

Description :

The scan shows physiologic radiotracer activity throughout the body.

Interpretation :

- The study is negative for abnormal radioiodine uptake



1402.04.28

FDG-PET

Radmanesh, Amir
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1402.04.28

There is an FDG-avid lymph node in supra sternal notch (size= 20*15 mm). Chain of FDG-avid lymph nodes are noted in tracheoesophageal groove in lower neck and superior mediastinal regions.

FDG-PET/CT SCAN REPORT

Patient Name: [REDACTED]

Date: 1402/04/28 (July 19, 2023)

Age: 62 Y/O

Height: 170 cm

Referring: [REDACTED]

Weight: 80 Kg

Technique:

Blood Sugar at injection time: 90 mg/dl

Duration of fasting: At least 6 hr

Injected Dose: 9 mCi of F-18 FDG

Interval between injection and acquisition: 60 min

Field of View: Skull-base to Mid-Thigh

Time/Bed position: 3 min Acquisition: 3D HD

Low-dose CT images (30 mAs and 120 KV) without contrast were obtained for attenuation correction and anatomical localization purposes. The CT quality of low-dose PET/CT study is not intended to replace the diagnostic CT quality used for clinical purposes.

Diagnosis: PTC

Indication: Evaluation of Metastasis

Findings:

Brain, Head and Neck:

No remarkable structural finding or abnormal FDG uptake is noted in the brain. **There is an FDG-avid lymph node in suprasternal notch (SUVmax=46, size=20x 15mm). Chain of FDG-avid lymph nodes are noted in tracheoesophageal groove in lower neck and superior mediastinal regions (SUVmax=16.8).** Physiological uptake is seen in salivary glands and tonsils.

Thorax:

Lungs and Hila: There are a few pulmonary nodules without FDG uptake located in the left pulmonary fissure, apicoposterior segment of LUL (5mm) and superior segment of RLL; all of them are less than 5mm. There are multiple pulmonary nodules randomly distributed in both lung fields (with both centrilobular and perilymphatic patterns). Bilateral hilar lymph nodes with moderate FDG uptake are noticed (right side SUVmax=6.8 and left side SUVmax=8.3) more likely due to inflammatory process. **Mediastinum and Axillary Regions:** No remarkable lymphadenopathy or abnormal FDG uptake is visualized in the mediastinal and axillary regions.

Chest Wall: No remarkable structural abnormality or abnormal FDG uptake is seen in the chest wall.

1402.05.28

Chain of FDG-avid lymph nodes are noted in tracheoesophageal groove in lower neck and superior mediastinal regions.

FDG-PET/CT SCAN REPORT

Patient Name: [REDACTED] Date: 1402/04/28 (July 19, 2023)
Age: 62 Y/O Height: 170 cm
Referring [REDACTED] Weight: 80 Kg

Abdomen:

Liver and Spleen: Liver and spleen reveal normal structural appearance and metabolic activity

Gastrointestinal/Peritoneal/Retroperitoneal: No remarkable lymphadenopathy or FDG-avid lesion is noted in the intraperitoneal and retroperitoneal regions. Physiologic uptake is seen throughout the gastrointestinal tract.

Urinary System: Physiologic uptake is noticed within the kidneys, ureters and bladder.

Other Abdominal Viscera: No abnormal uptake is noted in the adrenal glands and pancreas.

Pelvis:

No remarkable structural finding or abnormal FDG uptake is seen in the pelvis.

Musculoskeletal System:

Linear calcification is noted in the site of muscle insertion to left greater trochanter due to old chronic enthesopathy. Well-defined sclerotic changes without FDG uptake is noted in the bilateral femoral heads, bilateral iliac bones and bilateral humerus heads.

Impression:

- Multiple metastatic lymph nodes in suprasternal notch and left tracheoesophageal groove (at the level of lower neck and superior mediastinum).
- Multiple pulmonary nodules randomly distributed in both centrilobular and perilymphatic patterns suspicious for metastases; (however, because the size of nodules is below the threshold of PET for characterization of metabolic activity, follow-up CT study is strongly recommended).

1402.05.15

71894-62Y

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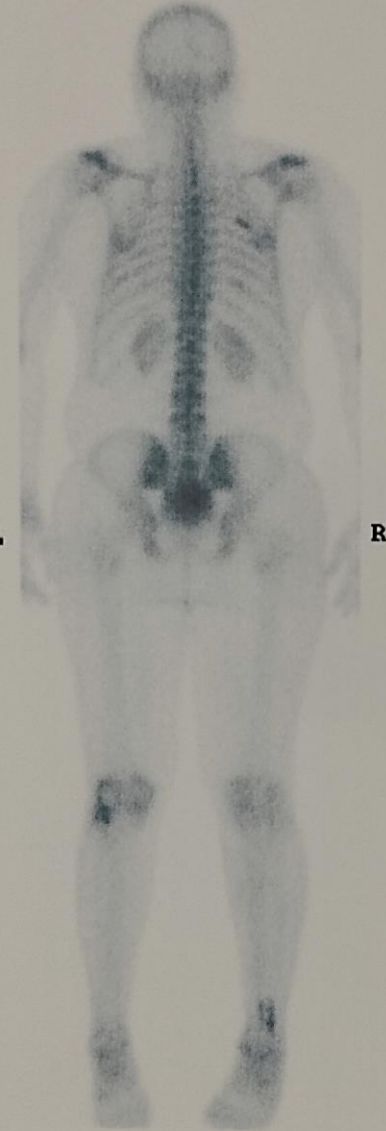
TALEGHANI MEDICAL CENTER
NUCLEAR MEDICINE DEPARTMENT

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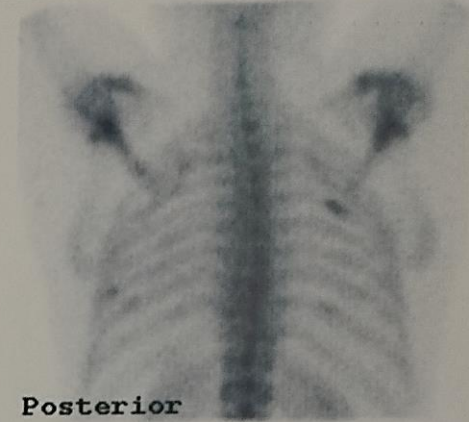
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ANTERIOR



POSTERIOR



Posterior

1402.05.15

WHOLE BODY BONE SCAN BY ^{99m}Tc - MDP

2 hours after IV injection of ^{99m}Tc - MDP, scanning was performed in anterior and posterior projections.

A focal radiotracer uptake is detected in posterior aspect of 5th or 6th rib on right side, medial to medial border of right scapula. There are two other in-line foci of uptake in posterolateral aspect of 7th or 8th rib on left side. Distal part of right tibia also reveals hyperactivities.

Except for degenerative changes in knees and spine, no other abnormality is detected in the skeleton.

IMPRESSION:

Findings of ribs and right distal tibia are in favor of traumatic lesion. Otherwise, scan is negative for metabolically active bone metastasis.

- Past medical:

- PTC, Total thyroidectomy (1401)

- Drug history:

- Levothyroxine 1050mcg per weeks
- Aspirin 80 mg OD
- Atorvastatin 20 mg OD
- Piracetam 800 mg OD

- Habitual History:

- Neg

- Family History :

- Neg

- Social History :

- Married

- Three children

- Education: high school Degree

Review of Systems:

- ▶ Headache (-) Nausea & Vomiting (-) Visual problems (-)
- ▶ Weight changes (-) Appetite changes (-) Sexual problems (-)
- ▶ Skin: Pigmentation (-) Diaphoresis (-) Dry & Fragile Hair (-)
- ▶ Ears, nose, mouth: N1
- ▶ Cardiovascular: N1, Palpitation (-)
- ▶ Respiratory: N1
- ▶ Gastrointestinal: N1, Epigastric pain (-)
- ▶ Musculoskeletal: N1
- ▶ Neurological: N1
- ▶ Psychiatric: N1

Physical Examination:

- General Appearance:

- A 62-year-old man , awake and alert

- Vital Sign:

- BP: 120/80 mmHg
- HR: 98 / min

- BMI:

- Wight: 83Kg Hight:1.68 m BMI:29.4 Kg/m²

Physical Examination:

- Neck: Scar of pervious surgery
- Thorax: Nl
- Lungs : Clear
- Heart : Normal
- Abdomen : Normal
- Skin: No pigmentation
- Extremities :
 - Upper : Normal
 - Lower : Normal

Problem list:

- A 62-year-old
- PTC with locoregional metastatic lymph nodal
 - Elevated Tg in multiple laboratory tests
 - Sonography shows a lesion thoracic inlet
 - WBS (Negative)
 - FDG-avid in lymph nodal in suprasternal notch and tracheoesophageal groove in lower neck and superior mediastinal regions.

PTC with locoregional recurrent

AGENDA:

- ✓ Risk stratification of patient
- ✓ What's the risk factors for LRR?
- ✓ Diagnostic work up for PTC with locoregional LN recurrence (structural neck recurrence)?
 - Role of serum Tg to guide decision-making in this patient?
 - Role of imaging studies (US, CT, MRI, PET) for LRR diagnosis ?
- ✓ What are the treatment modalities for LRR?

TABLE 2. COMPARISON OF THE AJCC SEVENTH AND EIGHTH EDITION STAGING SYSTEM

	<i>Stage</i>	<i>7th edition description</i>	<i>7th edition 10-year DSS</i>	<i>8th edition description</i>	<i>8th edition expected 10-year DSS</i>
Younger patients	I	<45 years old All patients without distant metastases, regardless of tumor size, lymph node status, or extrathyroidal extension	97–100%	<55 years old All patients without distant metastases, regardless of tumor size, lymph node status, or extrathyroidal extension	98–100%
	II	<45 years old Distant metastases	95–99%	<55 years old Distant metastases	85–95%
Older patients	I	≥45 years old ≤2 cm tumor Confined to the thyroid	97–100%	≥55 years old ≤4 cm tumor Confined to the thyroid	98–100%
	II	≥45 years old 2–4 cm tumor Confined to the thyroid	97–100%	≥55 years old Tumors >4 cm, or tumors of any size with central or lateral neck lymph nodes, or gross extrathyroidal extension into strap muscles	85–95%
	III	≥45 years old >4 cm tumor, or minimal extrathyroidal extension, or central neck lymph node metastasis	88–95%	≥55 years old Tumors of any size with gross extrathyroidal extension into subcutaneous tissue, larynx, trachea, esophagus, recurrent laryngeal nerve	60–70%
	IV	≥45 years old Gross extrathyroidal extension, or lateral neck lymph node metastasis, or distant metastasis	50–75%	≥55 years old Tumors of any size, or lymph node status with gross extrathyroidal extension into prevertebral fascia, encasing major vessels, or distant metastasis	<50%

TABLE 11. ATA 2009 RISK STRATIFICATION SYSTEM WITH PROPOSED MODIFICATIONS

ATA low risk	<p>Papillary thyroid cancer (with all of the following):</p> <ul style="list-style-type: none"> • No local or distant metastases; • All macroscopic tumor has been resected • No tumor invasion of loco-regional tissues or structures • The tumor does not have aggressive histology (e.g., tall cell, hobnail variant, columnar cell carcinoma) • If ^{131}I is given, there are no RAI-avid metastatic foci outside the thyroid bed on the first posttreatment whole-body RAI scan • No vascular invasion • Clinical N0 or ≤ 5 pathologic N1 micrometastases (< 0.2 cm in largest dimension)^a <p>Intrathyroidal, encapsulated follicular variant of papillary thyroid cancer^a Intrathyroidal, well differentiated follicular thyroid cancer with capsular invasion and no or minimal (< 4 foci) vascular invasion^a Intrathyroidal, papillary microcarcinoma, unifocal or multifocal, including <i>BRAF</i>^{V600E} mutated (if known)^a</p>
ATA intermediate risk	<p>Microscopic invasion of tumor into the perithyroidal soft tissues RAI-avid metastatic foci in the neck on the first posttreatment whole-body RAI scan Aggressive histology (e.g., tall cell, hobnail variant, columnar cell carcinoma) Papillary thyroid cancer with vascular invasion Clinical N1 or > 5 pathologic N1 with all involved lymph nodes < 3 cm in largest dimension^a Multifocal papillary microcarcinoma with ETE and <i>BRAF</i>^{V600E} mutated (if known)^a</p>
ATA high risk	<p>Macroscopic invasion of tumor into the perithyroidal soft tissues (gross ETE) Incomplete tumor resection Distant metastases Postoperative serum thyroglobulin suggestive of distant metastases Pathologic N1 with any metastatic lymph node ≥ 3 cm in largest dimension^a Follicular thyroid cancer with extensive vascular invasion (> 4 foci of vascular invasion)^a</p>

<i>Category</i>	<i>Definitions^a</i>	<i>Clinical outcomes</i>	<i>Management implications</i>
Excellent response	Negative imaging and either Suppressed Tg <0.2 ng/mL ^b or TSH-stimulated Tg <1 ng/mL ^b	1%–4% recurrence ^c <1% disease specific death ^c	An excellent response to therapy should lead to an early decrease in the intensity and frequency of follow up and the degree of TSH suppression
Biochemical incomplete response	Negative imaging and Suppressed Tg ≥1 ng/mL ^b or Stimulated Tg ≥10 ng/mL ^b or Rising anti-Tg antibody levels	At least 30% spontaneously evolve to NED ^d 20% achieve NED after additional therapy ^a 20% develop structural disease ^a <1% disease specific death ^a	If associated with stable or declining serum Tg values, a biochemical incomplete response should lead to continued observation with ongoing TSH suppression in most patients. Rising Tg or anti-Tg antibody values should prompt additional investigations and potentially additional therapies.
Structural incomplete response	Structural or functional evidence of disease With any Tg level With or without anti-Tg antibodies	50%–85% continue to have persistent disease despite additional therapy ^c Disease specific death rates as high as 11% with loco-regional metastases and 50% with structural distant metastases ^a	A structural incomplete response may lead to additional treatments or ongoing observation depending on multiple clinico-pathologic factors including the size, location, rate of growth, RAI avidity, ¹⁸ F ¹⁸ FDG avidity, and specific pathology of the structural lesions.
Indeterminate response	Nonspecific findings on imaging studies Faint uptake in thyroid bed on RAI scanning Nonstimulated Tg detectable, but <1 ng/mL Stimulated Tg detectable, but <10 ng/mL or Anti-Tg antibodies stable or declining in the absence of structural or functional disease	15%–20% will have structural disease identified during follow-up ^a In the remainder, the nonspecific changes are either stable, or resolve ^a <1% disease specific death ^a	An indeterminate response should lead to continued observation with appropriate serial imaging of the nonspecific lesions and serum Tg monitoring. Nonspecific findings that become suspicious over time can be further evaluated with additional imaging or biopsy.

Recurrence:

- In the ATA risk classification, risk factors for recurrence include
 - ***tumor extension*** (extrathyroidal or extranodal) ***to adjacent structures***
 - ***gross residual disease after resection***
 - ***palpable cervical metastases***
 - ***extensive vascular invasion***
 - ***inappropriately elevated serum thyroglobulin titers*** postoperatively.

Locoregional recurrence:

- More than 30% of patients with WDTC recurrence are diagnosed **after the first decade of follow-up**, and the most common sites of involvement are **cervical lymph nodes**.
- more than a third of reoperations for persistent or recurrent disease are related to **inadequate initial thyroid surgery**.
- Among the subtypes of WDTC, **papillary thyroid carcinoma** is the major source of locoregional tumor recurrence occurring in the central or lateral neck compartments.



Diagnostic Work-Up

- Clinical management after initial surgical treatment of WDTC
 - physical examinations
 - serum thyroglobulin
 - serum anti-thyroglobulin antibody levels
 - structural assessment with high-resolution cervical ultrasonography, preferably with color Doppler.

Monitoring during the first year after thyroid surgery

Initial Plan Based on ATA Risk for the First Year of Follow-Up	ATA Low Risk	ATA Intermediate Risk	ATA High Risk
Tg, TgAb, TFTs, every 3–6 months	✓	✓	✓
Neck US in 3–6 months	–	✓	✓
Neck/chest CT with contrast in 6–12 months	–	Consider ^a	✓ ^b
Cross-sectional imaging of other sites (brain, abdomen, pelvis)	–	–	Consider ^c
Routine surveillance diagnostic RAI scan	–	–	Consider
¹⁸ FDG-PET scan	–	–	Consider
Dynamic risk assessment at each visit	✓	✓	✓

Diagnostic Work-Up

- An elevation of serum thyroglobulin level should be followed by high-resolution ultrasonography of the neck.  (CT) of the  neck, mediastinum, and lungs



Diagnostic Work-Up

- Serum thyroglobulin level
 - Serum Tg correlate not only with tumor volume but also predict the lesion location.
 - serum anti thyroglobulin antibodies
 - Thyroglobulin doubling time
- In high-risk patients, a postoperative Tg value <1 ng/mL does not rule out RAI-avid disease and therefore is unlikely to alter the decision to proceed with RAI ablation.

Diagnostic Work-Up

- Following surgery, cervical US to evaluate the thyroid bed and central and lateral cervical nodal compartments should be performed at 6–12 months and then periodically, depending on the patient's risk for recurrent disease and Tg status.

Diagnostic Work-Up

- If suspicious lesions ($\geq 8-10$) are detected in the neck  FNA
 Tg wash-out

Diagnostic Work-Up

- Diagnostic WBS, either following thyroid hormone withdrawal or rhTSH, **6–12 months after adjuvant RAI therapy** can be useful in the follow-up of patients with **high or intermediate risk** (higher risk features) of persistent disease and should be done with 123I or low activity 131I.

Diagnostic Work-Up

- Cross-sectional imaging of the neck and upper chest (CT, MRI) with IV contrast should be considered:
 - i. in the setting of **bulky and widely distributed recurrent nodal** disease where **US may not completely delineate** disease,
 - ii. in the assessment of possible **invasive recurrent** disease where potential **aerodigestive tract invasion** requires complete assessment,
 - iii. when neck US is felt to be inadequately visualizing possible neck nodal disease (**high Tg, negative neck US**).

Diagnostic Work-Up

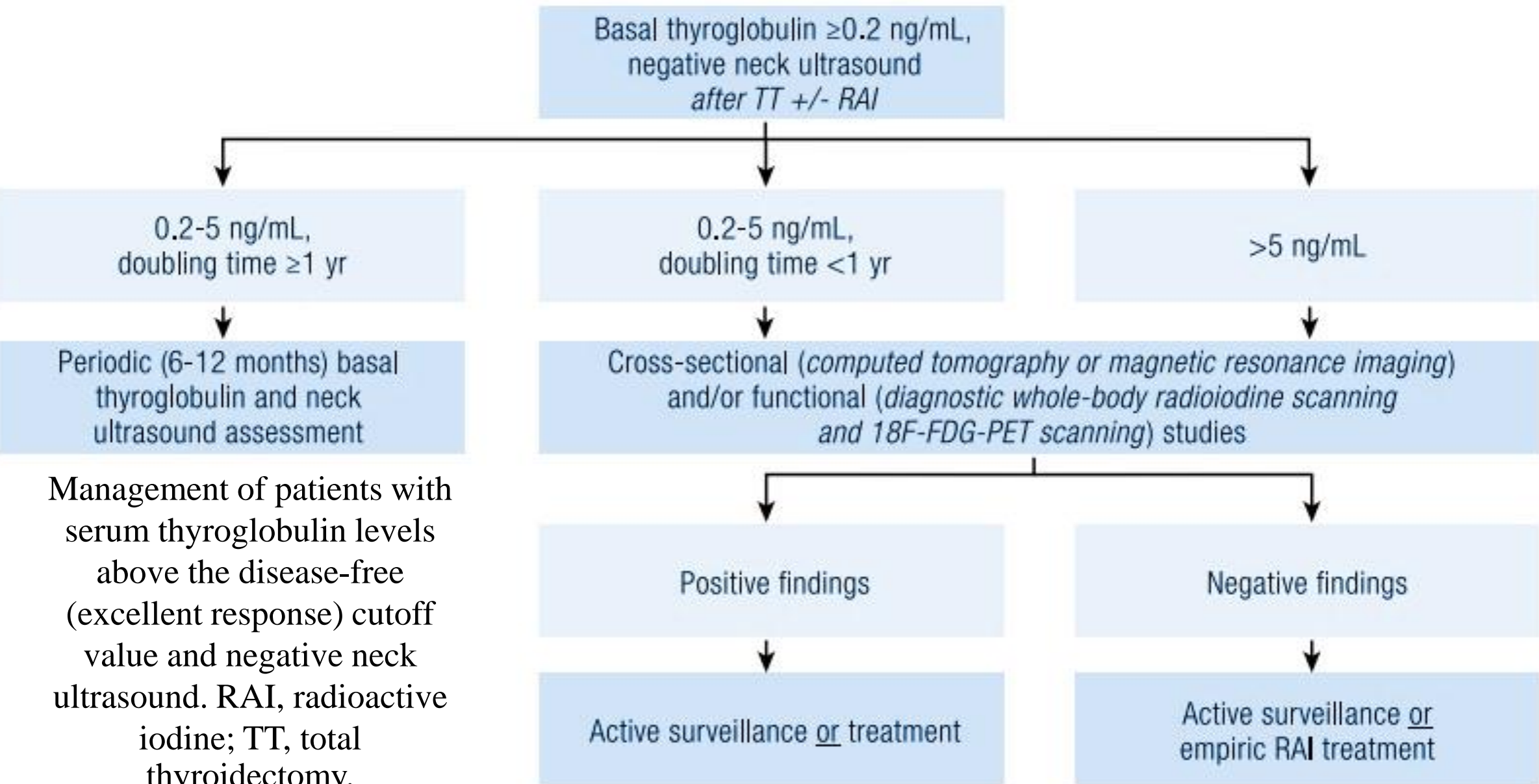
- CT imaging of the chest without IV contrast (**imaging pulmonary parenchyma**) or with IV contrast (to **include the mediastinum**) should be considered in high risk DTC patients with elevated serum Tg (generally >10 ng/ mL) or rising Tg antibodies with or without negative RAI imaging.

Diagnostic Work-Up

- Imaging of other organs including MRI brain, MR skeletal survey, and/or CT or MRI of the abdomen should be considered in high-risk DTC patients with **elevated serum Tg** (generally >10 ng/mL) and **negative neck and chest imaging** who have **symptoms referable to those organs** or **who are being prepared for TSH-stimulated RAI therapy** (withdrawal or rhTSH) and may be at risk for complications of **tumor swelling**.

Diagnostic Work-Up

- 18FDG-PET scanning should be considered in high risk DTC patients with **elevated serum Tg** (generally >10 ng/mL) with **negative RAI imaging**.
- **Delineation between lymph node metastases or local recurrence and vessels or the aerodigestive axis is often not well visualized on 18FDG-PET/CT** **in the absence of contrast injection**, and if necessary other imaging techniques (CT and MRI with contrast medium) may be performed **especially for a preoperative work-up**.
- As a result, most patients with extensive disease should be considered for **18FDG-PET/CT** and **CT imaging with contrast**, and some patients will also be considered for **MRI**



Management of patients with serum thyroglobulin levels above the disease-free (excellent response) cutoff value and negative neck ultrasound. RAI, radioactive iodine; TT, total thyroidectomy.

Management of recurrent thyroid cancer

- Surgery/ Active surveillance
- Radioactive iodine therapy (RAI)
- External beam radiotherapy(EBRT)
- Systemic Therapy
- Ultrasonography-Guided Percutaneous Ablation

Surgery:

- Surgery is the usual treatment of choice
- The ATA guidelines recommend surgery for central neck compartment nodes ≥ 8 mm or lateral neck nodes ≥ 10 mm in their short-axis diameter.

TABLE 2. VARIABLES TO CONSIDER WHEN DECIDING HOW BEST TO MANAGE A DIFFERENTIATED THYROID CANCER PATIENT WITH RECURRENT/PERSISTENT NODAL DISEASE

<i>Variables</i>	<i>Active surveillance</i>	<i>Surgery</i>
<i>Key considerations</i>		
Absolute size of lymph nodes (any dimension) ^a	≤0.8 cm (central compartment) <1 cm (lateral compartment)	>0.8 cm (central compartment) ≥1 cm (lateral compartment)
Rate of lymph node growth on serial imaging	Minimal/slow (<3–5 mm/year)	Progressive (>3–5 mm/year)
Vocal cord paralysis contralateral to the paratracheal nodal basin where the positive lymph node is located (next to only working RLN)	Strongly consider observation if node is stable	Consider surgery if node is increasing in size and expertise for reoperative surgery available
Known systemic metastases	Progressive distant disease outpacing nodal metastasis	Stable distant metastasis, but nodal disease threatens vital structures
Comorbidities for surgery	Yes	No
Invasion into/proximity to critical anatomic structures	No	Yes
Good long-term prognosis	No	Yes
Patient wishes to undergo surgery	No	Yes
Disease likely to be identified intraoperatively	No	Yes
<i>Biological considerations</i>		
RAI-avid ^c	Yes	No (unless other criteria for surgery met)
FDG-PET-avid	No	Yes
Aggressive histology	No	Yes
Extrathyroidal extension of primary tumor	No	Yes
More advanced initial T stage (>4 cm) and more advanced nodal disease	No	Yes
Extranodal extension (features of nodes at initial surgery)	No	Yes
Molecular prognosticator for aggressive biology (see text)	No	Yes
<i>Surgical technical considerations</i>		
First recurrence in that compartment?	No	Yes
Recurrent or persistent disease in previously formally dissected compartment or multiple dissections in same compartment ^b	Stable disease	Limited/focused dissection if progressive disease and threatening important structures

Management of
Recurrent/Persistent Nodal
Disease in Patients with
Differentiated Thyroid
Cancer

Management of recurrent thyroid cancer

- ❑ Surgery/ Active surveillance
- ❑ Radioactive iodine therapy (RAI)
- ❑ External beam radiotherapy(EBRT)
- ❑ Systemic Therapy
- ❑ Ultrasonography-Guided Percutaneous Ablation

Association of Radioactive Iodine Administration After Reoperation With Outcomes Among Patients With Recurrent or Persistent Papillary Thyroid Cancer

Matthew L. Hung, BS; James X. Wu, MD; Ning Li, PhD;
Masha J. Livhits, MD; Michael W. Yeh, MD

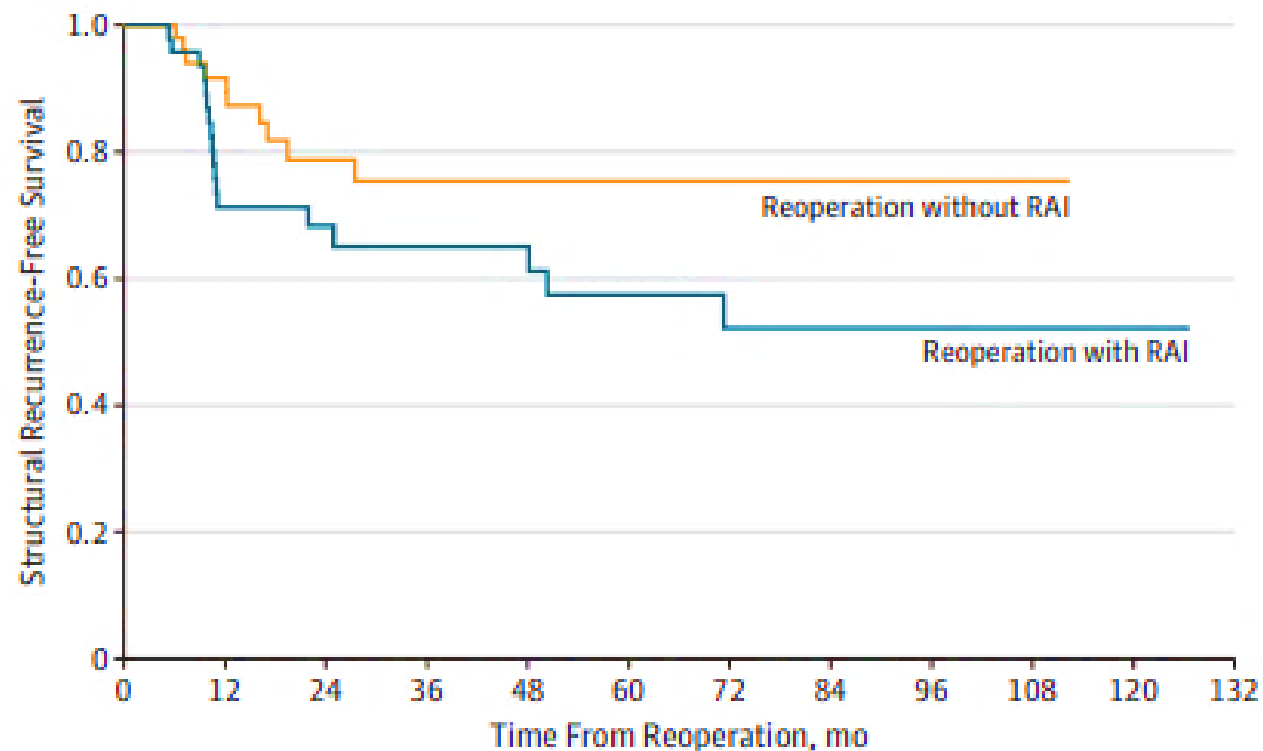
2018

- Retrospective cohort study included electronic health record data from 102 patients who underwent neck reoperation for persistent or recurrent PTC at a tertiary referral center from April 2006 to January 2016;
- 50 patients received RAI after reoperation, and 52 did not receive RAI after reoperation.
- Outcomes were biochemical response and structural recurrence after reoperation.

Table 1. Baseline Clinical Characteristics of Patients With Recurrent or Persistent Papillary Thyroid Cancer at Initial Operation^a

Characteristic	Reoperation Without RAI (n = 52) ^b	Reoperation With RAI (n = 50) ^c	Standardized Difference ^d
At baseline			
Age, median (IQR), y	40.5 (32.4-52.3)	47.1 (34.9-54.6)	0.30
Male	15 (29)	20 (40)	0.24
Tumor size, median (IQR), cm	1.7 (1.2-3.0)	2.2 (1.3-3.7)	0.32
Aggressive tumor histologic findings ^e	7 (13)	6 (12)	0.04
Extent of initial operation			
Total thyroidectomy only	24 (46)	27 (54)	0.20
Plus CND	17 (33)	12 (24)	
Plus MRND	3 (6)	3 (6)	
Plus CND and MRND	8 (15)	8 (16)	
T stage			
pT1	23 (44)	14 (28)	0.48
pT2	10 (19)	8 (16)	
pT3	17 (33)	21 (42)	
pT4	2 (4)	7 (14)	
N stage			
pN0	5 (10)	5 (10)	0.27
pN1a	21 (40)	14 (28)	
pN1b	13 (25)	16 (32)	
pNx	13 (25)	15 (30)	
AJCC group staging			
I/II	33 (63)	29 (58)	0.11
III/IV	19 (37)	21 (42)	

Figure 2. Kaplan-Meier Curves Showing Structural Recurrence-Free Survival in the Reoperation Without Radioactive Iodine (RAI) Group and the Reoperation With RAI Group



No. at risk		0	12	24	36	48	60	72	84	96	108	120	132
Reoperation without RAI	52	41	25	19	15	10	8	7	4	1	0	0	0
Reoperation with RAI	50	35	26	24	21	18	15	12	8	6	2	0	0

There was no significant between-group difference in structural recurrence-free survival after reoperation (P = .24 by log-rank test)

Table 3. Response to Therapy Classification

Disease Status	No. (%) of Patients		P Value
	Reoperation Without RAI (n = 52)	Reoperation With RAI (n = 50)	
Thyroglobulin level after reoperation ^a			
Excellent response	24 (47)	4 (12)	.007
Biochemical incomplete response	10 (20)	10 (30)	
Structural incomplete response	6 (12)	10 (30)	
Indeterminate response	11 (22)	9 (27)	
Last follow-up examination			
Excellent response	28 (54)	13 (26)	.04
Biochemical incomplete response	6 (12)	8 (16)	
Structural incomplete response	8 (15)	13 (26)	
Indeterminate response	10 (19)	16 (32)	

Conclusions:

- Reoperation for PTC may be associated with low morbidity and an excellent biochemical response.
- Up to one-third of patients in this cohort developed a second recurrence.
- Receipt of RAI after reoperation was not associated with outcomes in this series.

Management of recurrent thyroid cancer

- ❑ Surgery/ Active surveillance
- ❑ Radioactive iodine therapy (RAI)
- ❑ External beam radiotherapy(EBRT)
- ❑ Systemic Therapy
- ❑ Ultrasonography-Guided Percutaneous Ablation

External Beam Radiotherapy

- EBRT can be considered as
 - *postoperative adjuvant therapy*
(for treatment of presumed residual disease and low likelihood response to RAI)
 - *definitive treatment of unresectable relapses*
 - *Palliation* (symptom control)

Management of recurrent thyroid cancer

- ❑ Surgery/ Active surveillance
- ❑ Radioactive iodine therapy (RAI)
- ❑ External beam radiotherapy(EBRT)
- ❑ Ultrasonography-Guided Percutaneous Ablation
- ❑ Systemic Therapy

Ultrasonography-Guided Percutaneous Ablation

- Ultrasonography-guided percutaneous ablation is a localized treatment modality.
- It can be considered for patients with localized lymph node metastatic disease. Ideally, small-volume (<2 cm) lesions that are low in number (<4) are selected in patients who could undergo surgery but are poor surgical candidates

Management of recurrent thyroid cancer

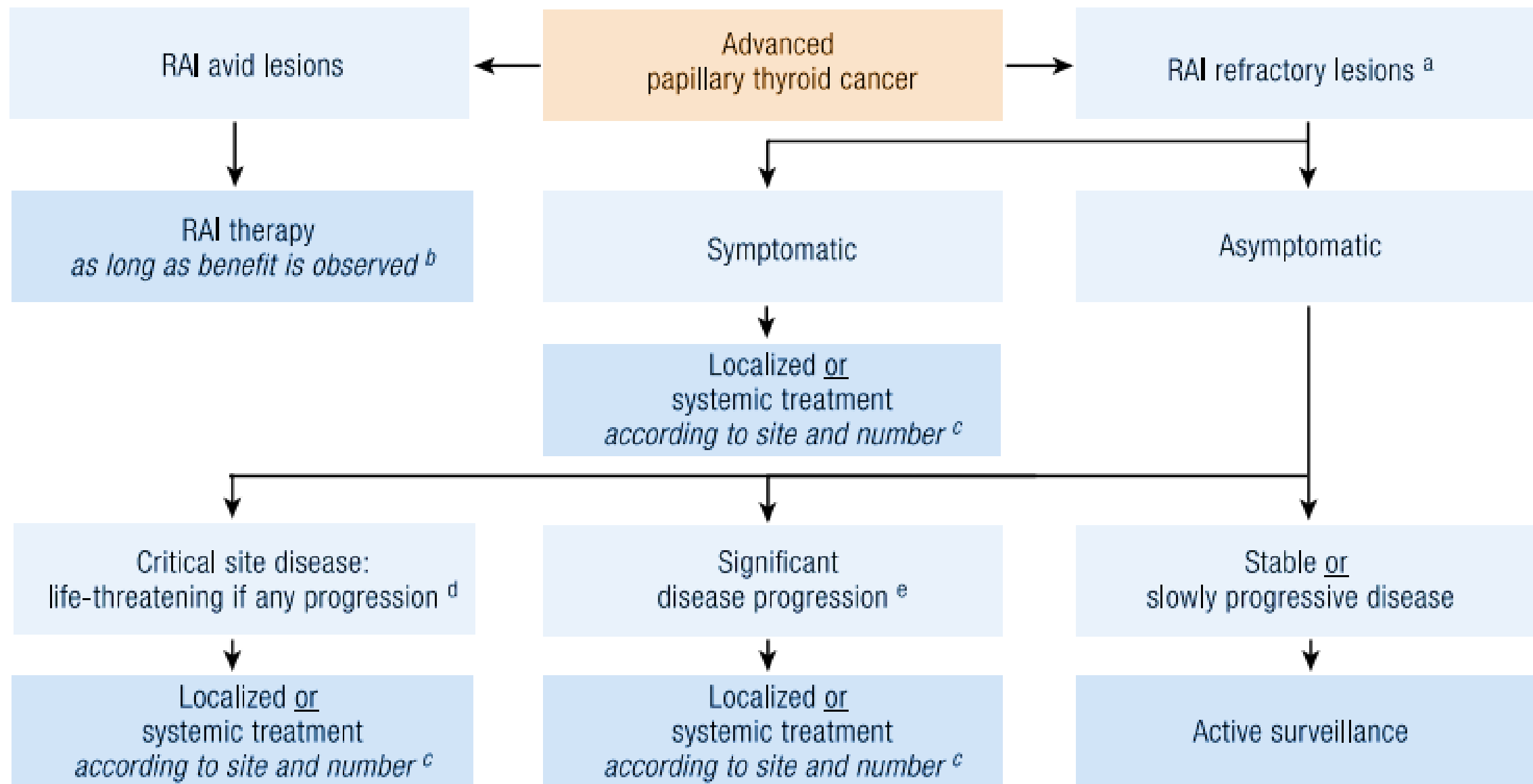
- ❑ Surgery/ Active surveillance
- ❑ Radioactive iodine therapy (RAI)
- ❑ External beam radiotherapy(EBRT)
- ❑ Ultrasonography-Guided Percutaneous Ablation
- ❑ Systemic Therapy

Systemic Therapy

- Systemic therapy may be considered for disease and symptom control in WDTC patients with neck recurrences, preferably if the disease ***is advanced, multi-metastatic, and progressive.***
- A combination of imaging techniques, as well as other diagnostic tools, is indicated to define which tumor lesion requires systemic treatment.

Systemic Therapy

- Sorafenib
- Lenvatinib
- Duration of Treatment
 - Tyrosine kinase inhibitors are cytostatic



Treatment Plan:

- ❖ Surgery
- ❖ Checking of off LT4; Tg, Anti-Tg after 4-6 weeks.
- ❖ RAI therapy?
- ❖ Cross sectional imaging after 6 month



Thank you for your attention!

