

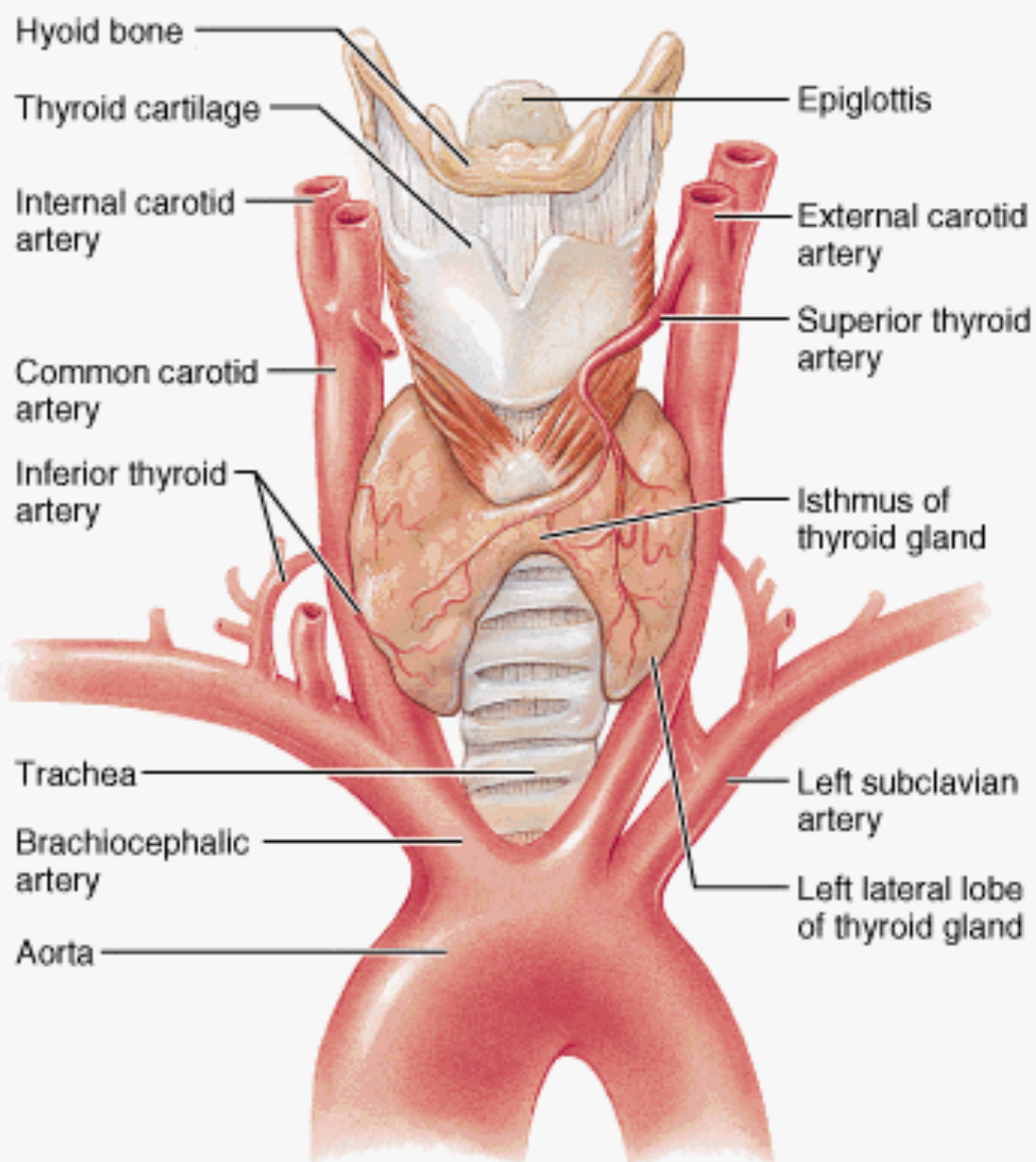
TIROIDA

AGENDA

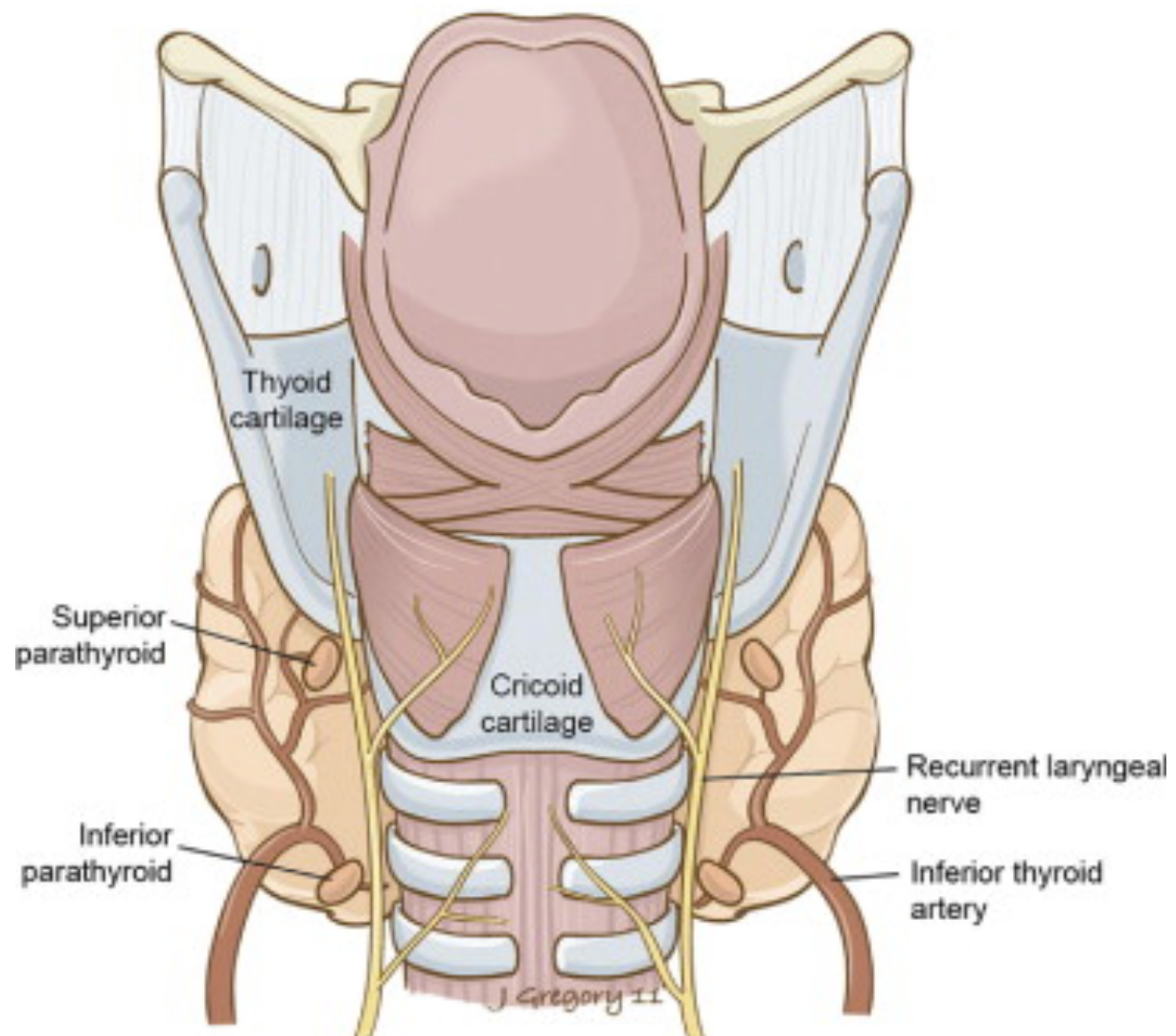
- Tiroida
 - Anatomie
 - Fiziologie
- Evaluare morfofunctională

Tiroida

- Glanda acinara (alveolar, fara ducte) , 10-25 g
- Lobi drept + stang + istm
- Regiunea cervicala anterioara, in fata traheei
- Marginile posterioare ating esofagul
- Vascularizatie importanta
 - Arterele tiroidiene superioare (ACC)
 - Arterele tiroidiene inferioare (trunchi brahiocefalic)
- Inervatie: ganglionii cervical medii/inferior ai SNS
- Invaginatia mezodermica a plafonului faringian, coborare de-a lungul traheei (duct tireoglos)
- Hormoni principali: T3, T4 = tirozine iodinate (hormoni aminici)



(a)



Isthmus of thyroid gland

Esophagus

Trachea

Recurrent laryngeal nerve

Right lobe of thyroid gland

Longus colli muscle

Prevertebral fascia

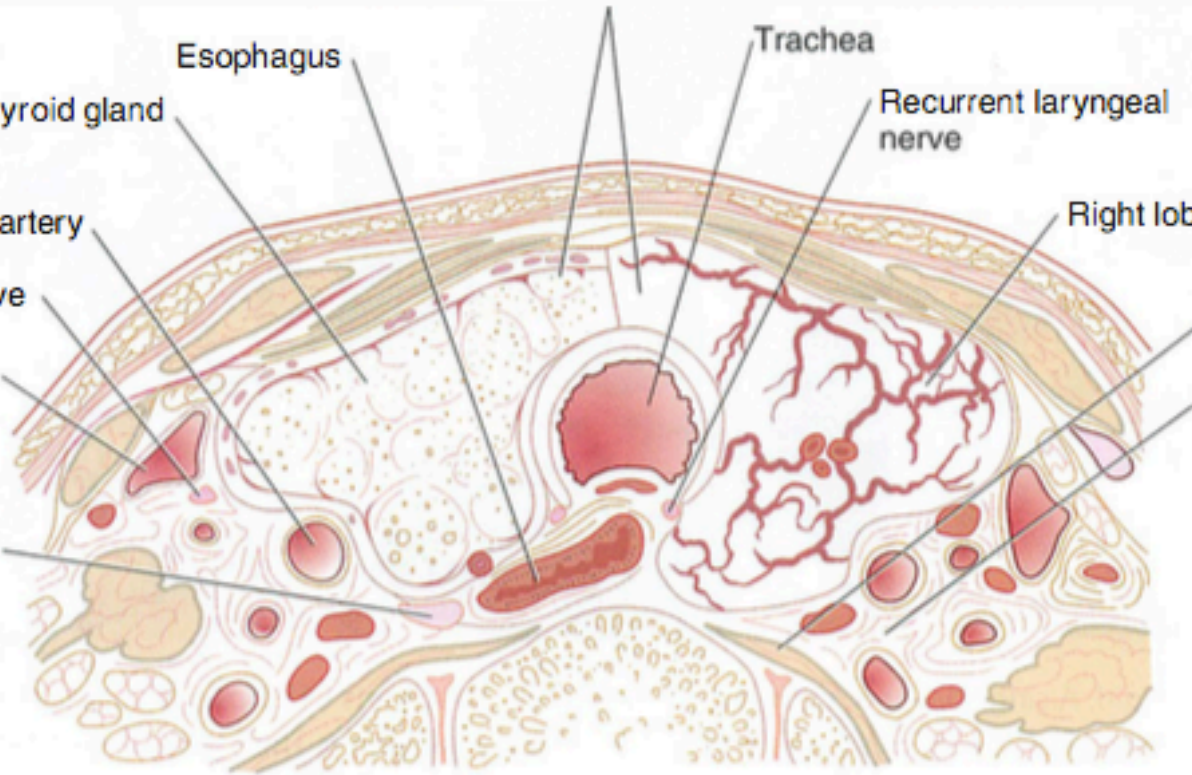
Left lobe of thyroid gland

Common carotid artery

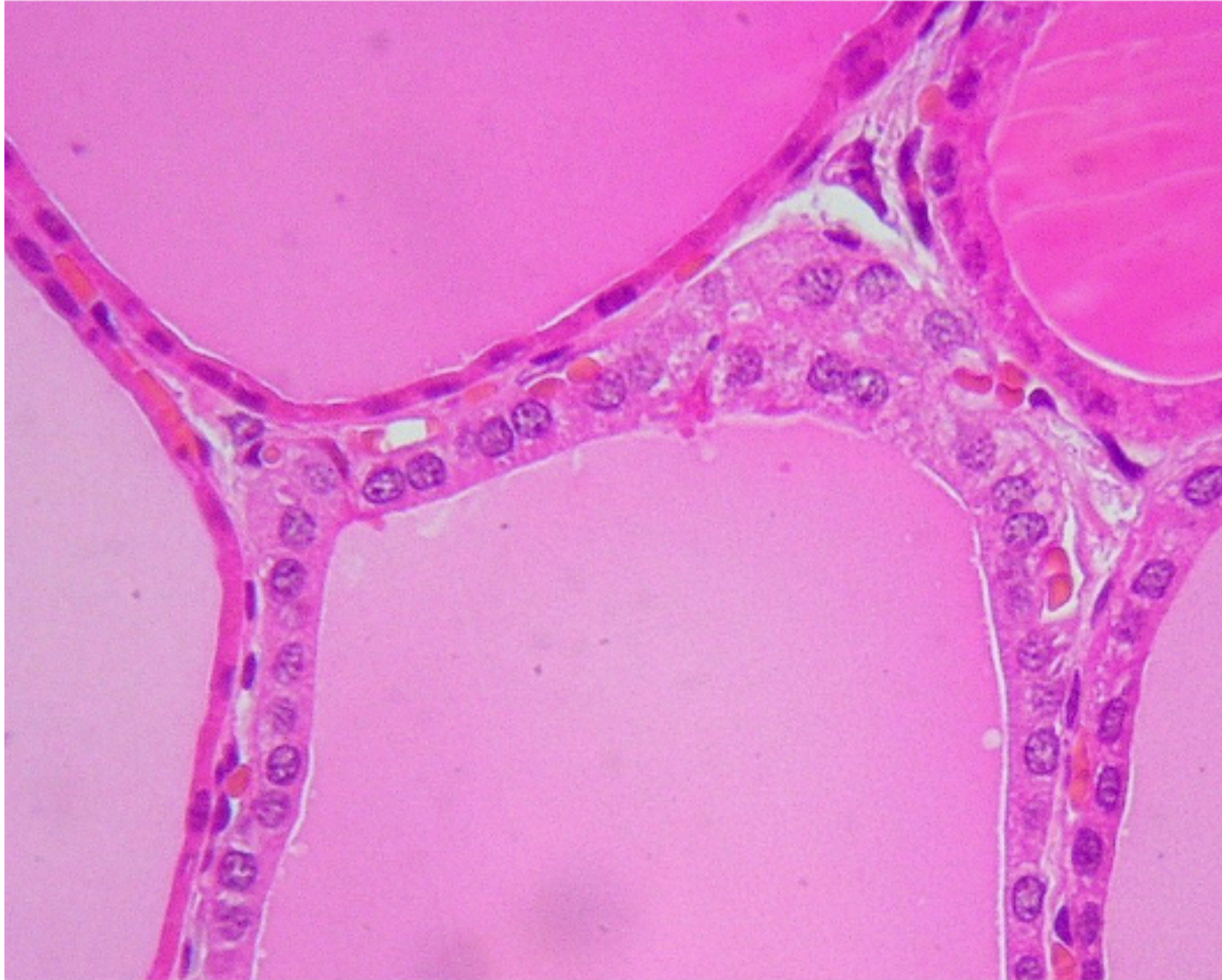
Vagus nerve

Internal jugular vein

Parathyroid gland



Tireocitele formeaza sfere goale (foliculi) care inconjoara un lumen central. Ce contine coloid = tireoglobulina iodinata= rezervor hormonal





- 1 = folliculi
2 = celule foliculare
3 = celule endoteliale
4 = celule C parafoficulare

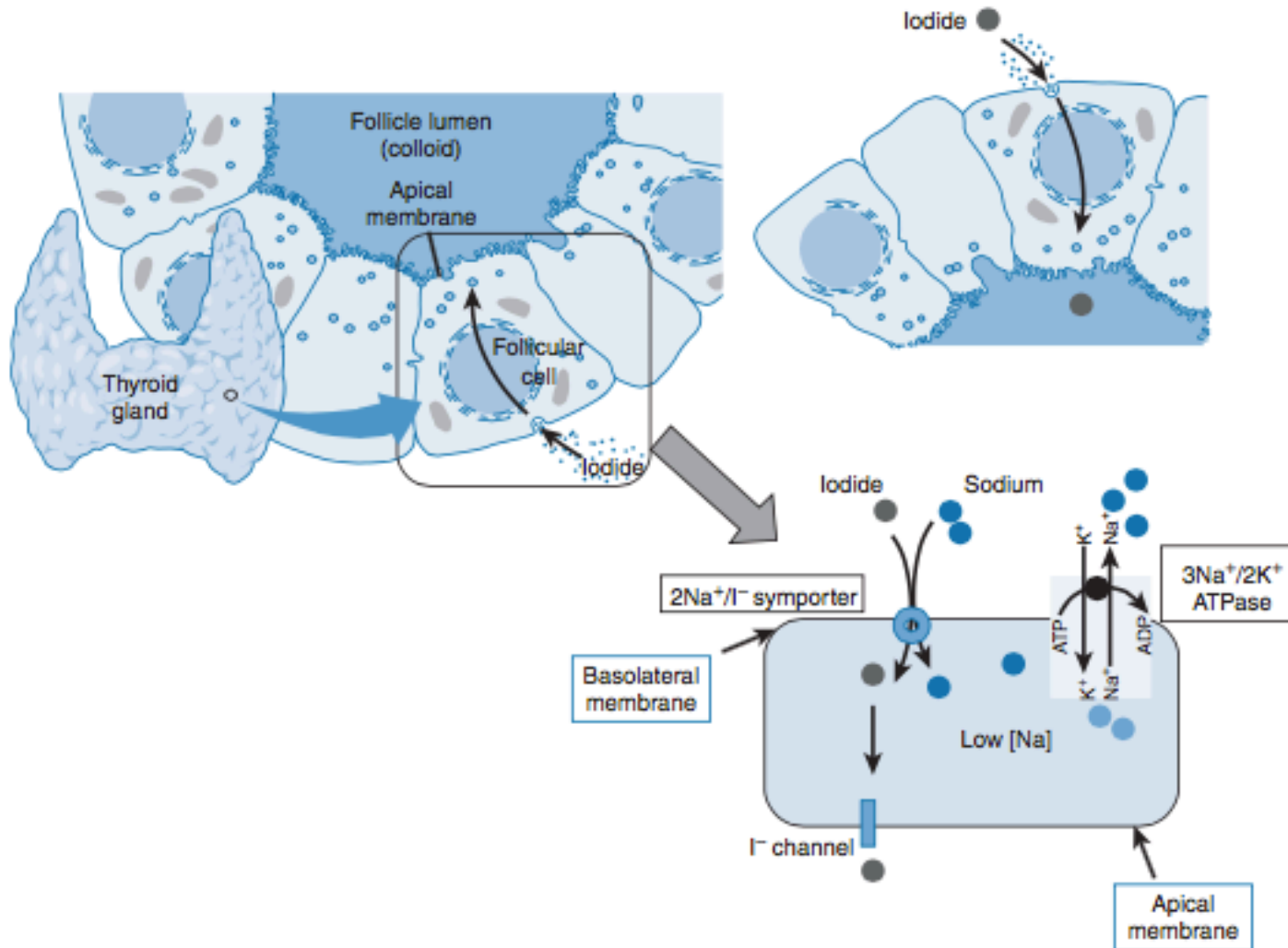
Celule foliculare

- Hormoni tiroidieni

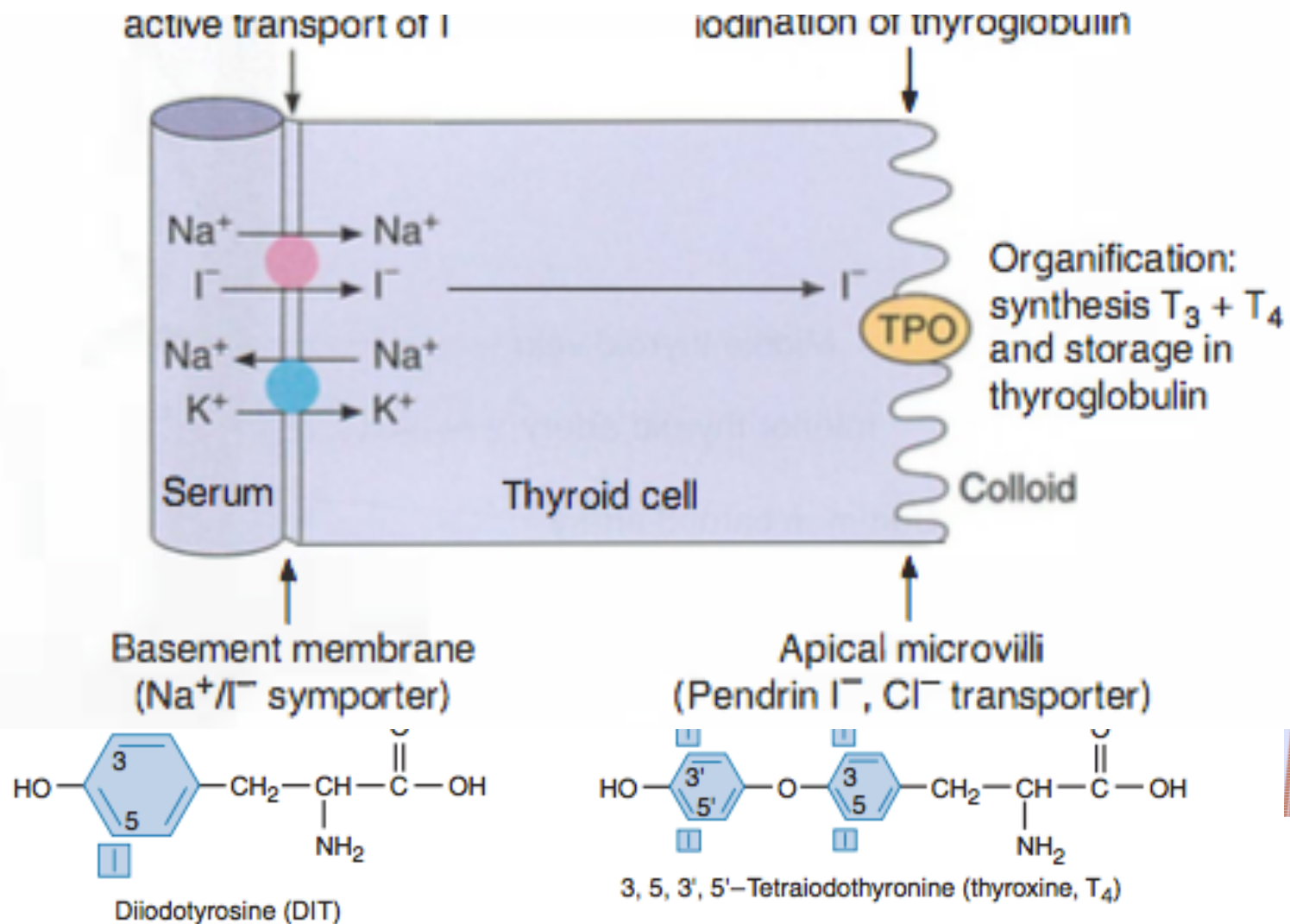
Celule parafoliculare (neuroendocrine)

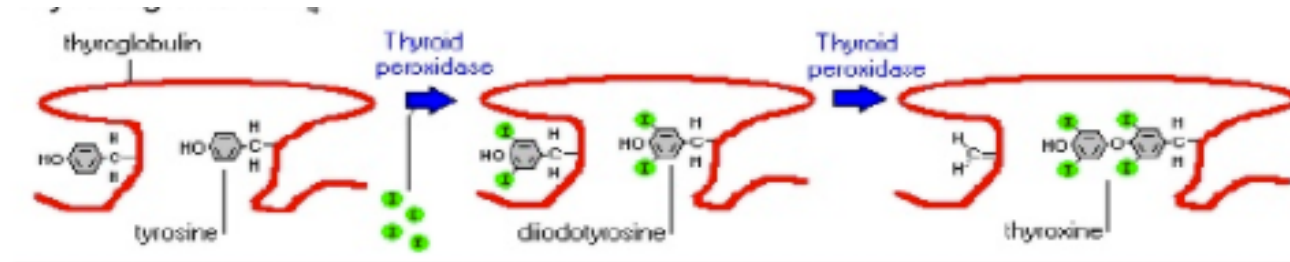
- Calcitonina

Funcția tiroidiană = TSH dependentă

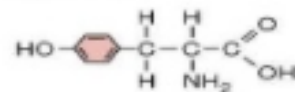


Iodare – organificare - cuplare

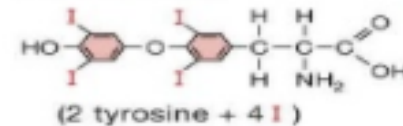




Tyrosine

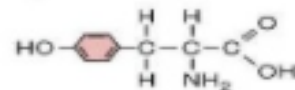


Thyroxine (T₄)

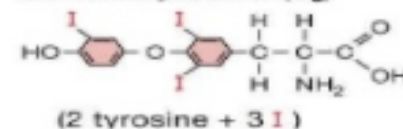


3,5,3',5'
Tetraiodothyronine

Tyrosine



Triiodothyronine (T₃)



3,5,3'
Tri-iodothyronine

METABOLISMUL IODULUI

- **Recomandarile OMS**

Adulti	150 mcg iod din aport (alimente+apa)
Sarcina	200 mcg iod
Alaptare	200 mcg iod
Copii	50-250 mcg iod

Surse: sare iodata, conservante din patiserie, lactate, agenti iodofori antimicrobieni: recoltare lapte, colorarea alimentelor, fructe de mare..

Aportul < 50 mcg/zi = incapacitatea mentinerii/sustinerii sintezei HT

Surse naturale de iod

Sol

- NaIO_3 = sodiu iodură
- NaIO_4 = sodiu periodat

Alge/plancton

- KI = iodide de potasiu
- NaI = iodide de sodiu
- I_2 – iodin
- I = iodid

Apa marină

- I = iodid

Surse artificiale de iod

Iodarea sării

Conservati

Iodofori antimicrobieni

Conținutul de iod al alimentelor

Aliment	Conținut de iod (mcg/100gr)
Sare (iodată)	2000
Alge	16-2984
Fructe de mare	66
Cod	75
Legume	32
Carne	26
Ouă	26
Lactate	13
Panificație	10
Fructe	4

Aport alimentar EXCLUSIV



Absorbție în Intestinul și Piele/plămâni ? Aer/apa MARE
Crème cu alge marine



Transport plasmatic legare slabă de
proteine



Uptake preferențial în tiroidă (NIS)

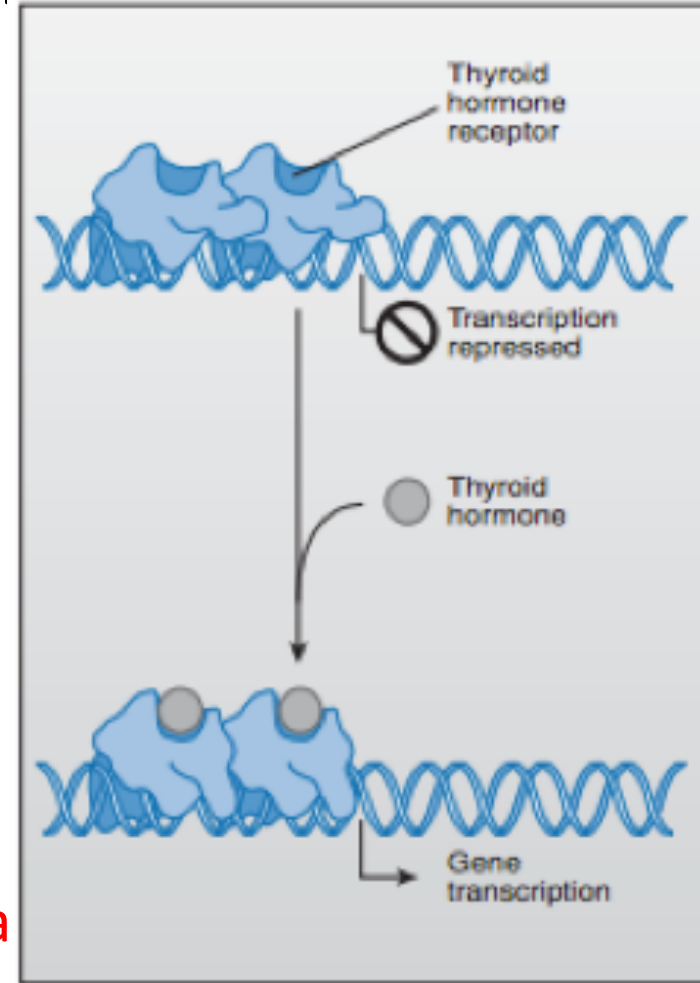


Excreție urinară (2/3)

Transportul hormonilor tiroidieni

- Liber 0.04% T4 0.001% T3
- Legat:
 - Globulina ce leaga TBG
 - Transtiretin prealbumina
 - Albumina

1. Rezervor de hormoni
2. Prelungeste T1/2 al hormonilor
3. Regleaza fractia libera a hormonilor
4. Conditioneaza rata clearance-ului meta

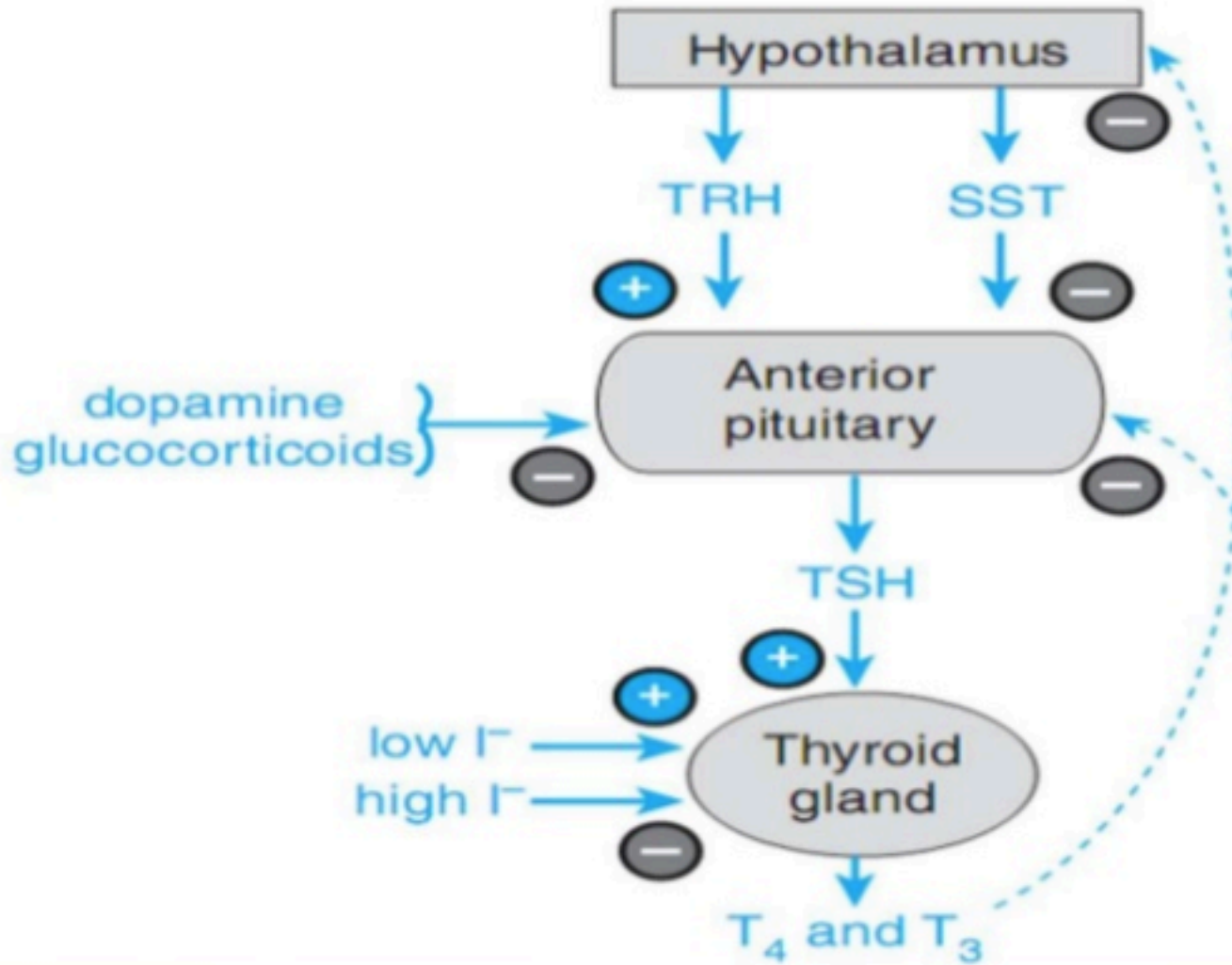


Efectele hormonilor tiroidieni I

Nivel	Efect
Metabolism bazal	Stimuleaza activitatea mitocondriala calorigeneza Rata metabolism baza
Metabolism glicemic	<ul style="list-style-type: none"> ↑ Absorbtia intestinala ↑ Consumul periferic ↓ glicogenoliza hepatica ↑ glicogenoliza hepatica ↓ sensibilitatea la insulina
Metabolism proteic	<ul style="list-style-type: none"> ↑ sinteza proteica (doze mici) ↑ Degradarea proteica
Metabolism lipidic	<ul style="list-style-type: none"> ↑ Lipogeneza ↑ Sinteza trigliceride– hipolipemiant ↑ clearance hepatic LDL
Metabolism hidroelectolitic	faciliteaza diureza pierderi urinare/fecale de iod
Metabolism iod	Controlat aproape integral de tiroida: NIS
Imunitate	Sinteza de IgG

NIVEL	EFFECT
Cardiovascular	<p>↑Inotropism, ↑eflux cardiac</p> <p>↑Cronotropism</p> <p>↑senzitivitatea la adrenergice</p>
Pulmonar	<p>Mentine raspunsul ventilator la hipoxie/hipercapnie</p> <p>↑ Functia muschiului respirator</p>
Hematopoetic	<p>↑Eritropoetina /eritropoeza</p> <p>Favorizeaza disocierea O₂ de pe suprafata Hb</p>
Gastrointestinal	<p>↑Motilitatea intestinala</p>
Schelet	Turnover osos
Neuromuscular	<p>Dezvoltarea normala a SNC</p> <p>Conditioneaza contractiile musculare/relaxarea musculara</p> <p>echilibru emotional</p>
Tegumente	Troficitate, mentine fanere, cresterea pilozitatii
Dezvoltare fetala	<p>Dezvoltarea creierului fetal</p> <p>Sustine cresteri si maturarea scheletala</p>
Endocrin	Functionarea normala a GH, GhRH, CRH, PRL

Controlul functiei tiroidiene



PATOLOGIA TIROIDIANA

BOLI AUTOIMUNE = BTA

- AC INHIBITORI
- AC STIMULATORI

LEZIUNI NODULARE= GN

- Uni/multinodulara
- Benign/malign

Boli prin carenta de iod= IDD

- Gusa difuza
- Transformare nodulara
- Disfunctie tiroidiana

Evaluare

- Clinica
 - Hormonala : TSH, Ft3, Ft4
 - Immunologica : Ac anti TPO, Ac anti Tg, TRAB
 - Morfologica: imagistica
 - Morfo-functionala : Scintigrafie
 - Teste Dinamice: stimulatorii = TRH
 - Teste aditionale– Calcitonina, Tireoglobulina
 - Fine Needle Aspiration Biopsy
-
- Scala simptomelor clinice
 - Rata MB

Simptome

- COMPRESIE
- DISTIROIDIE

Examinarea tiroidei

- Inspectie = pacientul inghite
- Palpare
 - = cu policele de-a lungul traheei
 - = palparea lobului
 - = Normal – rar palpabil , suprafata neteda, moale –
consistenta cauciucata diametru 1cm/2cm
 - Gusa difuza/gusa nodulara
- Auscultatie
 - = flux vascular crescut





A. Palpation of the thyroid
from behind



B. Palpation of the thyroid
from in front

Source: Richard F. LeBlond, Donald D. Brown, Manish Suneja, Joseph F. Szot:
DeGowin's Diagnostic Examination, 10th Edition:

www.accessmedicine.com

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Masurare TSH

- Sange venos periferic ($T_{1/2}$ 30-50')

- Limitele normei

valori TSH

1. Adulti: 0.5-4.7 mUI/L

2. copii:

1stziua 1 de viata 70 mUI/L

ziua 2 - 3

< 10 mUI/L

screening neonatal

sapt. 2 - 6

1.7-9.1 mUI/L

luna a 2a

< 6 mUI/L

3. varstnici

0.5 – 7 mUI/L

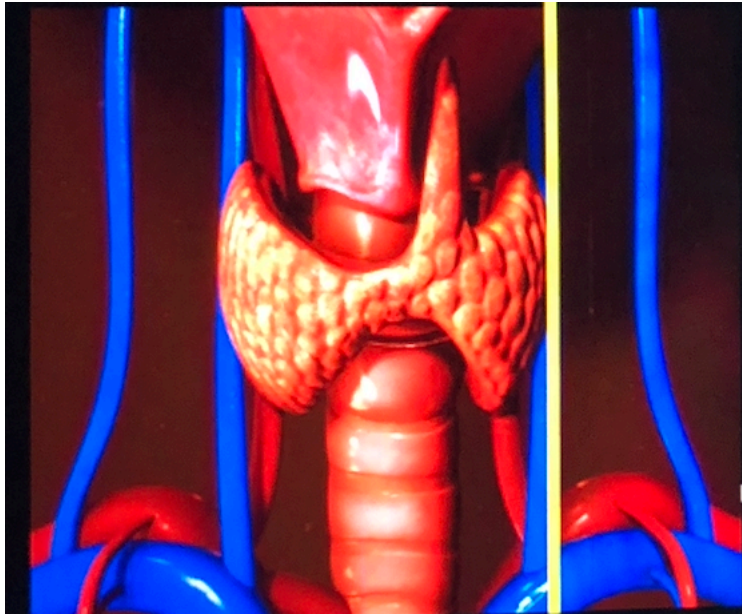
- Intotdeauna CENTRAL + PERIFERIC

N TSH	N Ft3/fT4	Funcție normală
↓ TSH	N Ft3/fT4	HIPER subclinic
↓ TSH	↑ Ft3/fT4	HIPER clinic
↑ TSH	↑ Ft3/fT4	HIPER central
↑ TSH	N Ft3/fT4	Hipo subclinic
↑ TSH	↓ Ft3/fT4	Hipo clinic
↓ TSH	↓ Ft3/fT4	Hipo central

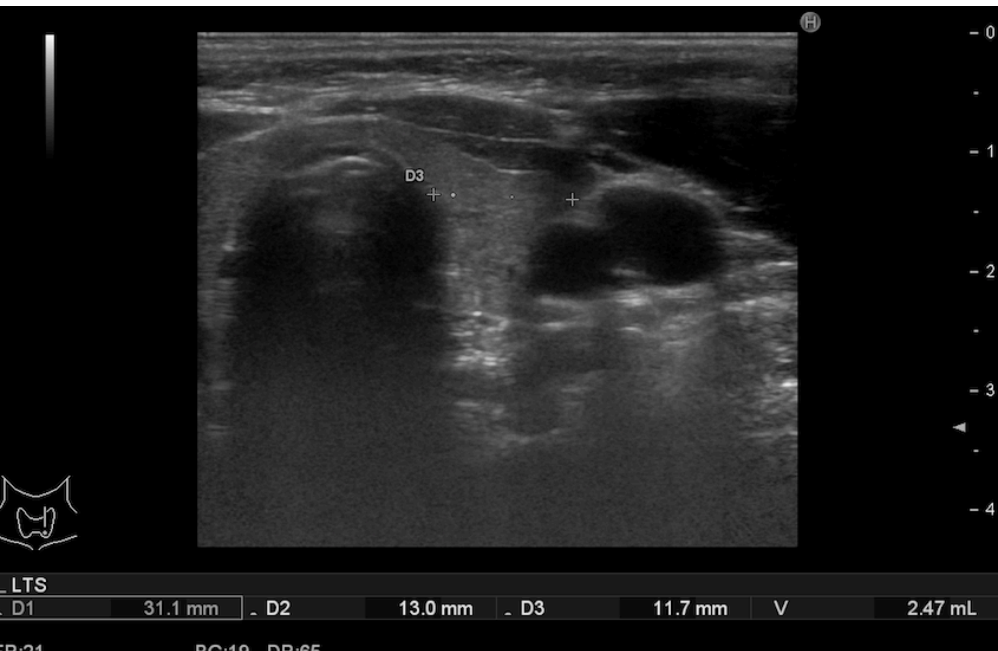
MARCHERI AUTOIMUNITATE

- AC anti TPO + Ac anti TG = B tir AUTOIMUNA
 - Marcheri diagnostici
 - FARA VALOAREA PROGNOSTICA
- Ac anti receptor TSH = TRAB – tipic de BB
 - Marcher diagnostic
 - Valoare prognostica: agravare/vindecare

EVALUARE MORFOLOGICA



Volum diminuat



?

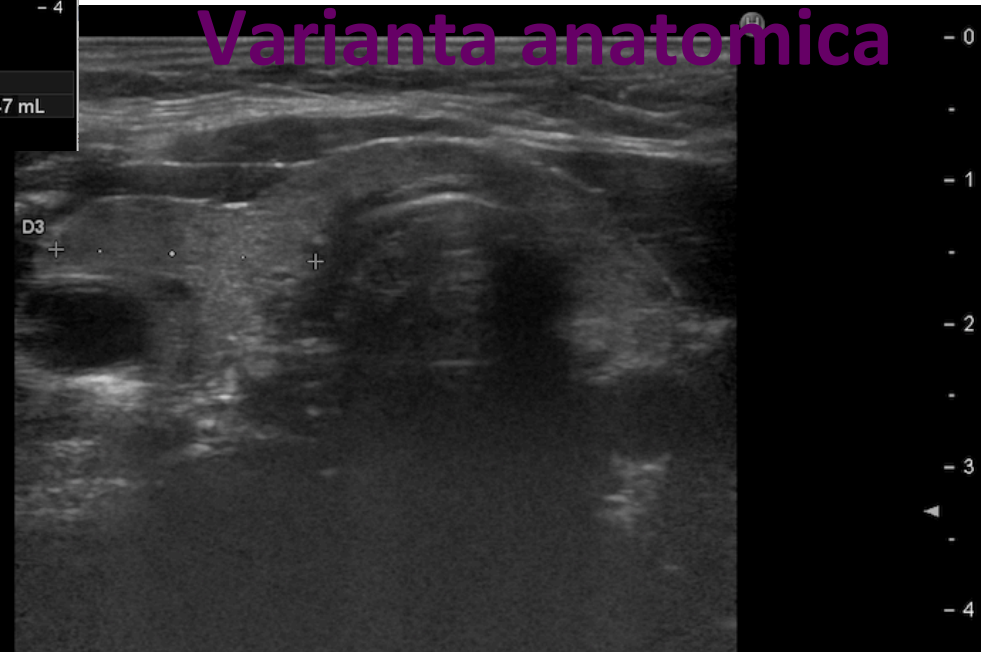
Atrofie

Lobectomie subtotala

postRAIU

postRX

Varianta anatomica



Volum crescut



?

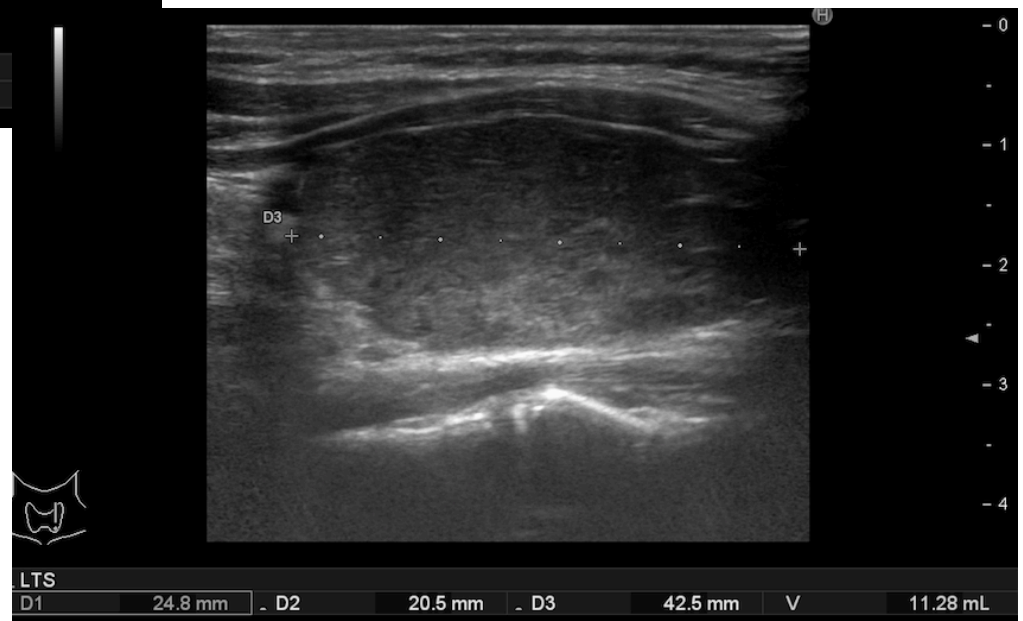
autoimun

Hashimoto

Graves

IDD

Boli infiltrative



GN

- FORMA
- MARGINI
- ECOGENITATE
- OMOGENITATE
- POZITIE
- \pm CALCIFICARI
- COMPOZITIE

EVALUARE MORFOFUNCTIONALA

- SCINTIGRAFIE

ADM DE Izotopi concentrabili la nivel tiroidian

^{123}I	oral	8-24 ore
$^{99\text{m}}\text{Tc}$ pertechnetat	iv	30-60'
^{131}I		

Masurarea nivelului de radiatii generat de regiunea tiroidiana

RADIATII GENERATE ← IZOTOP CAPTAT ← ACTIVITATE FOLICULARA

Fara detalii anatomice precise/pozitie anatomica relativa



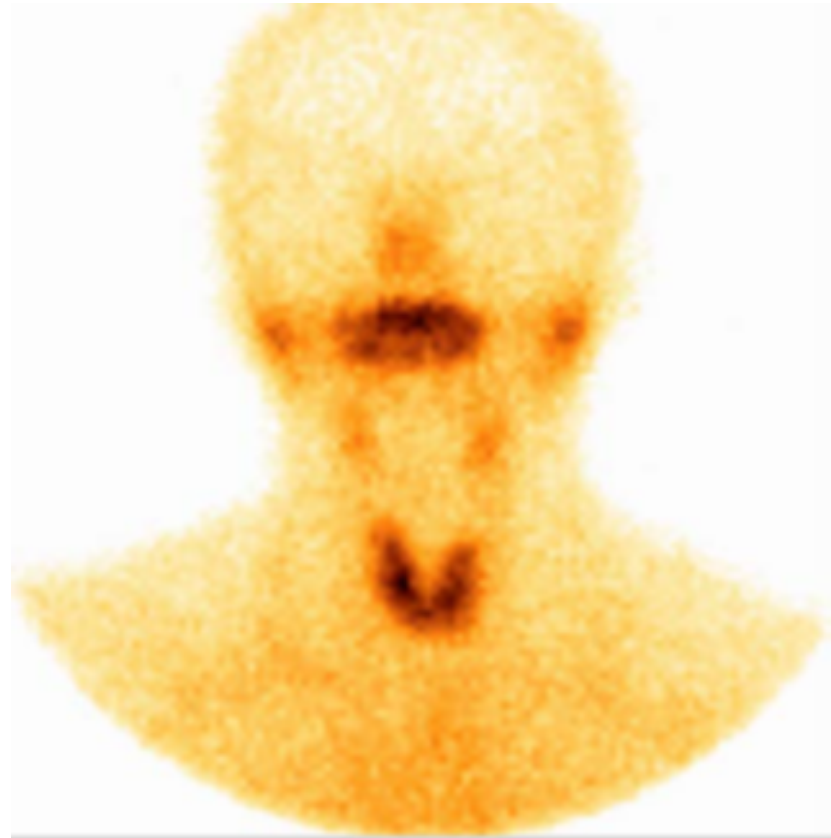
Scintigrafie

INDICATII:

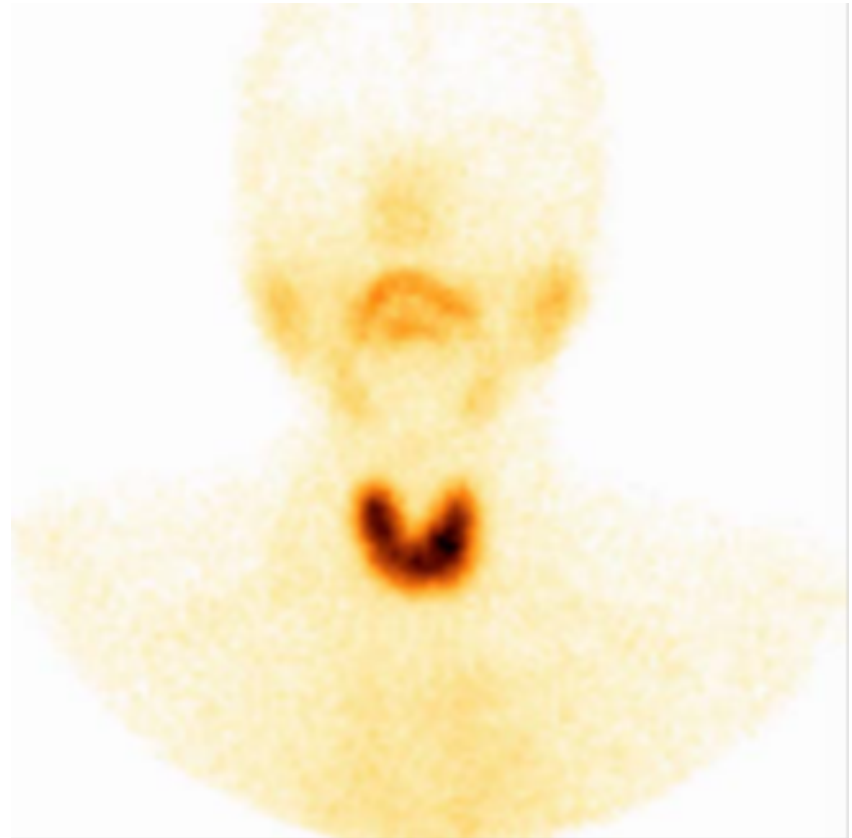
- 1. Hipertirodism subclinic/clinic, cu sau fara gusa nodulara**
- 2. Suspiciune de gusa ectopica**
- 3. Suspiciune gusa retrosternala**
- 4. Evaluare postoperatorie carcinoamelor diferite**
- 5. Coexistenta leziunilor tiroidiene + paratiroidiene**

ASPECT NORMAL

„V” shape

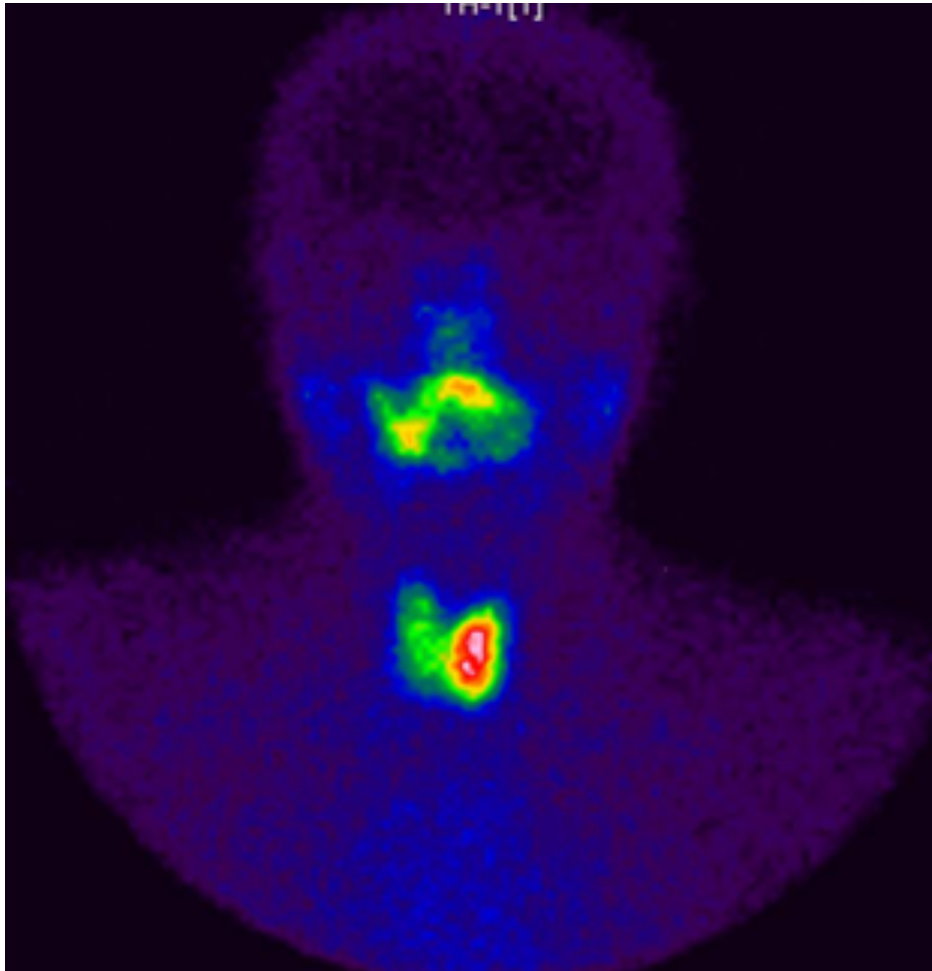


„U” shape



ASPECT NORMAL

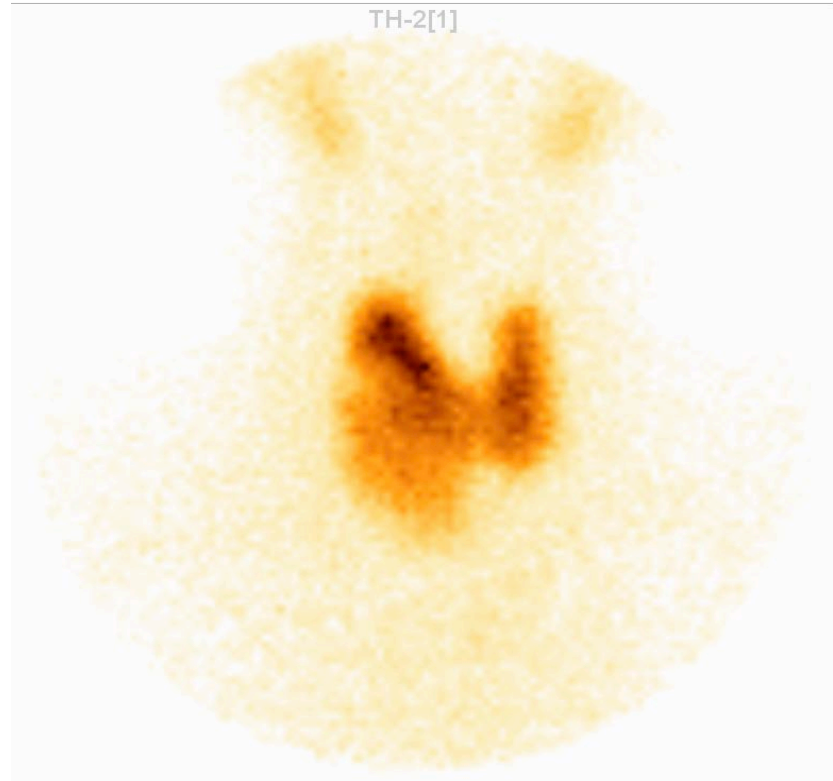
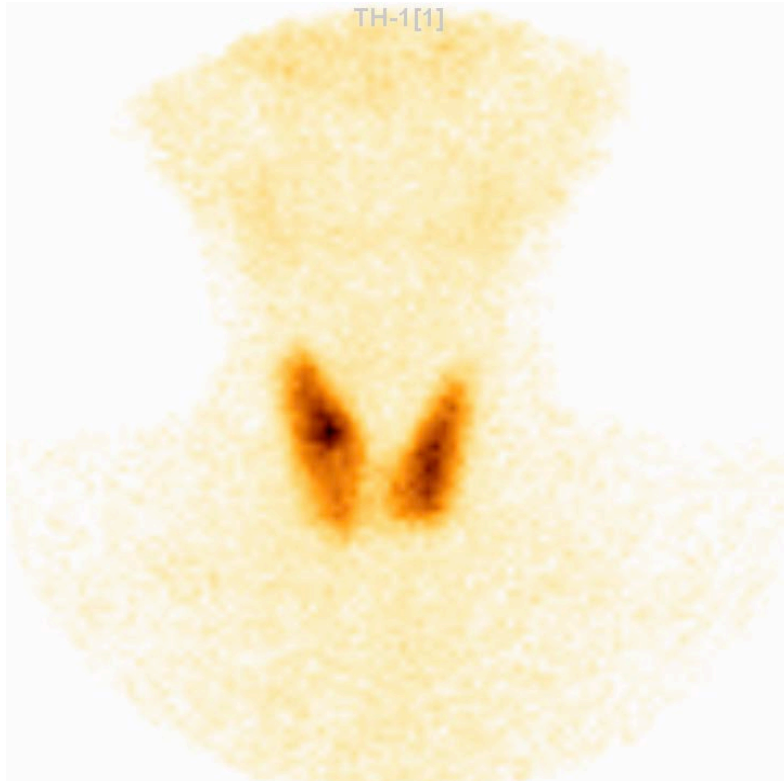
asimetric



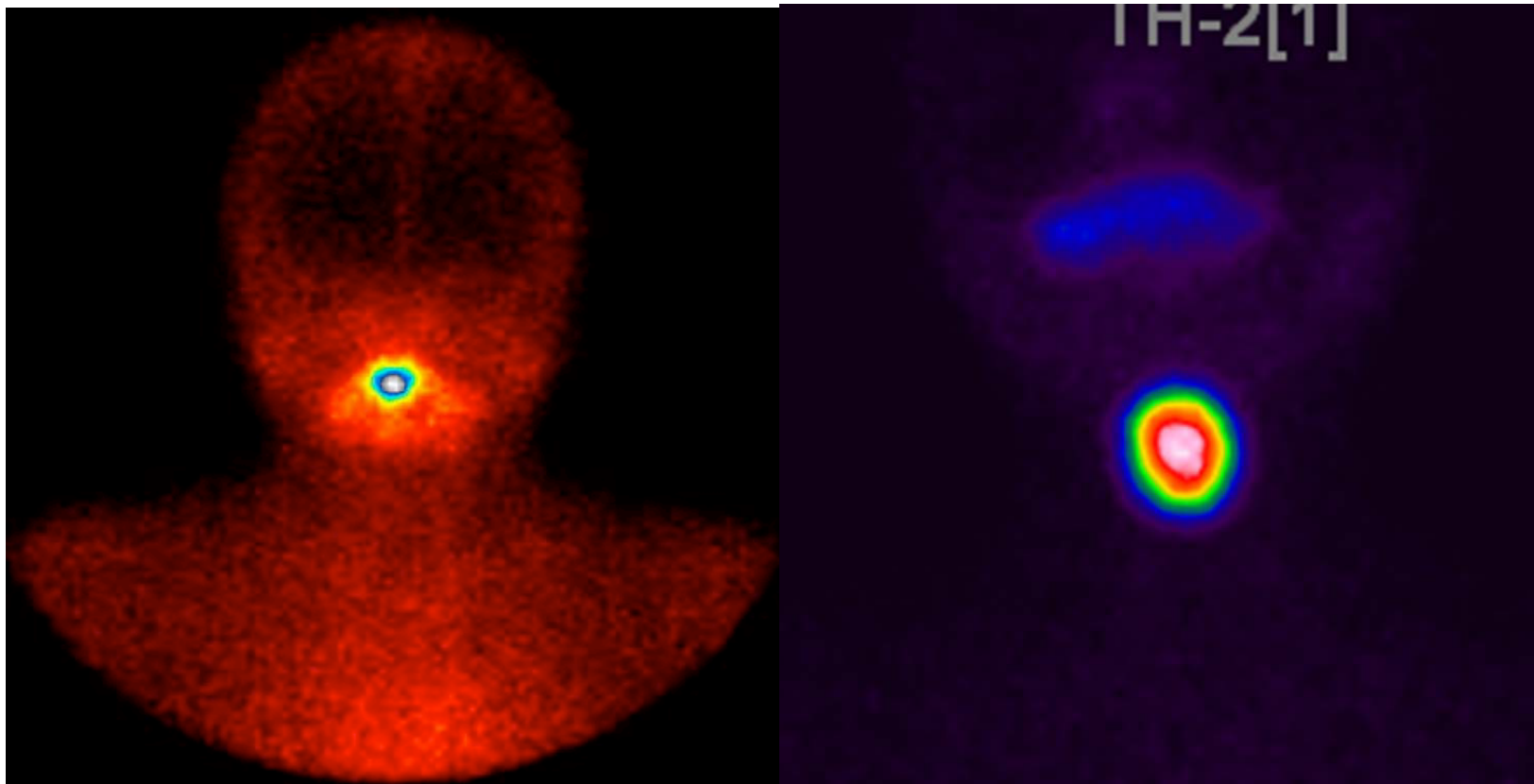
neregulat



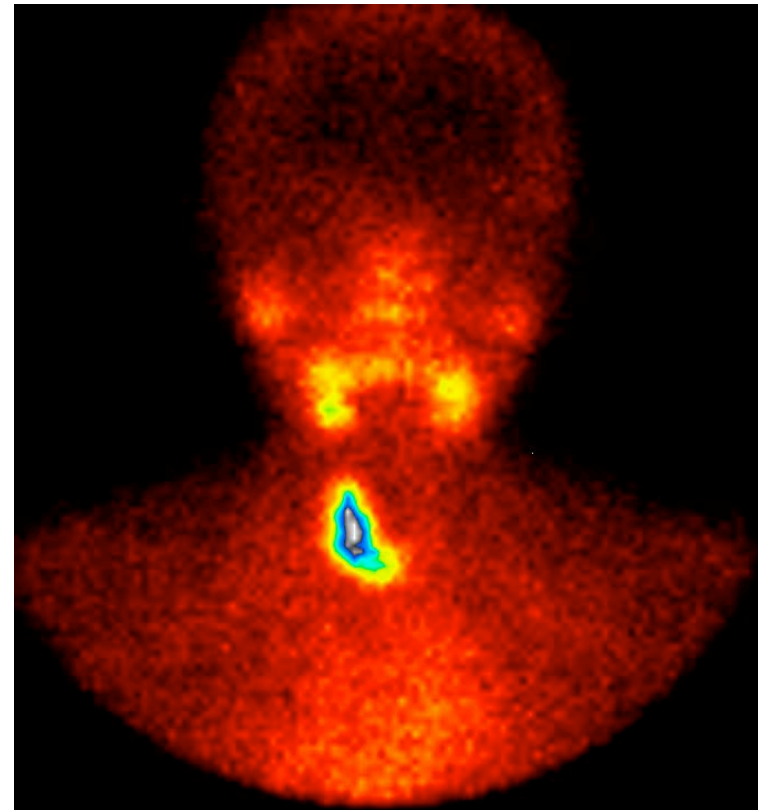
VARIANTE ANATOMICE



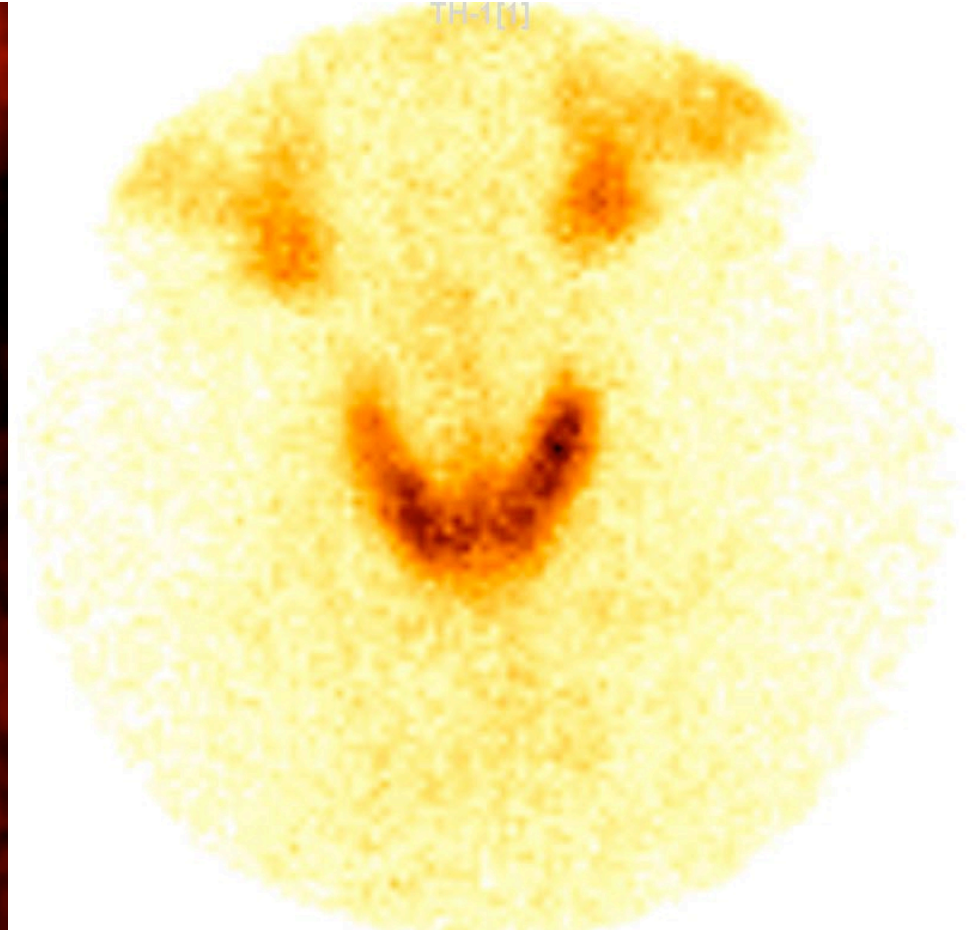
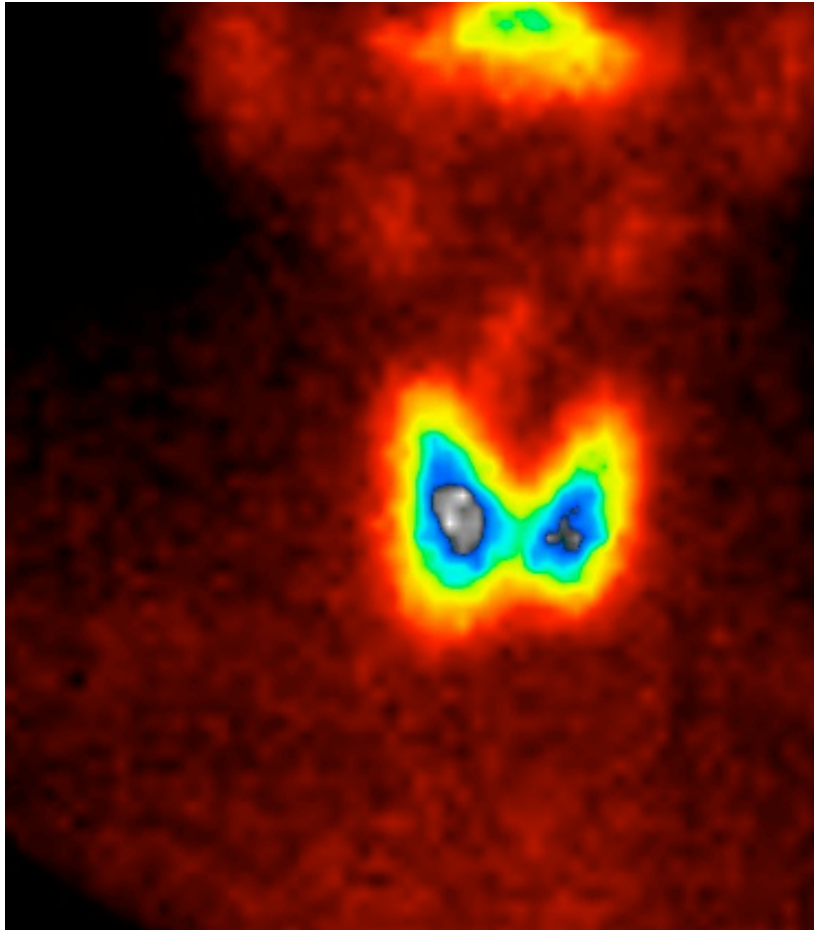
ECTOPIE TIROIDIANA



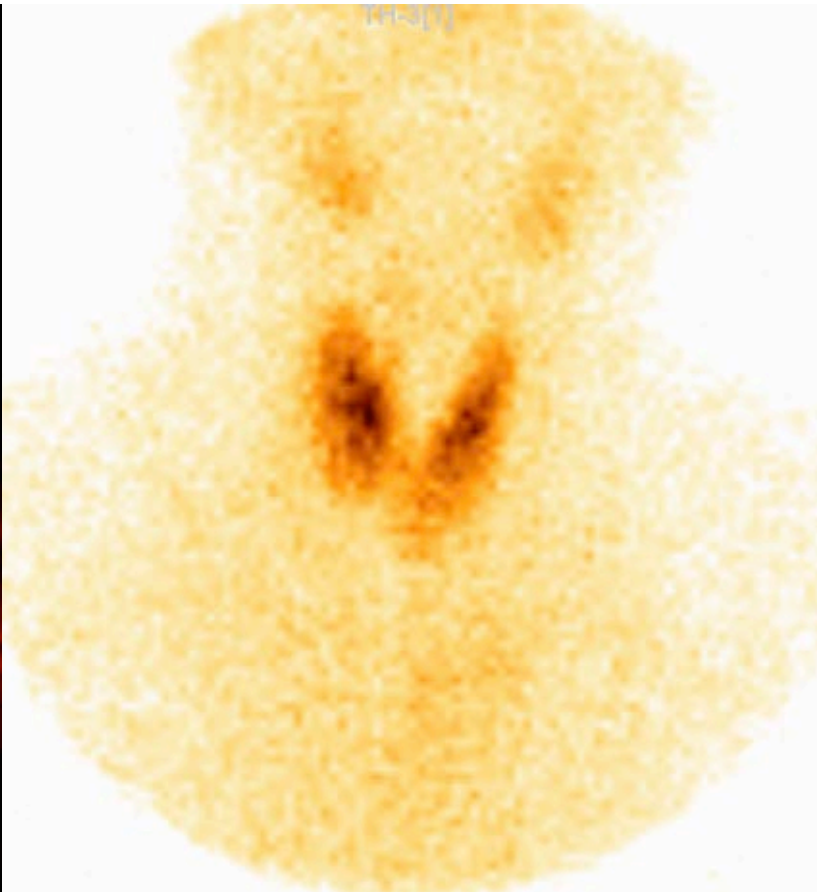
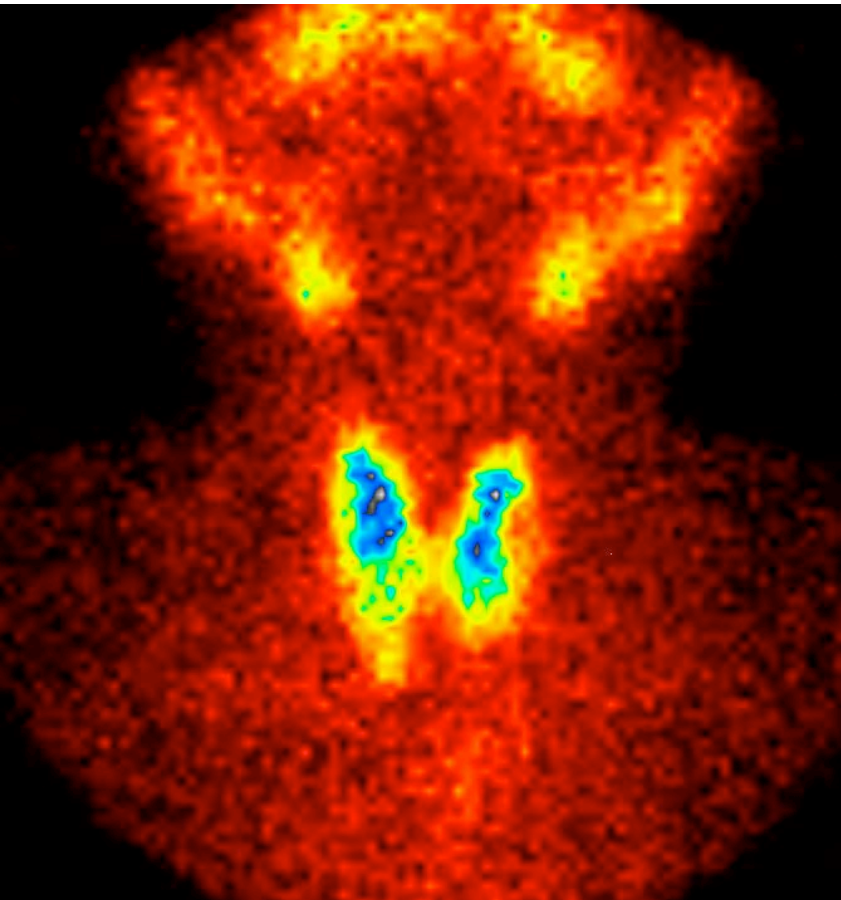
ANOMALII ANATOMICE



LOB PIRAMIDAL



LOB ACCESOR



alte tehnici imagistice

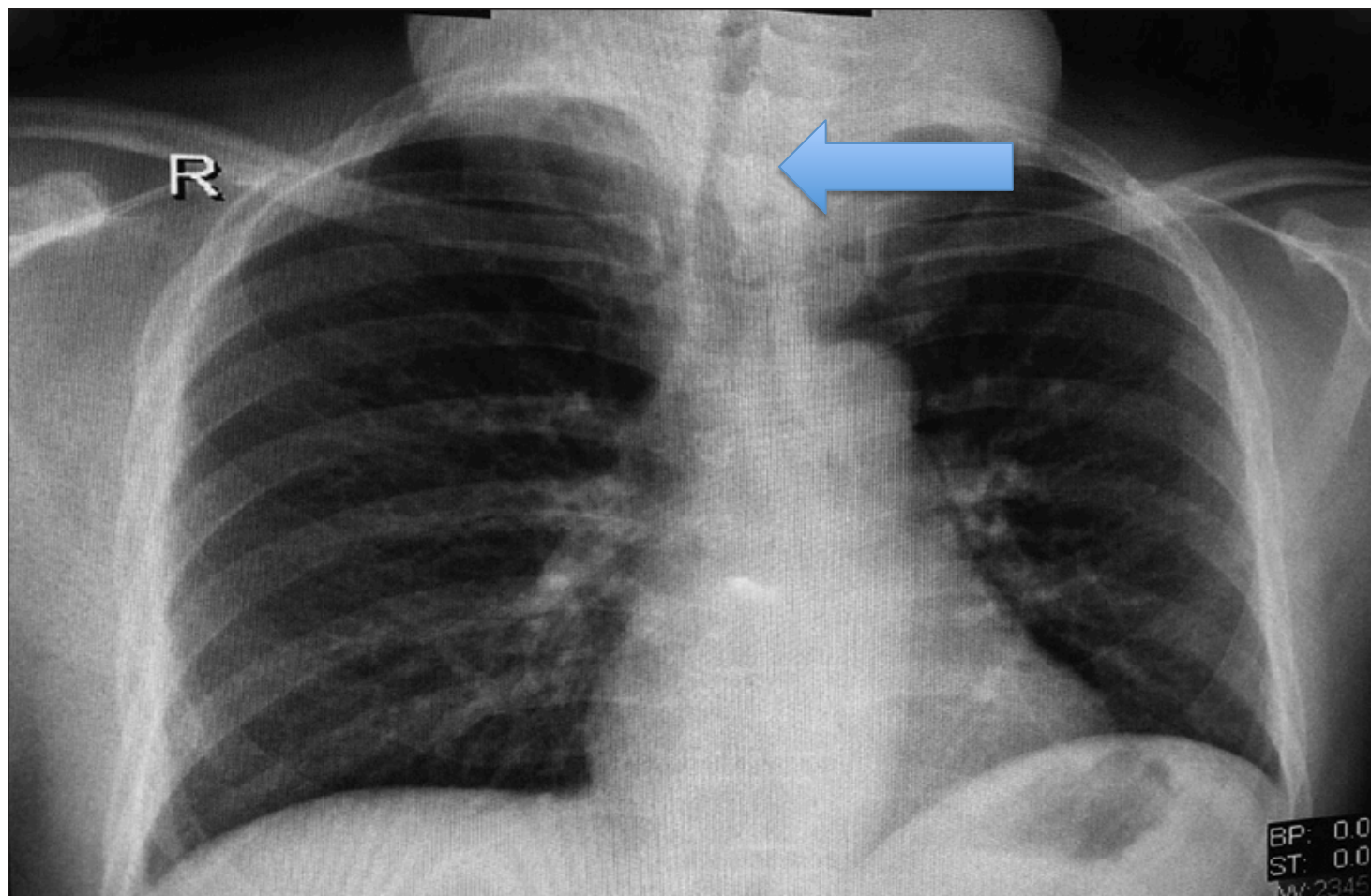
- Cervical Rx images - tracheal deviation
- CT and MRI of Neck
 - Compressive symptoms
 - Tracheal compression
 - Esophageal compression
 - Not useful for evaluation of intrathyroidal nodules
 - Insensitive for intrathyroidal nodules

1. RECOMMENDED for advanced disease

2. RECOMMENDED for invasive primary tumor

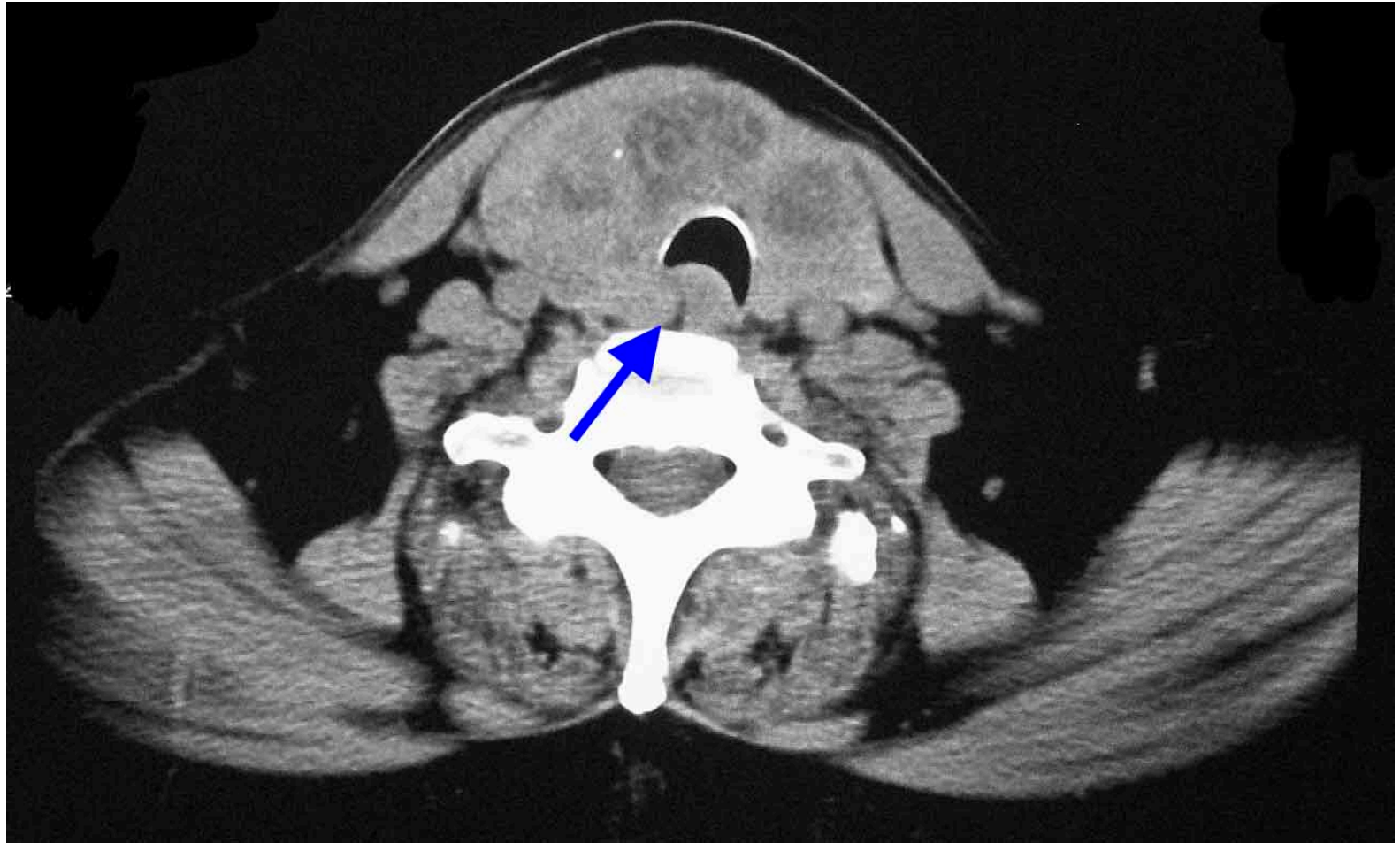
3. Regional lymph node estimation (level VI – I)

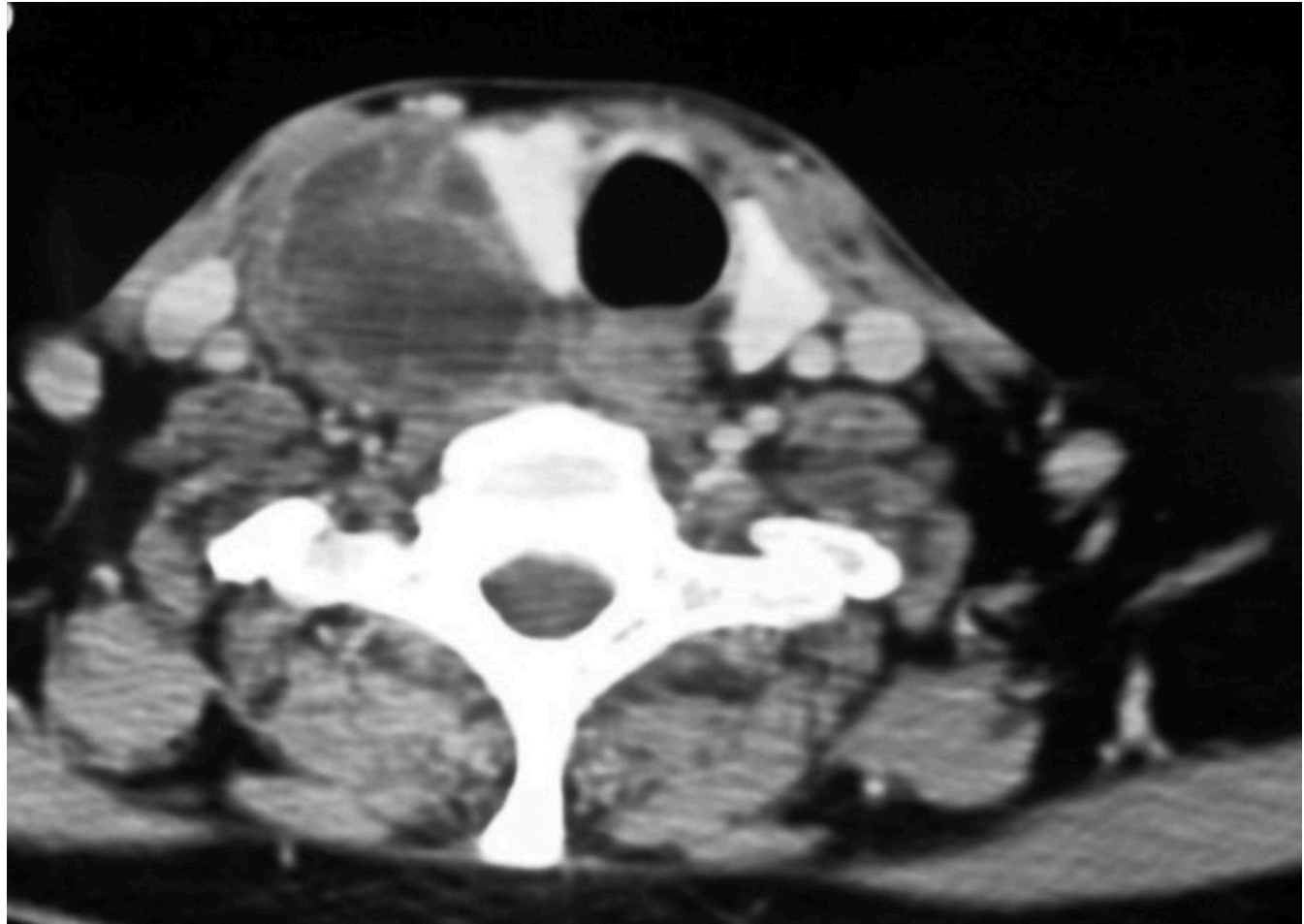
- CT of the chest
 - Inferior border of the nodule
- FDG-PET is not routinely recommended
 - Distant metastases

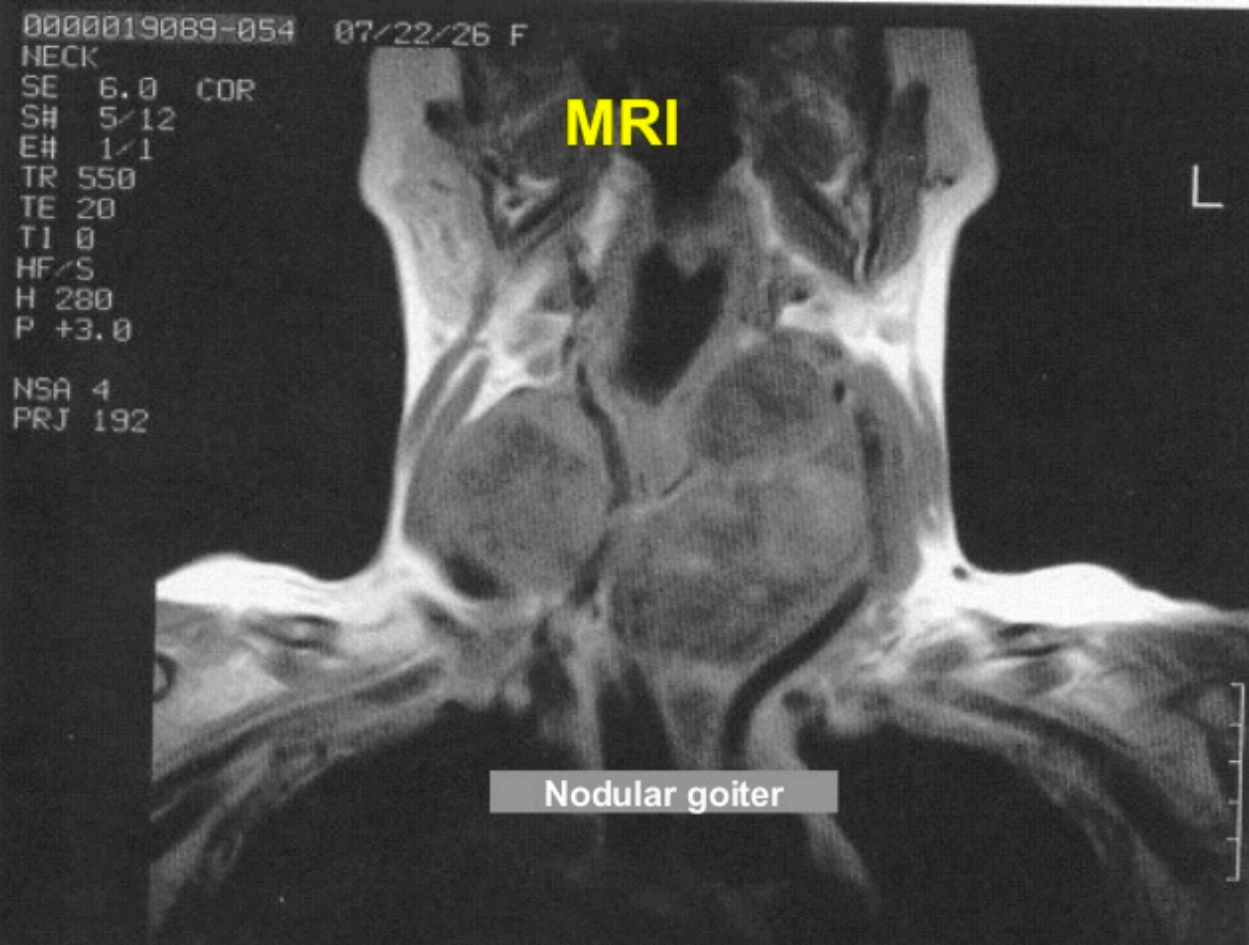


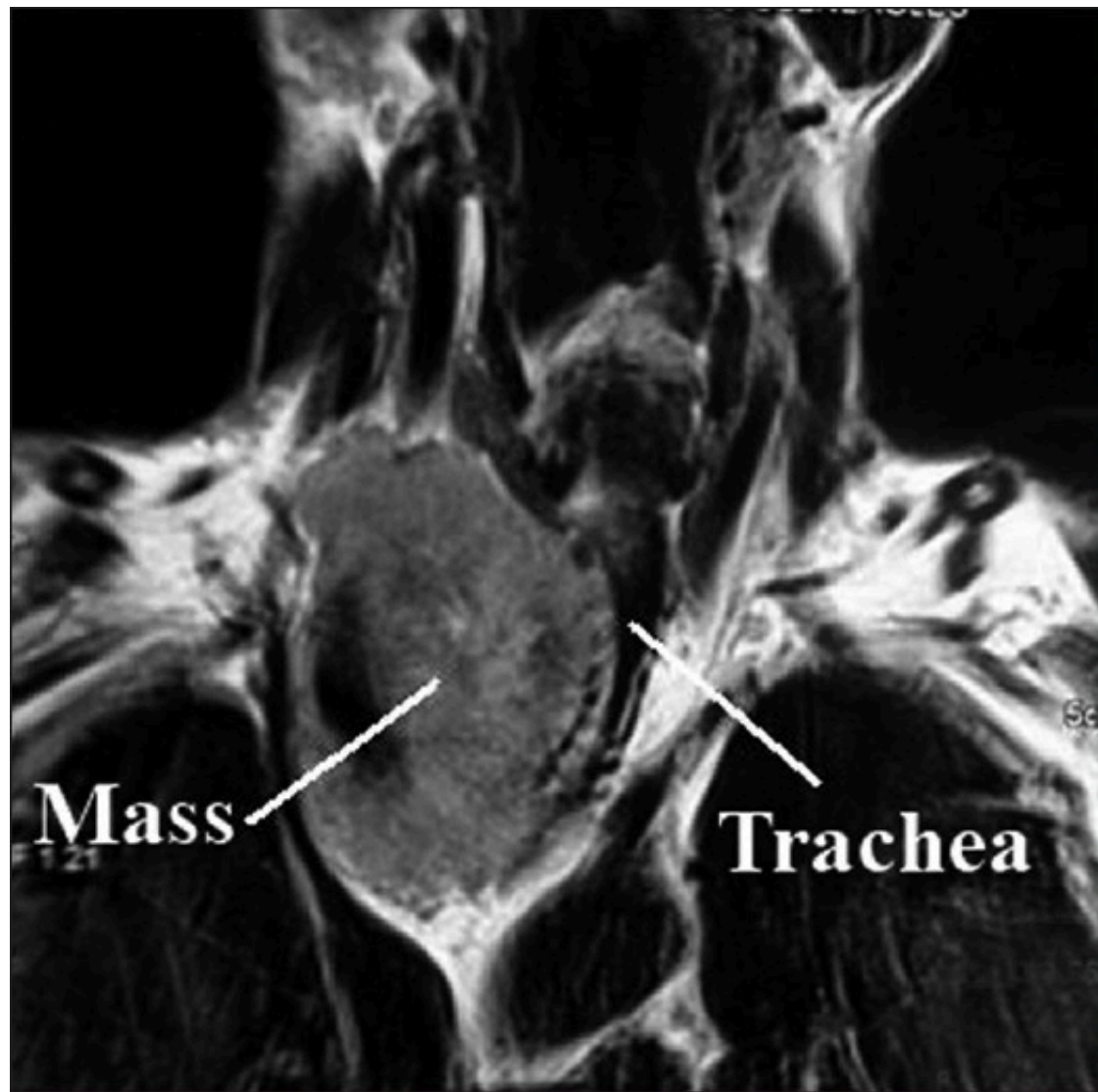












CITOLOGIE - FNAC

- Informatii clare
 - Reconfirmarea benignitati/reconfirmare la cazurile de noduli clasa de risc mic
 - Lamurire la cazurile cu risc intermediar
 - Obligatoriu la cazurile cu risc inalt
- ? Momentul FNAC ← **selectia ECOGRAFICA a riscului**
- SELECTIE CATEGORIE RISC !!!!!**

Punctie cu ac fin

- US guided
- 23-26 G needle
- Always perpendicular
- RESULTS = BETSEHDA SYSTEM
 - I = nondiagnostic
 - II = benign
 - III = follicular lesion/unclear cytology
 - IV = follicular neoplasm
 - V = suspect malignant
 - VI = malignant



