2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM

DEPARTMENT OF RADIO-DIAGNOSIS
JJMMC, DAVANGERE
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History

- 40 YEAR OLD MALE
- Patient was apparently normal 4 days back when he developed bilateral lower limb weakness, which was sudden in onset, gradually progressive in nature, while started while he was doing daily routine activities, weakness was in the form of requiring support to walk from bed to washroom
- Weakness of lower limb progressed to patient being bed bound
- h/o loss of sensations in b/L lower limb
- H/o bowel and bladder incontinence
- No h/o fever, Head Trauma, Headache, vomiting, blurring of vision, loss of consciousness, involuntary movements of limbs.
- Chronic Smoker since 22 years
- Power : Bilateral lower limb: 0/5. Upper limbs: 5/5
- Bilateral plantars mute
- Sensory system: Loss of sensations below umblicus (Pain, touch, vibration and temperature)

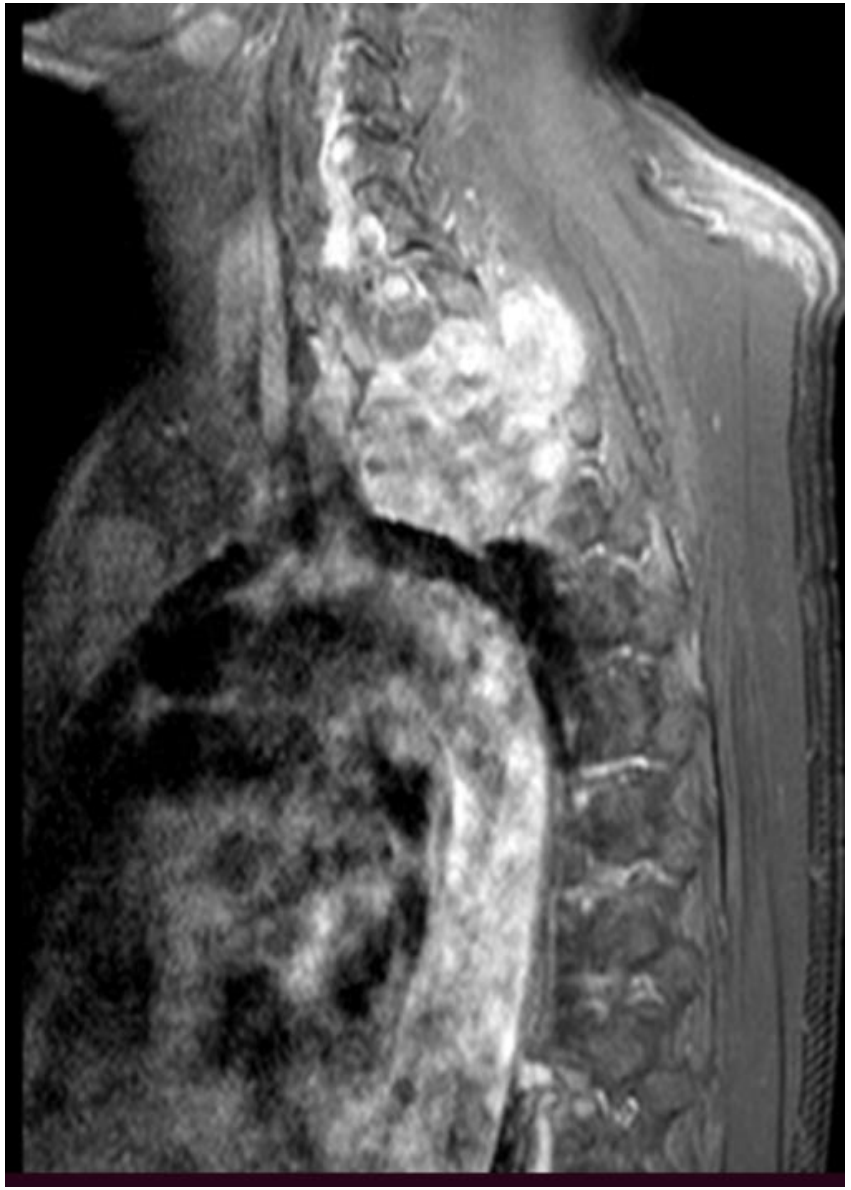
STIR CORONAL

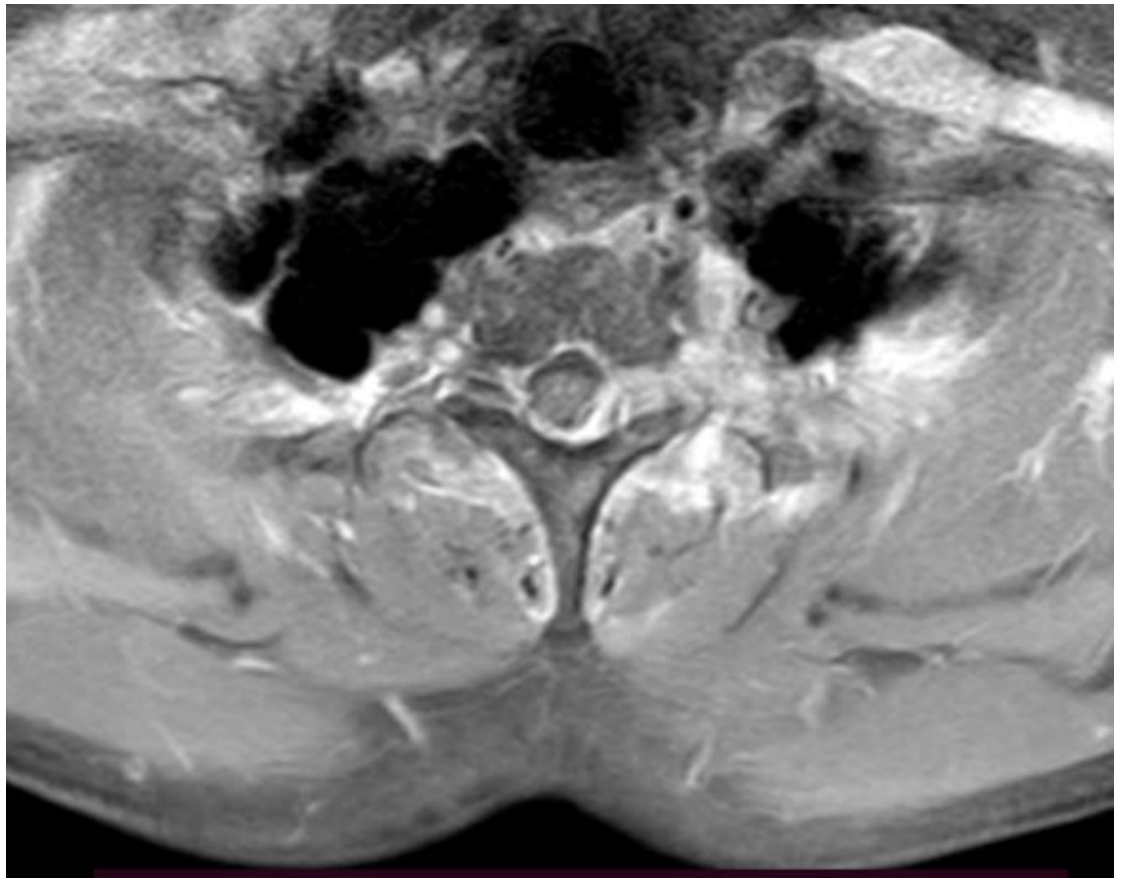
T1 SAGITTAL

T2 SAGITTAL

T1 isointense T2/SPAIR hyperintense lobulated mass lesion measuring approx 4.5x5.7x5.3cm (CCxAPxTR) with speculated margins noted epicentered in the apico-posterior segment of left upper lobe

EXTENSIONS

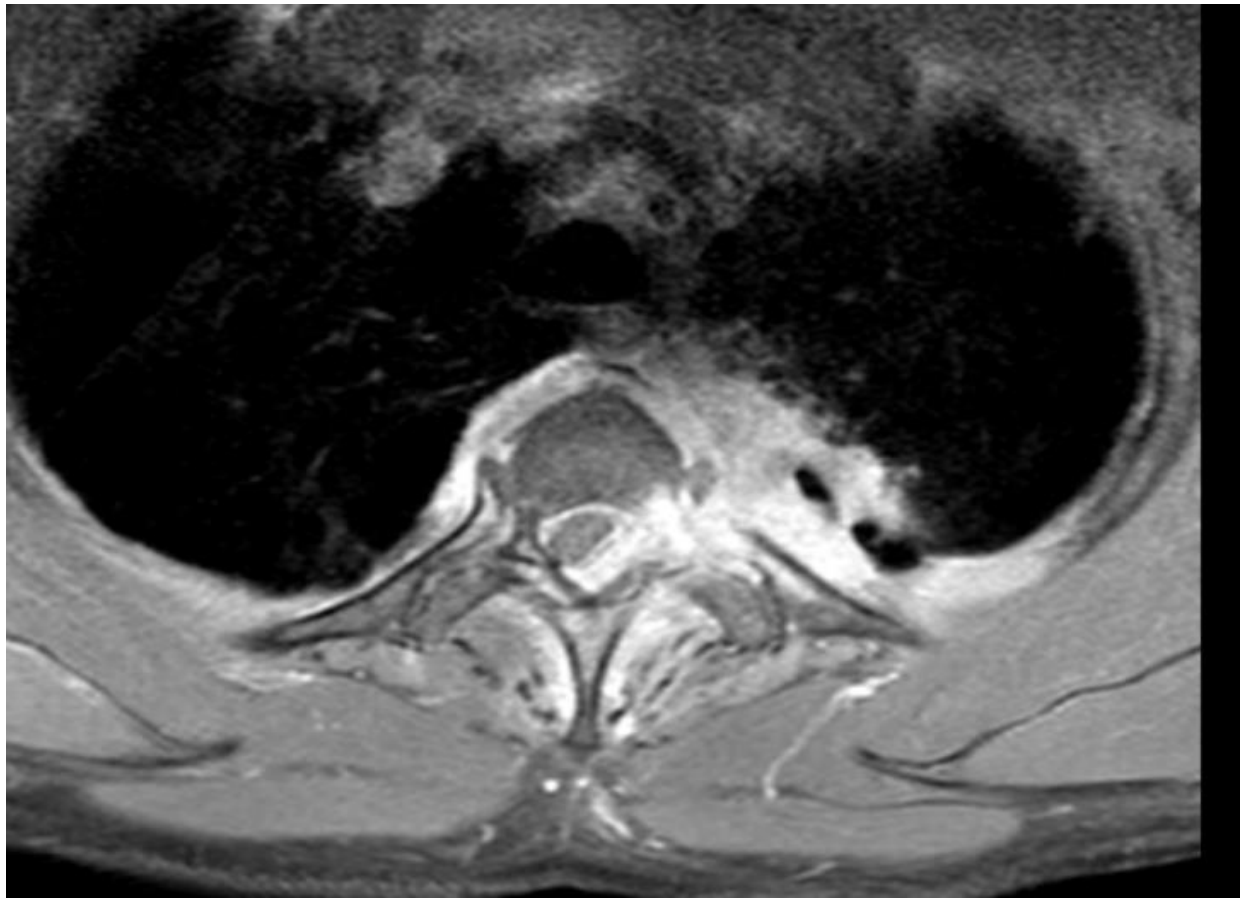




Extending cranio-caudally to Involve d1 to d3 vertebral body and left transverse processes of D1 and posterior aspect of left 1 st ri.
The lesion is seen extending to the D2 vertebral body via the widened left D2/D3 neural foramen into pre & para- vertebral soft tissue with associated sub-ligamentous and epidural space components from the level of D1 to D3 with adjacent dural enhancement and enhancing pleura noted bilaterally.

T1

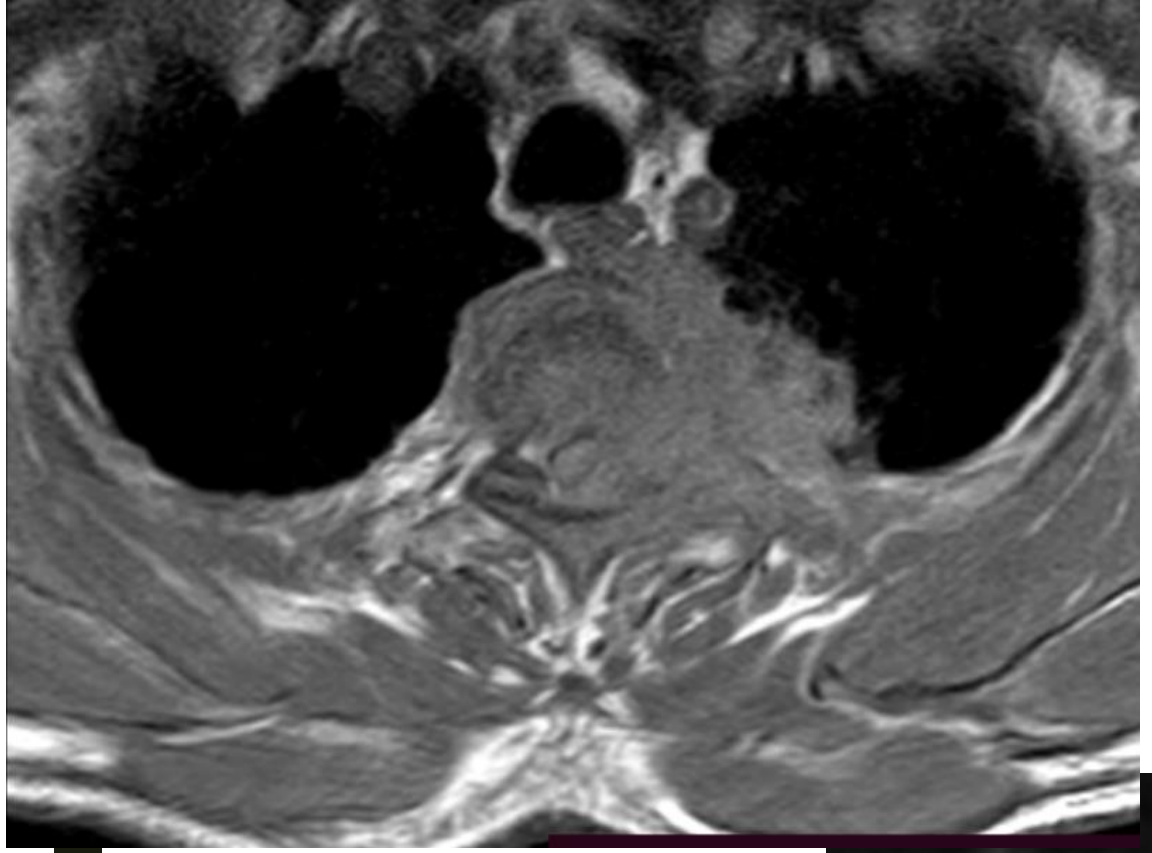
T2 SPAIR



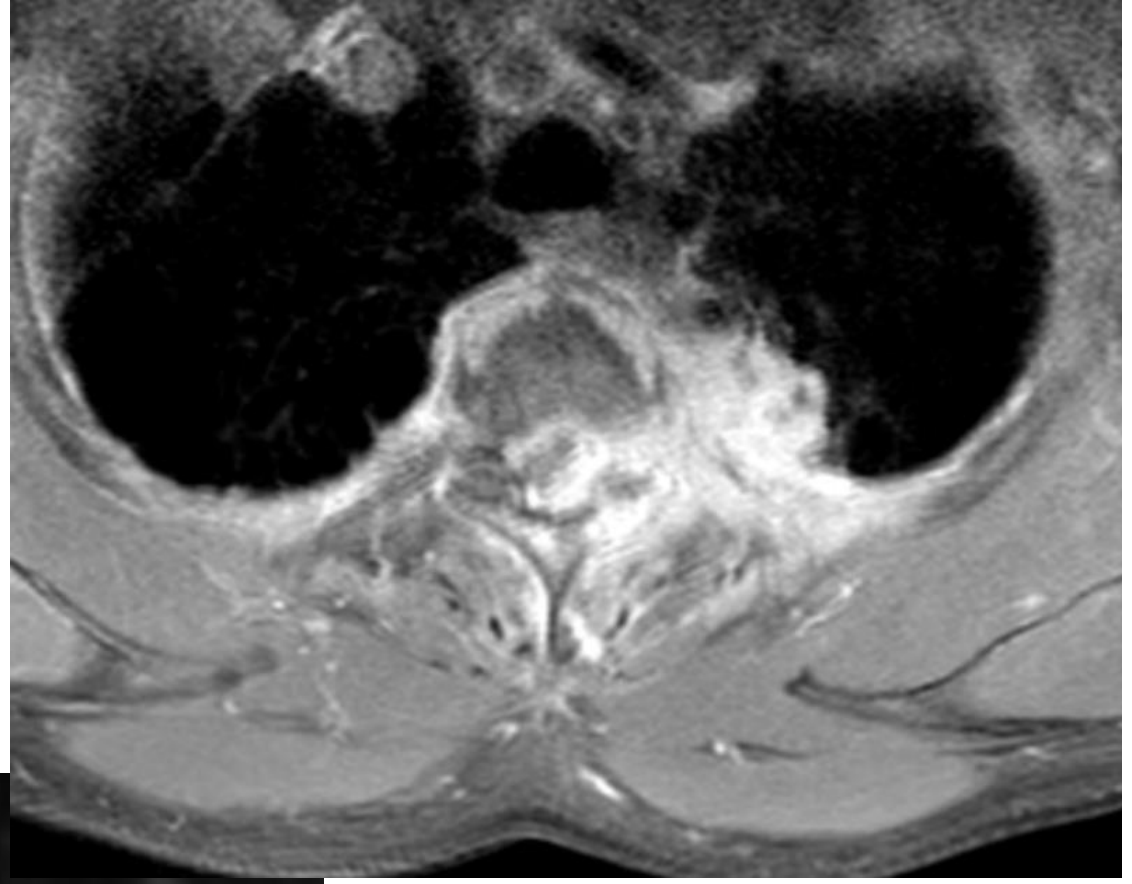
Post contrast T1 at D2-D3 level

Abnormal low t1 marrow signal noted in d2 vertebral body – s/o Pathological fracture with central wedge compression collapse and posterior retropulsion noted in the D2 with loss of height more than 75%. The cord at this level appears bulky with subtle T2 Spair hyperintensity noted.

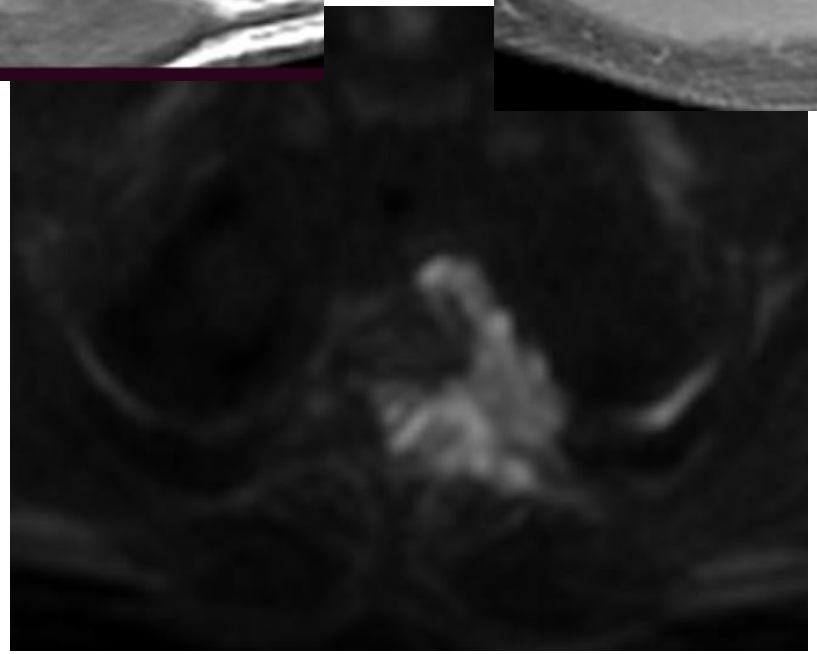
On Post contrast t1 – There is widening of the left d2-D3 neural foramina with extension into the adjacent pre and paravertebral soft tissue, epidural space and adjacent paraspinal muscles, pleura and left costo-vertebral junction.



Pre contrast T1-FS

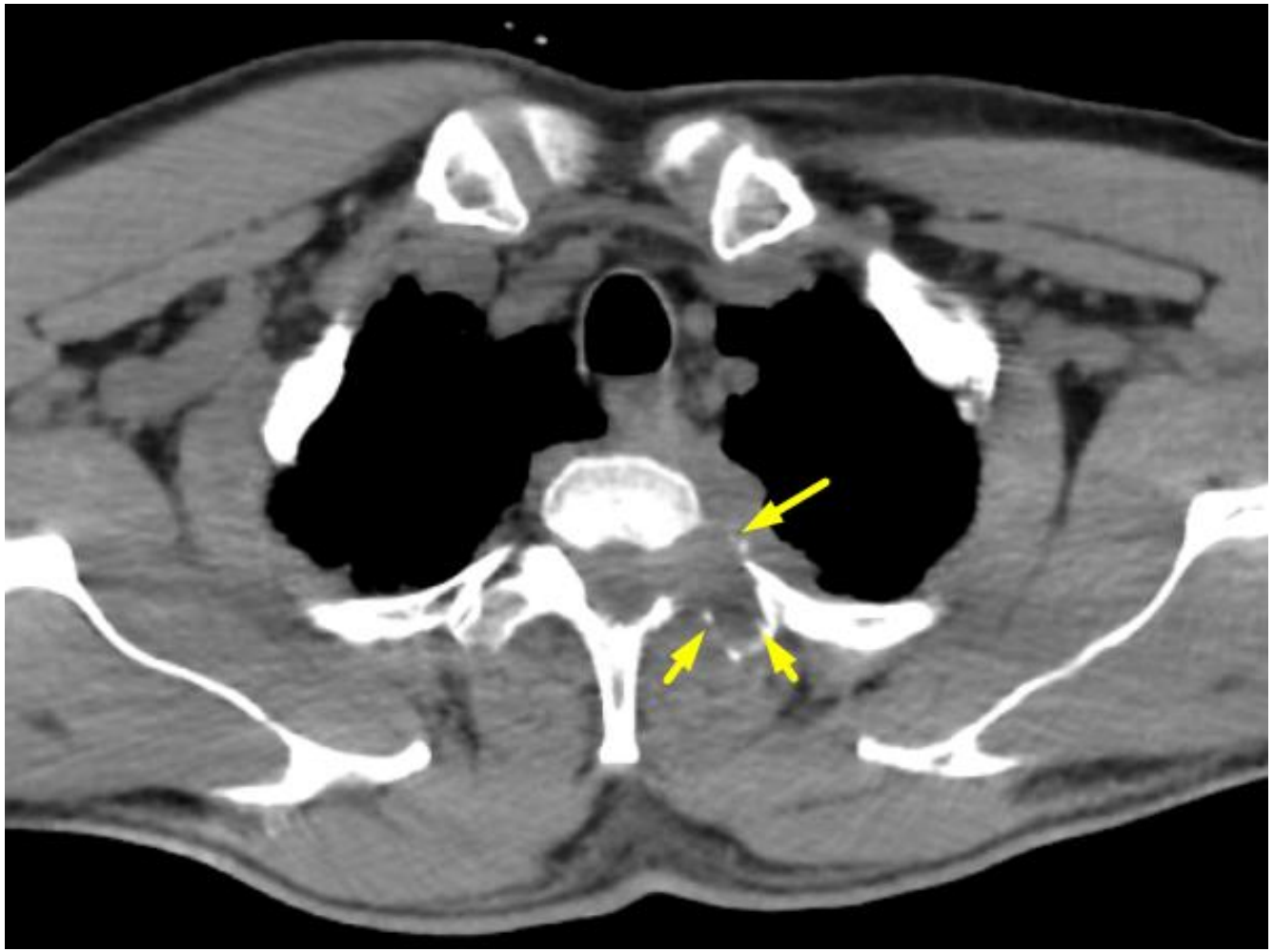


Post contrast T1



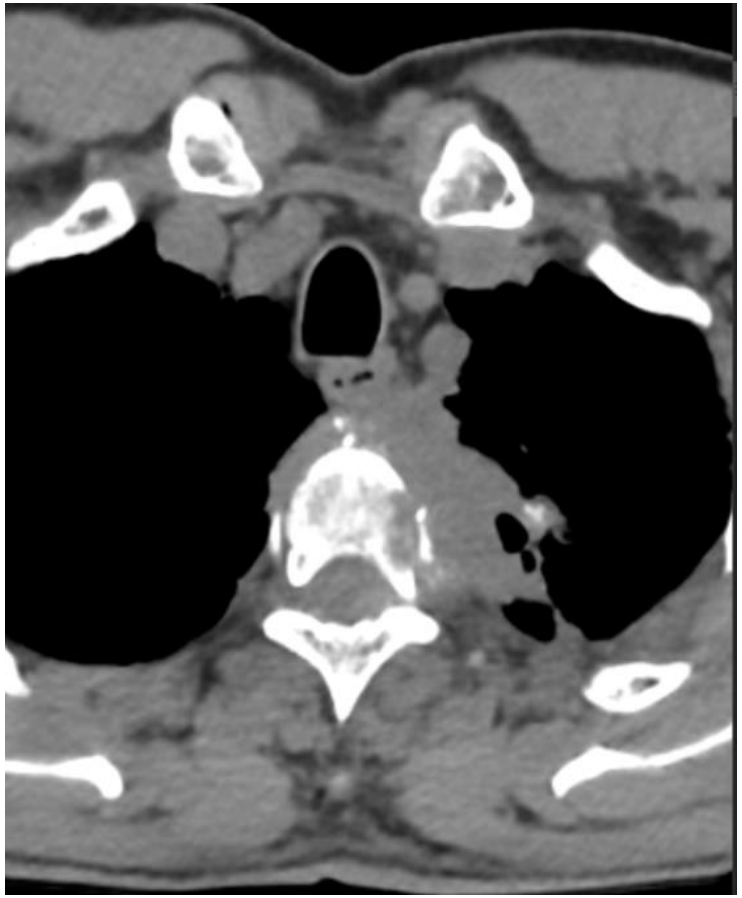
DWI b-600

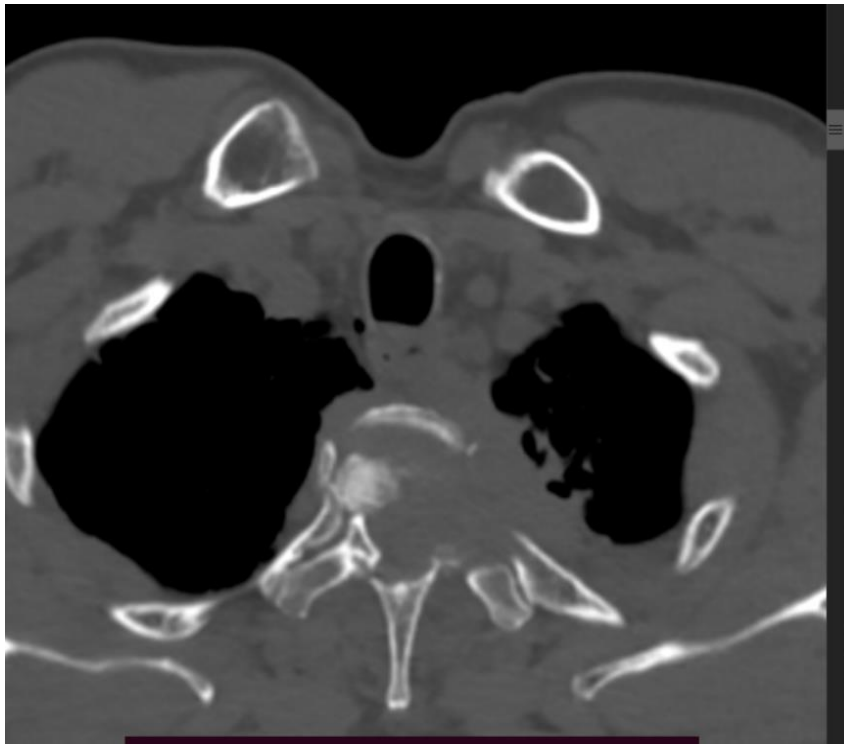
The lesion shows avid post contrast enhancement and diffusion restriction on DWI sequences



Complimentary CT showing

1. Pathological fracture of D2 vertebral body with more than 75% loss of vertebral height.(complete collapse of D2 vertebral body (vertebra plana).)
2. widening of the left d2-D3 neural foramina with extension into the adjacent pre and paravertebral soft tissue and left transverse process and costo-vertebral junction(yellow arrow)





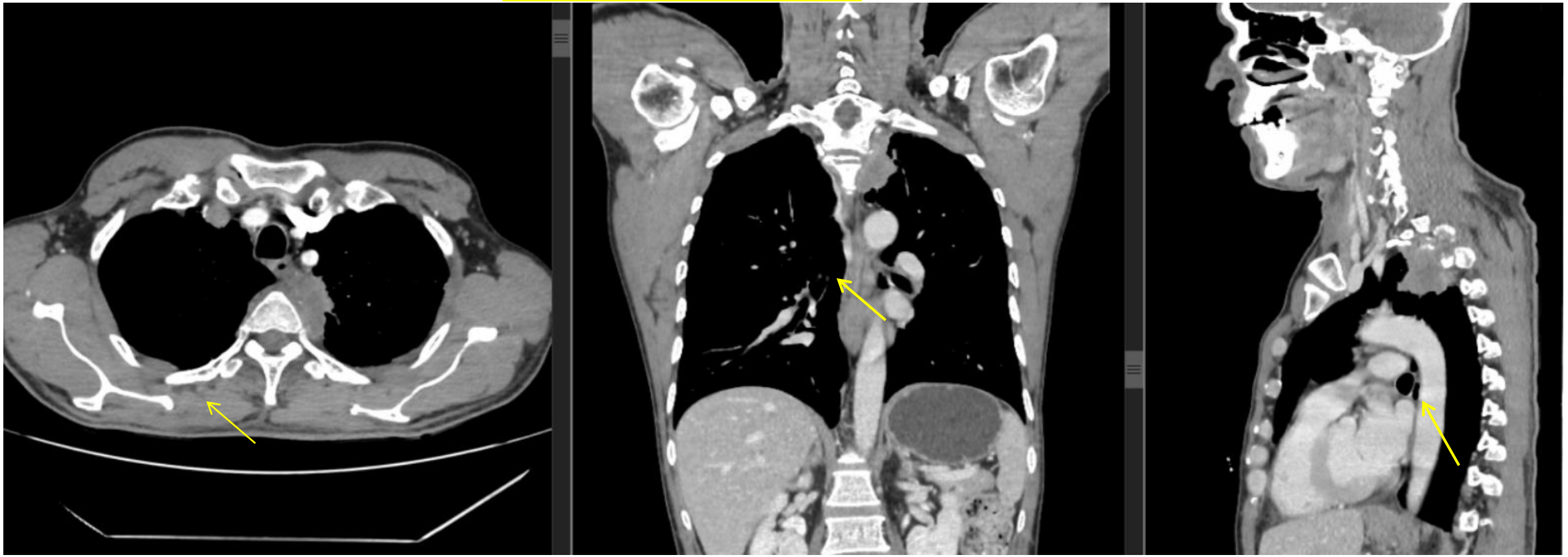
PLAIN CT
AXIAL:
Few specks of calcification

D2 vertebra: Seen invading & causing destruction of left pedicle, lamina, transverse process, superior & inferior articular, complete collapse of D2 vertebral body (vertebra plana).
Linear fracture of lamina of D2 vertebra on right side.
D3 vertebra: Seen invading & causing destruction of left postero-superior vertebral endplate, pedicle, lamina, superior articular facet & medial aspect of left transverse process.

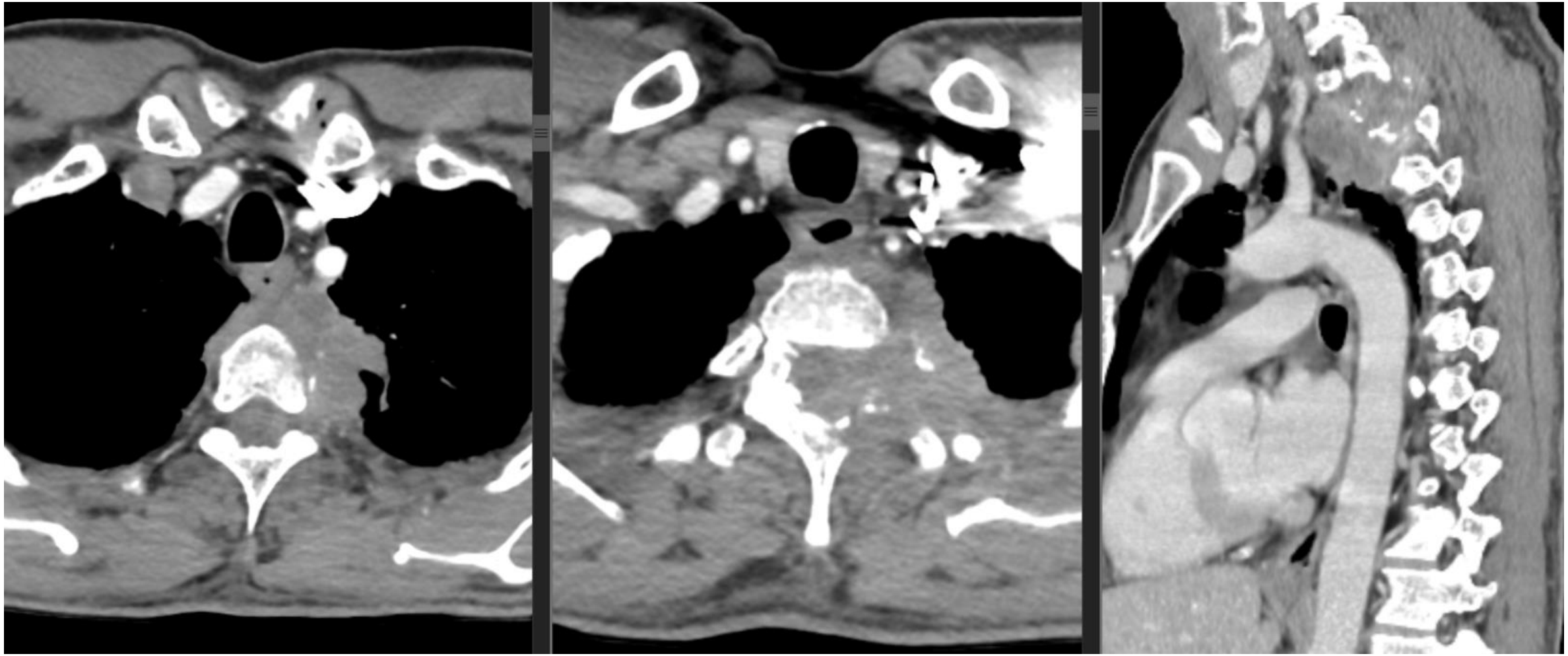
POST CONTRAST AXIAL

POST CONTRAST CORONAL

POST CONTRAST SAGITTAL

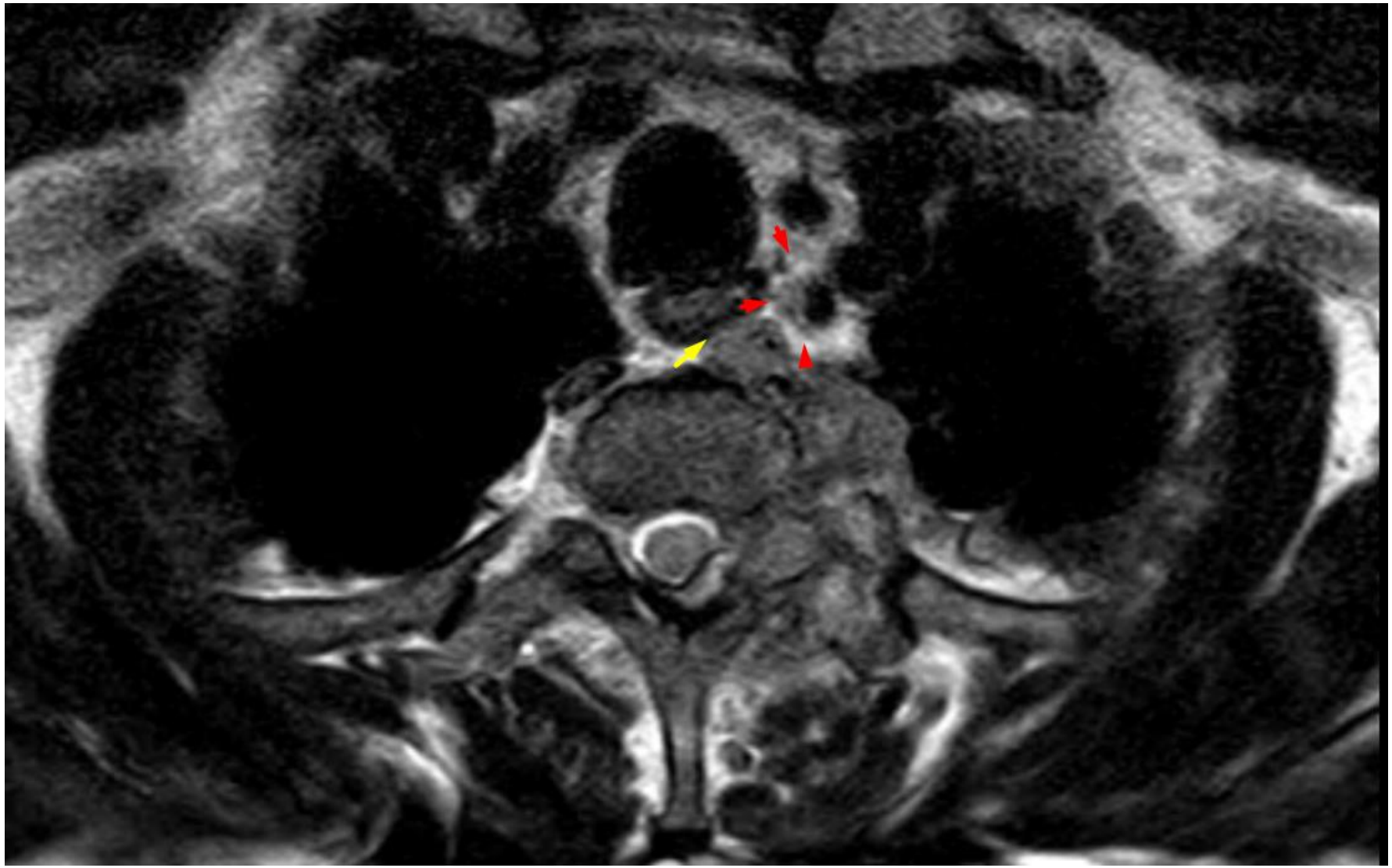


Ill- defined heterogeneously enhancing soft tissue mass lesion, measuring ~5.0 x 4.9 x 5.4 cm (AP x Tr x Cc), with few specks of calcification and non-enhancing areas within (likely necrotic) seen epicentred in apico-posterior segment of left upper lobe involving posterior & middle compartments of thoracic inlet

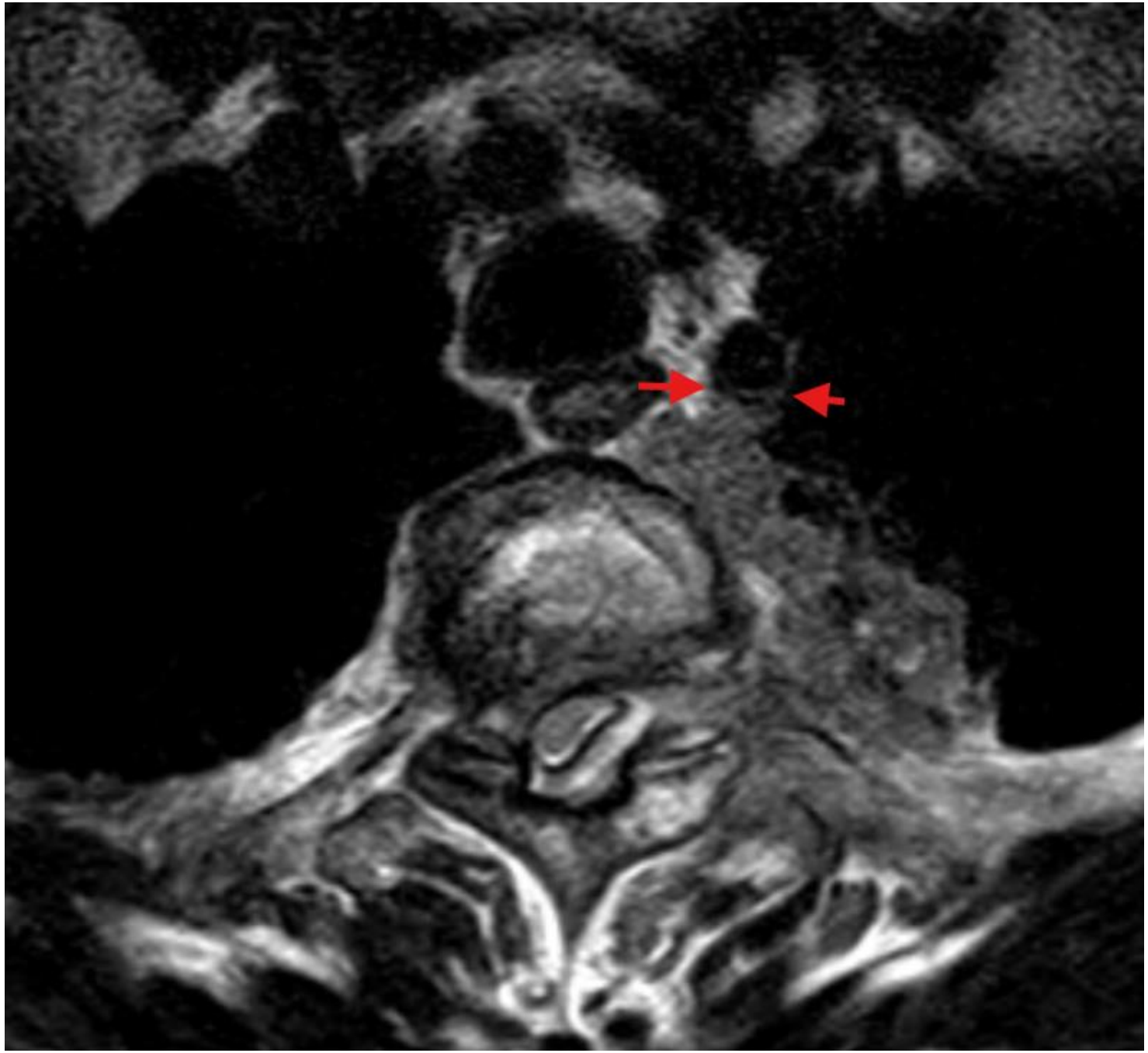


The lesion is seen encasing the left vertebral artery (Arc of contact >180°) & abutting the left subclavian artery (Arc of contact <180°) with loss of fat planes along the posterior wall & possible vascular invasion at the level of origin of left vertebral artery.

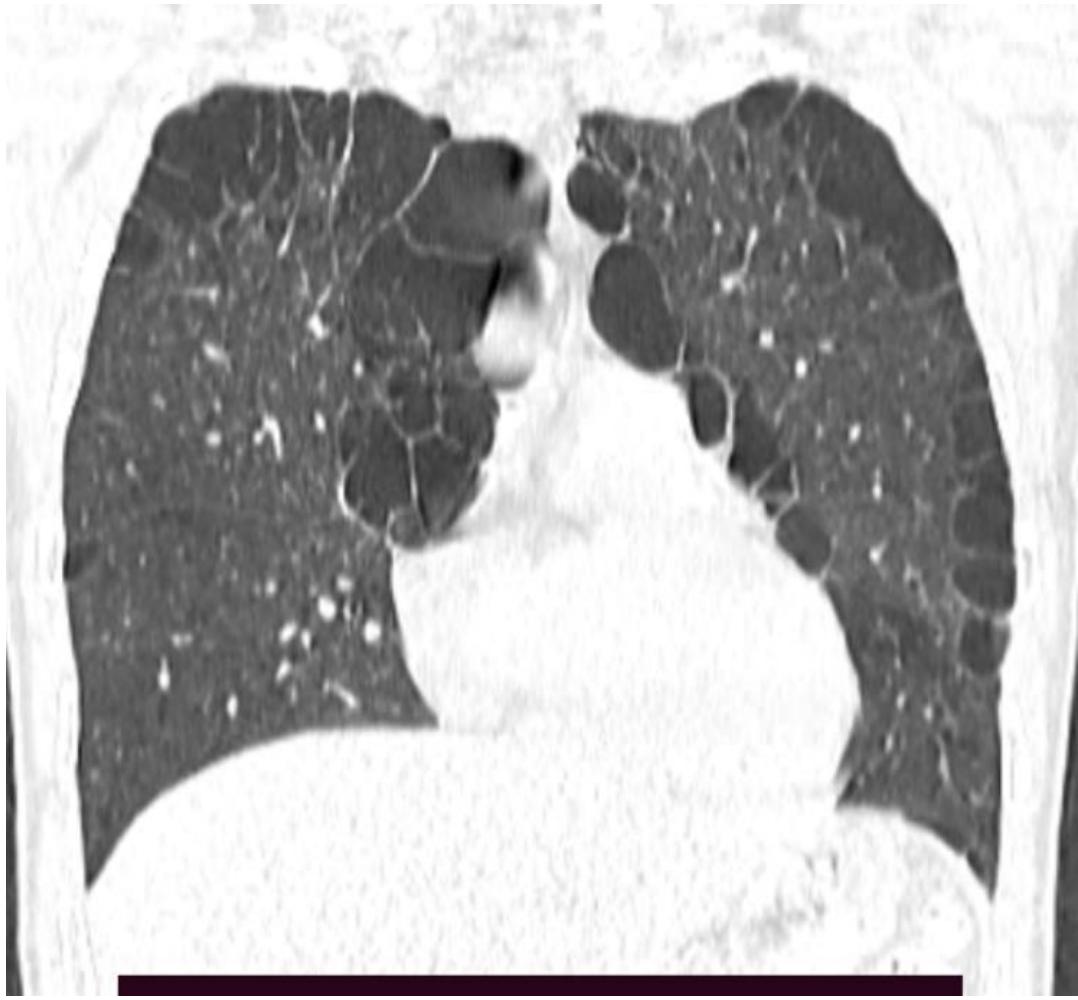
The lesion is seen abutting the postero-lateral wall of esophagus with loss of fat planes (Arc of contact <180°) with diffuse mild thickening of upper esophagus with single wall thickness of 6 mm.



Loss of fat planes with posterior aspect of esophagus(yellow arrow)
Loss of fat planes with origin of left vertebral artery (red arrows)



Loss of fat planes with origin of left subclavian artery (red arrows)



Extensive paraseptal emphysematous changes with subpleural bullae of varying sizes noted predominantly in bilateral upper lobes and centrilobular emphysematous changes also noted.

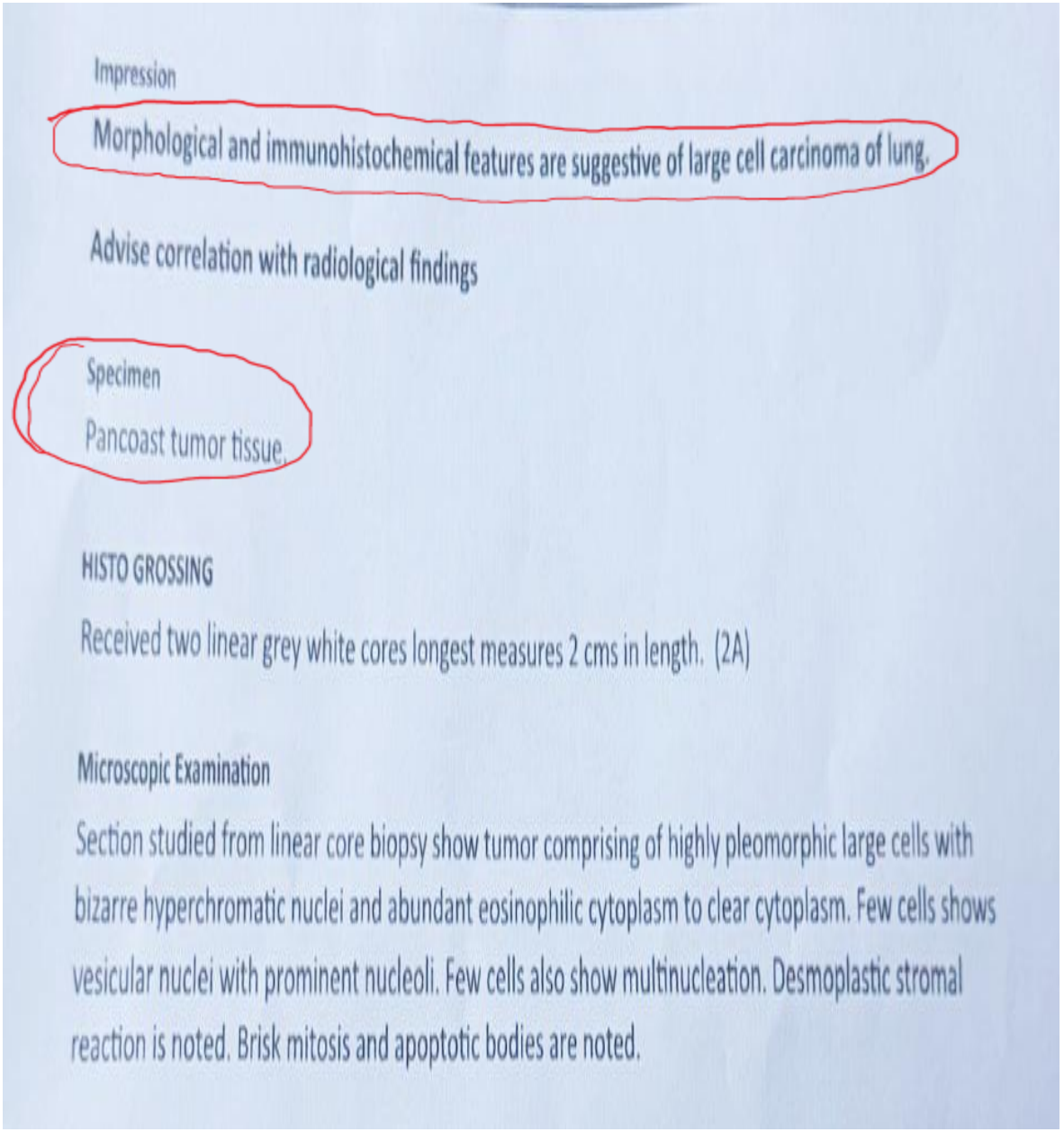
Impression:

- **Soft tissue mass lesion arising from apico-posterior segment of left upper lobe extending to the D2 vertebral body through the widened left D2/D3 neural foramen into pre & para- vertebral soft tissue with associated sub-ligamentous and epidural space components from the level of D1 to D3 with extensions as described**

⇨ **F/s/o: Left Pancoast tumour with vertebral metastasis**

Follow up

Patient underwent Ct guided biopsy of the lung lesion



Impression

Morphological and immunohistochemical features are suggestive of large cell carcinoma of lung.

Advise correlation with radiological findings

Specimen

Pancoast tumor tissue.

HISTO GROSSING

Received two linear grey white cores longest measures 2 cms in length. (2A)

Microscopic Examination

Section studied from linear core biopsy show tumor comprising of highly pleomorphic large cells with bizarre hyperchromatic nuclei and abundant eosinophilic cytoplasm to clear cytoplasm. Few cells shows vesicular nuclei with prominent nucleoli. Few cells also show multinucleation. Desmoplastic stromal reaction is noted. Brisk mitosis and apoptotic bodies are noted.

MATERIAL RECEIVED

IHC done on block no 50535908446 (1).

IHC FINDINGS

CK7 - diffuse strong membranous positivity in tumour cells.

CK20 - negative

TTF1 - negative

Napsin A - negative

AMACR - negative

CK5/6 - negative

P40 - negative

PAX5 - negative

INSM1- negative

INTERPRETATION

Immunohistochemical features are suggestive of large cell carcinoma of lung.

MICROSCOPIC IMPRESSION: Features are suggestive of –

"Metastatic deposits- Vertebrae."

MICROSCOPIC DESCRIPTION: - Sections studied from multiple tissue bits show tumour composed of pleomorphic cells. Tumour cells are showing anisonucleosis with irregular nuclear borders, hyperchromatism, high N:C ratio. Cytoplasm is moderate and eosinophilic. Increased mitotic figures and atypical mitosis seen.

MACROSCOPY: - Received multiple (6) grey white to grey brown soft tissue bits altogether m/s 0.3 x0.2 x0.1 cm.

CLINICAL DIAGNOSIS- Compressive myelopathy secondary to left pancoast tumour.

Tissue sent Vertebral tissue (? Left Pancoast tumour mets)

Discussion: **Pancoast Tumor or Superior Sulcus Tumor**

- Tumors arising at or near the lung apex are termed as superior sulcus carcinoma, thoracic inlet carcinoma or apical carcinoma.
- The term Pancoast tumor is reserved for patients with signs and symptoms of Pancoast syndrome .

Epidemiology and pathology:

- Superior Sulcus (Pancoast) tumour account for 3-5% of lung carcinomas. They are usually non-small cell carcinoma. Previously squamous cell carcinoma was considered predominant histological type, however recent studies shows adenocarcinoma as most common type.

Clinical presentation:

• The most common presenting complaint is pain confined to the shoulder or radiating to the arm. The usual symptoms of lung cancer like cough, dyspnea, and hemoptysis are usually absent due to the peripheral location of tumor in the lung apex

• Pancoast syndrome - pain in the shoulder & arm and features of Horner syndrome in up to 50% due to invasion of the superior cervical sympathetic chain and stellate ganglion (ipsilateral anhidrosis of the face, miosis, and ptosis). However classic Pancoast syndrome is uncommon, accounting for only 25%

Imaging features–

- **Chest radiography** – may show an apical mass or unilateral asymmetrical pleural thickening with or without adjacent bone destruction. Lordotic views can be helpful.

Occasionally, an AP radiograph of the cervical spine is better at demonstrating the tumor and associated rib destruction than a conventional chest radiograph

- **Computed tomography** – Chest CT scan is the modality of choice in the diagnosis of lung cancer.

Advantages include:

o Used for depicting bone abnormalities adjacent to the primary mass, such as rib and vertebral body erosion,

o Assessing the patency of subclavian and other vessels.

O Evaluating the intrathoracic structures (particularly the mediastinum) and extra-thoracic extension.

- **MRI** – For evaluation of loco-regional extension (particularly brachial plexus, subclavian vessels, parietal pleura, subpleural fat, neurovertebral foramina, and spinal canal)

- **PET-CT**- Helps in assessing nodal and distant metastases. PET-CT also helps in accurate delineation of the gross tumor volume, which will be essential for the radiation treatment planning

Treatment

Diagnosis is usually made by trans-thoracic needle biopsy

- Because of their location, bronchoscopy is frequently not able to reach tumor

- Invasion of adjacent vertebral body, the spinal canal or the upper brachial plexus as well as distant metastases are contraindications for surgery
- Preoperative radiation therapy followed by surgical resection is the most common form of treatment

Complications: Surgical complications include

- Atelectasis
- Chest pain
- Spinal fluid leaks
- Horner's syndrome

Prognosis

- Most tumors are Stage III at diagnosis
- Overall 5 –year survival is around 30%
- Right-sided Pancoast tumors have a worse 5-year survival than left-sided lesions

Teaching points –

- Imaging findings include lung apical mass with or without bone destruction, mediastinal extension, extra-thoracic extension to involve brachial plexus and stellate ganglion (lower Cervico-thoracic sympathetic nerve plexus).
- Most common histological type – adenocarinoma.
- Most common presenting symptom – Pain in shoulder with or without radiating pain to the arm.
- MRI plays a significant role in the assessment of soft tissues involvement and local staging.