

# Thyroid

Neck Lump/Bump/Mass/Lymph Node: CT Neck w/Contrast is the ACR gold standard



## Indications

- ◆ Evaluation of palpable mass or enlarged thyroid on exam or abnormal labs
- ◆ Follow up findings from other imaging studies
- ◆ Evaluation of presence, size and location of thyroid gland
- ◆ Evaluation of patients at high risk of thyroid malignancy
- ◆ Follow up thyroid nodules
- ◆ Evaluation of regional nodal metastases in patients with proven or suspected thyroid carcinoma prior to and post thyroidectomy
- ◆ Evaluation of thyroidectomy bed for local recurrence
- ◆ Evaluation of thyroid prior to non-thyroid related neck surgery
- ◆ Evaluation of thyroid prior to radioactive iodine ablation
- ◆ Localization of neck abnormalities prior to intervention
- ◆ Identification and localization of parathyroid abnormalities or evaluation for recurrent disease after surgery
- ◆ Guidance for aspiration or biopsy of thyroid abnormalities or other masses of the neck

## Indications Cont.

- ◆ Localization of autologous parathyroid gland implants
- ◆ Evaluation of the parotid and submandibular glands for masses and non-neoplastic conditions, i.e. infection and stones

## Equipment

- ◆ Linear Transducer
  - 10-15 MHz

## Patient Position

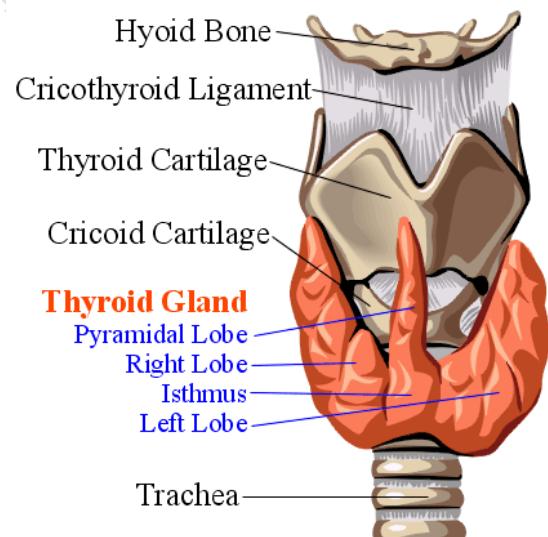
- ◆ Supine
- ◆ Neck in hyperextension (*roll under shoulders*)



## Evaluation

### Thyroid

- ◆ Measurements in 3 dimensions (Long, AP, Trans)
- ◆ Diffuse pathology
  - Overall heterogeneity
  - Hypervascularity
- ◆ Focal Pathology (significant abnormalities)
  - Document:
    - Location
    - Measurements (Long, AP, Trans)
      - Split screen
    - Number
    - Characteristics
      - Composition (solid/cystic)
      - Echogenicity
      - Margins (smooth or irregular)
      - Calcifications
      - Vascularity



# Thyroid

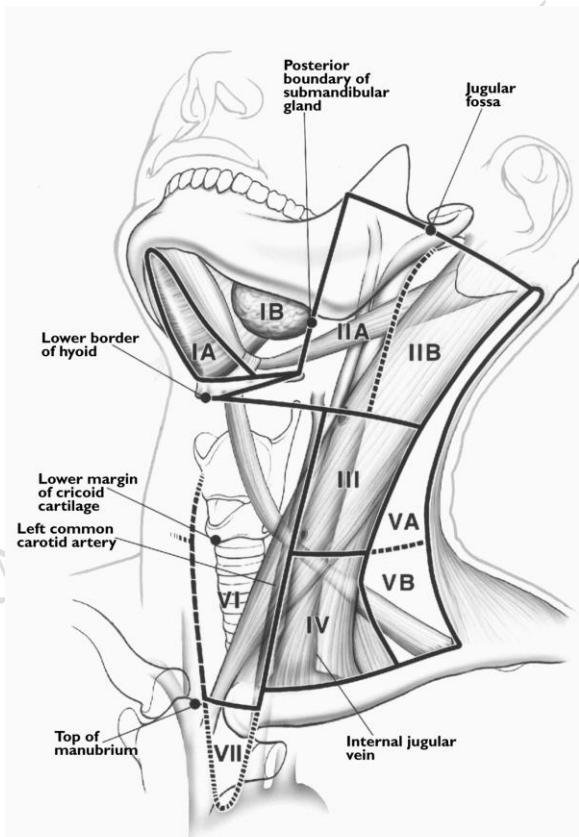
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## Evaluation Cont.

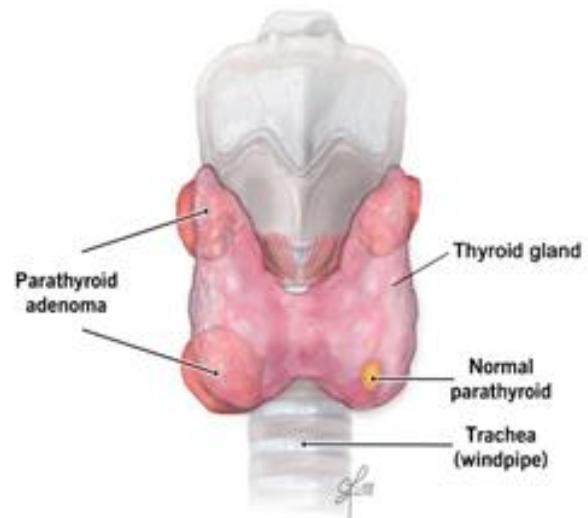
### Lateral Neck

- ◆ Evaluate for abnormal cervical lymph nodes
  - From angle of mandible/parotid gland to clavicle
  - Lateral to Jugular Vein & Carotid Artery
- ◆ Abnormal lymph nodes characteristics:
  - Calcifications
  - Cystic areas
  - Absence of central hilum
  - Round appearance
  - Abnormal color Doppler
- ◆ Document:
  - Measurement (*shortest dimension*)
  - Location (*Do NOT label images with level*)
    - Level I
      - Superior to hyoid bone/submental
    - Level II
      - Angle of the mandible to the carotid bifurcation/ hyoid bone
    - Level III
      - Inferior to carotid bifurcation to lower cricoid cartilage
    - Level IV
      - Inferior to lower cricoid cartilage to clavicle
    - Level V
      - Lateral/posterior to sternocleidomastoid muscle from the skull base to the clavicle
    - Level VI
      - Anterior neck
      - Between hyoid bone and manubrium
    - Level VII
      - Inferior to manubrium



### Parathyroid Adenomas

- ◆ Abnormal appearance:
  - Hypoechoic to thyroid
  - Homogenous
  - Greater than 1 cm
  - Feeding vessel on color Doppler
- ◆ Document:
  - Measurements (3 dimensions)
  - Location
    - Relation to thyroid lobe (posterior & inferior most common)
  - Color Doppler of feeding vessel



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## Images

### Thyroid

#### **Transverse (Right & Left)**

- ◆ Superior lobe
- ◆ Mid lobe
- ◆ Inferior lobe
- ◆ Cine clip superior to inferior

#### **Longitudinal (Right & Left)**

- ◆ Lateral
- ◆ Mid
- ◆ Medial
- ◆ Cine clip lateral to medial

#### **Color Doppler (Right & Left)**

- ◆ Either plane

#### **Transverse**

- ◆ Isthmus

#### **Measurements**

- ◆ Right & Left Thyroid Lobes
  - Long, AP & Trans
- ◆ Isthmus Trans
  - AP

#### **Transverse Comparison**

- ◆ Comparison of Right & Left lobes
  - Gray-scale
  - Color Doppler

#### **Thyroid Pathology\***

- ◆ Thyroid
  - Measure 3 planes
    - Split screen
    - AP on Trans image
  - Color Doppler
  - Max 1 nodule each side

### Lateral Neck

#### **Transverse (Right & Left)**

- ◆ Superior to inferior (Lateral to jugular vein and carotid artery)
  - Cine clip
  - Document abnormal lymph nodes
    - Measurement (*shortest dimension*)
      - Split Screen
    - Color Doppler
    - Do NOT label level on images

### Parathyroid

#### **(Right & Left) if visible**

- ◆ 2 located posterior to the thyroid gland on each side (4 total)
  - Normal glands are not visible
- ◆ Document parathyroid adenomas if seen
  - Measurements (Long, AP, Trans)
    - Split screen
  - Location
  - Color Doppler
    - Feeding vessel

#### \*Concerning features include:

**Composition:** Solid, mixed solid & cystic

**Echogenicity:** Hypoechoic

**Shape:** Taller-than-wide

**Margin:** Lobulated/irregular, extra-thyroidal extension

**Echogenic Foci:** Calcifications

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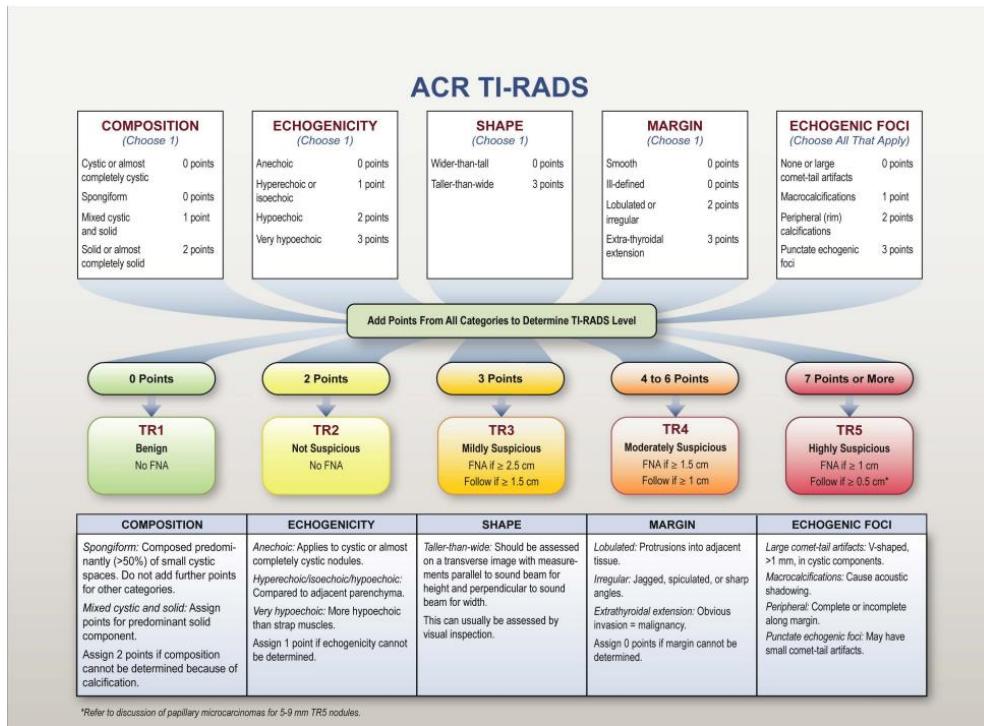
## Additional Information

### Thyroid

- ◆ Scan superior to the isthmus to evaluate for:
  - Possible pyramidal lobe of the thyroid
  - Thyroglossal duct cyst

### Parathyroid

- ◆ Can be supernumerary and in ectopic locations
- ◆ Evaluate infraclavicular and near upper mediastinum



## References

- ◆ ACR-AIUM-SPR-SRU Practice Parameters for the Performance and Interpretation of Diagnostic Ultrasound of the Thyroid and Extracranial Head and Neck Revised 2022  
<https://gravitas.acr.org/PPTS/GetDocumentView?docId=157+&releaseId=2>
- ◆ ACR TI-RADS <https://www.acr.org/-/media/ACR/Files/RADS/TI-RADS/TI-RADS-chart.pdf?la=en>
- ◆ Parathyroid adenoma: Diagnosis & Treatment. Cleveland Clinic.  
[http://my.clevelandclinic.org/disorders/parathyroid\\_disease/hic\\_parathyroid\\_adenoma\\_diagnosis\\_and\\_treatment.aspx](http://my.clevelandclinic.org/disorders/parathyroid_disease/hic_parathyroid_adenoma_diagnosis_and_treatment.aspx)  
Updated June 11, 2012. Accessed April 23, 2014.
- ◆ Som PM, Curtin HD, Mancuso AA. Imaging-Based Nodal Classification for Evaluation of Neck Metastatic Adenopathy. *AJR*. March 2000; 174: 837-845. <http://www.ajronline.org/doi/pdf/10.2214/ajr.174.3.1740837>
- ◆ Thyroid Anatomy. Family Practice Notebook. [http://www.fpnotebook.com/\\_media/ThyroidAnterior.gif](http://www.fpnotebook.com/_media/ThyroidAnterior.gif) Updated April 18, 2014. Accessed April 23, 2014.