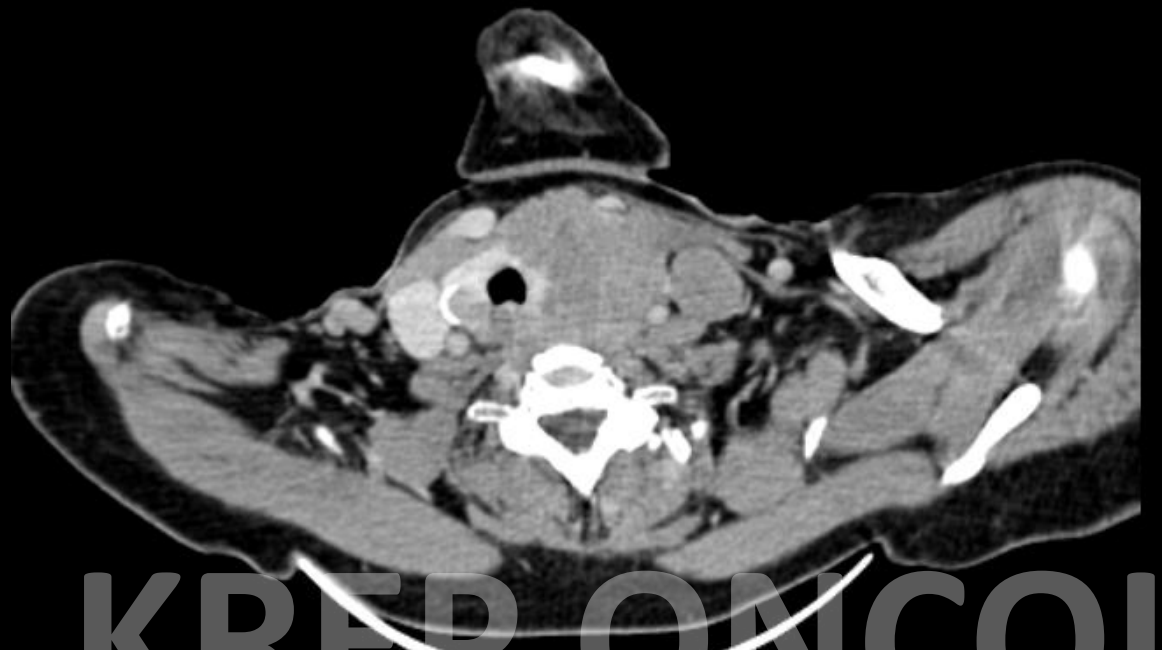
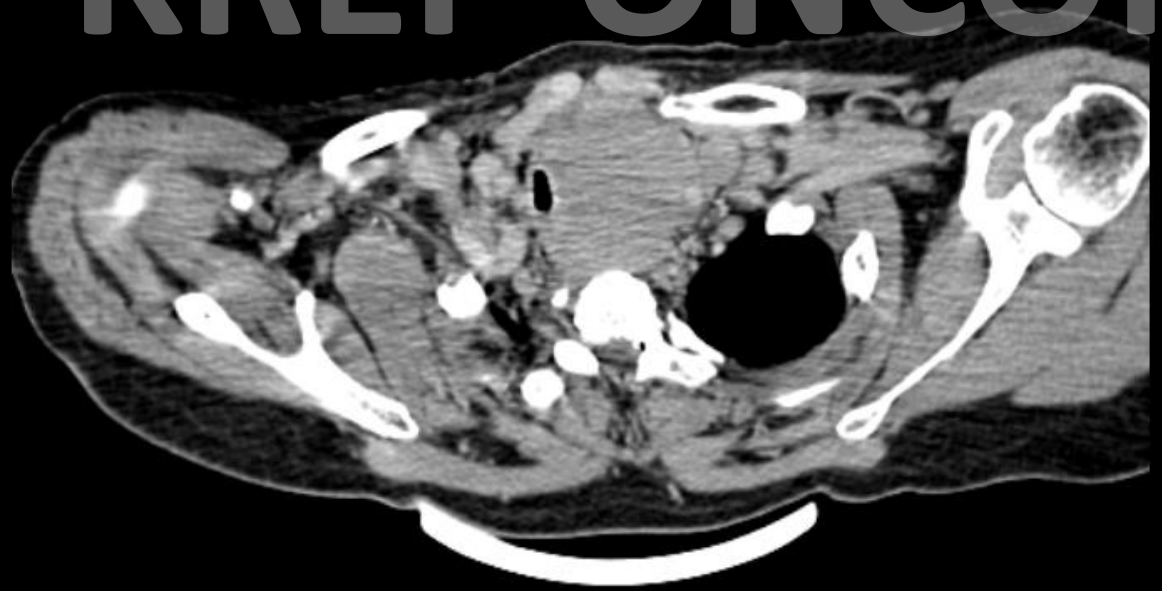
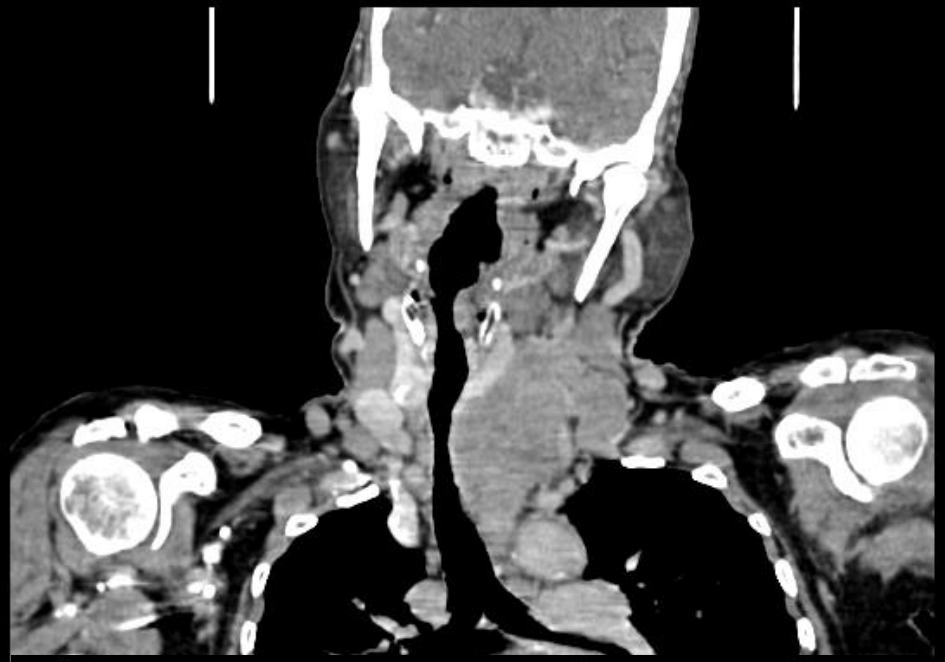
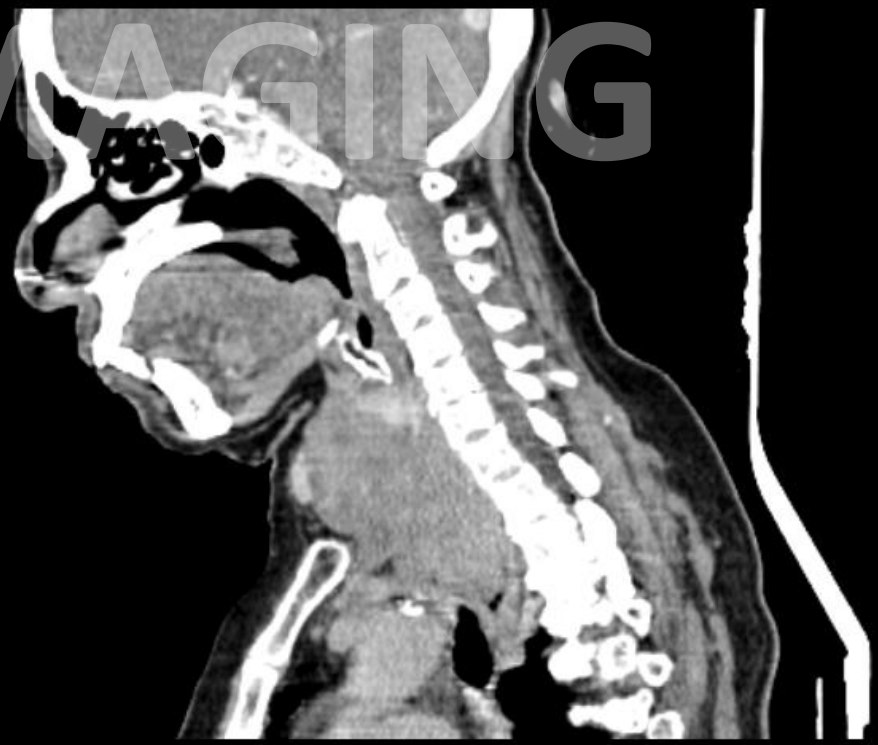
2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM

- A lobulated heterogeneously enhancing mass is noted epicentered in the left lobe of the thyroid gland.
  - Inferiorly, the lesion extends beyond the thoracic inlet into the superior mediastinum, reaching the level of the D3 vertebral body, consistent with retrosternal or mediastinal extension. Aortic arch was normal, lesion is above the arch.
  - Medially, the lesion causes mass effect on the trachea with evidence of luminal narrowing. No obvious tracheal wall thickening.
  - Laterally, displaces the left carotid sheath structures with luminal narrowing of the left internal jugular vein.
  - Posteriorly the planes with prevertebral fascia are lost. Esophagus was displaced. ‘
  - Anteriorly fat planes with strap muscles are lost.
- Enlarged lymph nodes left level 2, 3, 4 including supraclavicular region.
- The findings are consistent with thyroid malignancy arising from the left lobe with retrosternal / mediastinal extension.
- MRI will help in better local staging with respect to tracheal wall, strap muscles and prevertebral fascia involvement.

1. **Clinical Context & Relevance:**
   - Retrosternal or intrathoracic extension occurs when a **thyroid mass extends below the thoracic inlet**, potentially compressing **trachea, esophagus, or great vessels**.
   - Seen with **multinodular goiter, papillary carcinoma, follicular carcinoma**, and occasionally **medullary or anaplastic carcinoma**.
2. **CT is the Modality of Choice for Surgical Planning:**
   - Precisely defines **inferior extension**, **tracheal deviation/narrowing**, **degree of mediastinal involvement**, and **relationship to great vessels** (innominate vein, SVC, aortic arch).
   - Detects **extracapsular tumor extension**, calcification, hemorrhage, and mass effect.
3. **MRI Role:**
   - Useful when considering **tracheal, esophageal, or recurrent laryngeal nerve involvement**, or when iodinated contrast must be avoided.
   - **T1 isointense, T2 variable**, with **avid enhancement** of solid tumor components.
4. **Key Imaging Features Suggesting Malignancy:**
   - **Irregular margins**, **extrathyroidal extension**, **infiltration of strap muscles or tracheoesophageal groove**, **loss of fat planes**, **pathologic cervical or mediastinal lymph nodes**, **microcalcifications**, and **invasion of vascular structures**.
   - Follicular carcinoma may present as **smooth but invasive** due to capsular/vascular invasion not always seen on imaging.

5. **Evaluation of Airway and Vascular Compression:**
   - Assess **tracheal narrowing (<8 mm critical)**, **eccentric compression**, or **intraluminal invasion** (rare, but crucial if present).
   - Evaluate compression or displacement of **innominate vein, SVC, brachiocephalic artery**, and **right atrium** if descending >5–6 cm below thoracic inlet.
6. **Nodal Metastatic Patterns:**
   - **Papillary carcinoma:** Central (Level VI) and lateral cervical ± superior mediastinal nodes.
   - **Medullary carcinoma:** Evaluate **paratracheal, prevascular, and upper mediastinal** stations.
   - **Anaplastic carcinoma:** Aggressive **soft-tissue infiltration**, bulky necrotic nodes.
7. **Surgical Impact:**
   - Small retrosternal components are usually removed via **transcervical approach**.
   - **Deep or extensive mediastinal extension**, tracheal invasion, or vascular involvement may require **sternotomy or thoracotomy** — imaging must explicitly indicate whether the **inferior margin is above or below the aortic arch**.
8. **What the Radiology Report Must State Clearly:**
   - **Inferior extension depth** and **relation to thoracic inlet / aortic arch**.
   - **Degree of tracheal narrowing** and **airway invasion**.
   - **Vessel displacement vs encasement vs invasion**.
   - **Pattern and stations of nodal involvement**.
   - **Presence of extrathyroidal extension** and **esophageal or RLN groove invasion** (impact on voice preservation).

Contributors

Dr. M S Kashif
MD, Fellowship in Oncoimaging

Dr. Zain Sarmast
MD, Fellowship in Oncoimaging

Feedbacks are most welcome and appreciated - drkashif1196@gmail.com