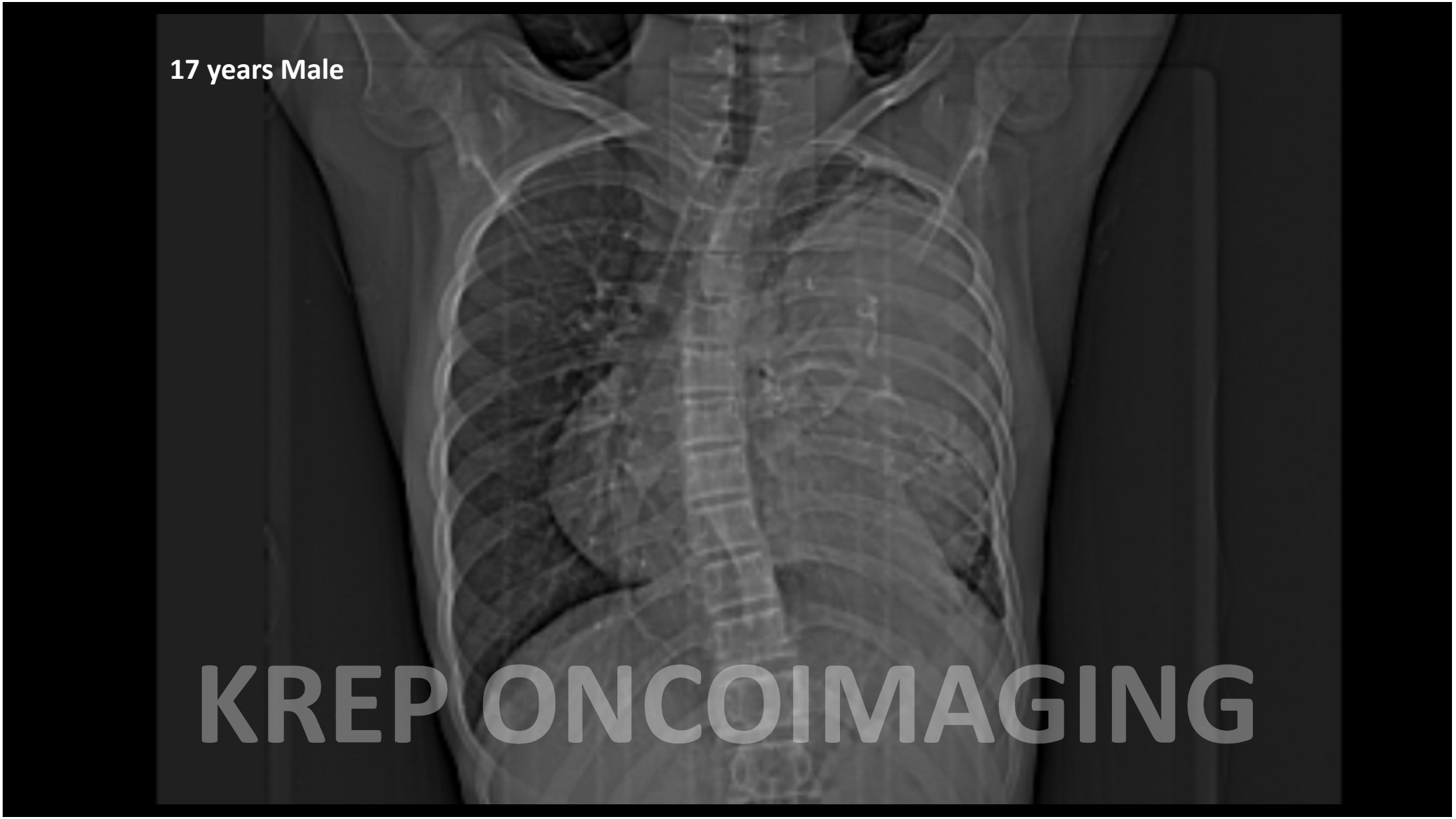
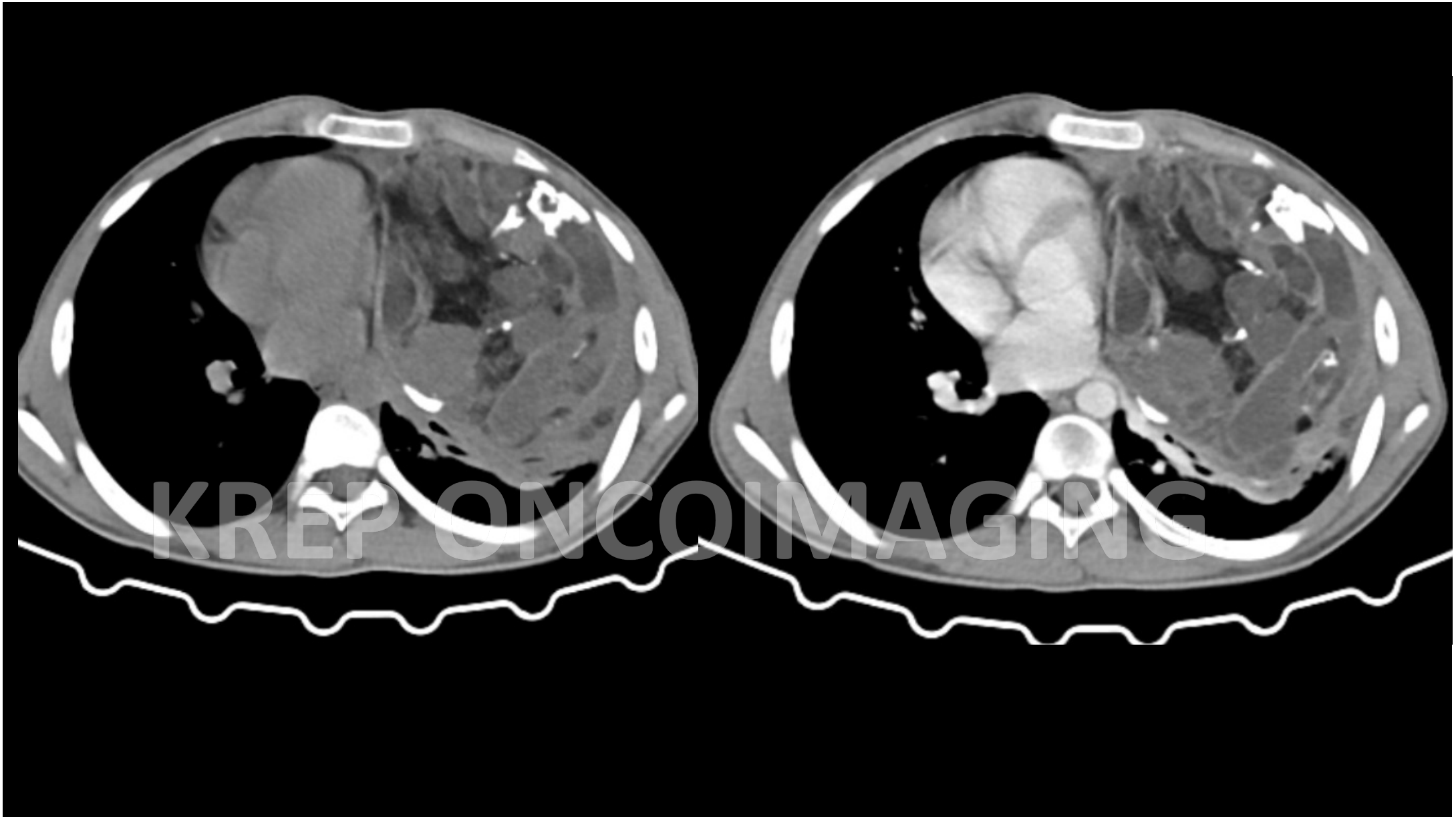
2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM


17 years Male
KREP ONCOIMAGING

- A fairly well-defined radio-opacity is seen in the left paracardiac region, extending into the left hemithorax. The opacity appears heterogeneous in density with few coarse calcific foci within.
- The lesion shows a broad base towards the mediastinum and a smooth, convex outer margin projecting into the left lung field.
- The opacity partially obscures the left cardiac border and causes rightward shift of the mediastinum and trachea.
- The left hilum is seen through the opacity.
- No air bronchograms, no pleural effusion, and no pneumothorax are seen.
- Right lung fields appear clear; bony thorax is intact.

Above features are suggestive of a left mediastinal mass, most likely anterior mediastinal in origin. Suggested CECT Thorax for further evaluation.


KREP ONCOIMAGING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- A well-defined, encapsulated heterogeneous mass is seen arising from the mediastinum on the left side, predominantly involving the prevascular compartment and extending posteriorly into the visceral compartment.
- The lesion exerts significant mass effect, resulting in rightward mediastinal shift and compression of the adjacent left lung parenchyma with partial collapse / atelectasis of adjacent segments.

- The mass demonstrates mixed internal attenuation, composed of:
  - Soft-tissue density components,
  - Cystic areas of fluid attenuation,
  - Fat-attenuation regions (−20 to −100 HU), and
  - Coarse, chunky calcific foci / tooth-like calcifications.
- There is mild enhancement of the capsule following contrast administration, while the internal components show predominantly peripheral and septal enhancement.

Features are suggestive of a large mediastinal teratoma, predominantly involving the prevascular compartment with extension into the visceral compartment.

MEDIASTINAL TERATOMA

Pathology & Origin:

Germ cell tumor arising from totipotent cells misplaced during embryogenesis, containing tissues from all three germ layers (ectoderm, mesoderm, endoderm).

Classified as mature (benign) or immature/malignant based on presence of primitive neuroectodermal tissue or associated germ cell components (e.g. yolk sac tumor).

Most commonly located in the anterior mediastinum.

Epidemiology:

Accounts for 8–13% of mediastinal masses and 60–70% of mediastinal germ cell tumors.

Predominantly affects young adults (20–40 years) with equal sex distribution (unlike gonadal GCTs).

Benign teratomas are more frequent in females; malignant ones (mixed GCTs) in males.

Clinical Presentation:

Often asymptomatic, discovered incidentally on chest imaging.Large lesions may cause chest pain, cough, dyspnea, or superior mediastinal compression.

Rarely, rupture into lung, bronchus, or pleural space → expectoration of hair/sebaceous material (“trichoptysis”) or chemical pleuritis.

CT Imaging Features (Modality of Choice):

- **Well-defined anterior mediastinal mass with mixed-density components —fat, fluid, soft tissue, and coarse calcification (diagnostic hallmark).**
- **Fat–fluid levels and tooth-like calcific foci are classic.**
- **Smooth or lobulated margins; no invasion in benign lesions.**
- **Ruptured teratomas show ill-defined margins, adjacent consolidation, pleural effusion, or air-fluid levels.**

MRI Characteristics:

- **T1: High signal from fat or proteinaceous material;**
- **T2: variable, often hyperintense due to cystic components.**
- **Fat suppression sequences confirm macroscopic fat.**
- **Post-contrast: Minimal or peripheral enhancement; heterogeneous if complex.**
- **Excellent for differentiating fat, fluid, and soft-tissue components, and assessing capsular integrity or invasion.**

Differential Diagnosis (Imaging):

Lesion ***Key Differentiator***

- **Thymic cyst, Simple cyst--- no fat or calcification.**
- **Thymoma ---Solid, enhancing mass without fat or cystic elements.**
- **Lymphoma ---Homogeneous soft-tissue mass, encasing but not invading vessels.**
- **Liposarcoma ---Predominantly fatty, irregular margins, invasive.**

Malignant Transformation / Immature Teratoma Clues:

- **Predominantly solid component, irregular or invasive margins.**
- **Absence of fat, heterogeneous enhancement, and vascular encasement.**
- **Elevated AFP or β-hCG if mixed with yolk sac or choriocarcinoma elements.**
- **May metastasize to lung, liver, or lymph nodes.**

Oncoradiologic Importance:

- **Imaging establishes diagnosis, resectability, and complications (rupture, infection, compression).**
- **Surgical excision is curative for mature teratomas; malignant variants require chemotherapy and follow-up imaging.**
- **Always report: location (prevascular), composition (fat–fluid–calcification), margins, invasion, rupture signs, and adjacent organ effects.**
- **Postoperative recurrence or malignant transformation mandates serial CT/MRI surveillance.**

Key Take-home:

- **Mediastinal teratoma is a well-circumscribed anterior mediastinal mass containing fat, fluid, and calcification — classic imaging triad.**
- **Presence of solid, invasive, or enhancing components raises concern for rupture or malignant transformation.**

Contributors

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