The Top Ten Times Not to Believe The Radiology Report

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Objectives

1. Outline concepts of false negative and false positive in medical testing.

2. Recognize false positive and negative results in radiologic imaging and identify guidelines to improve patient care.

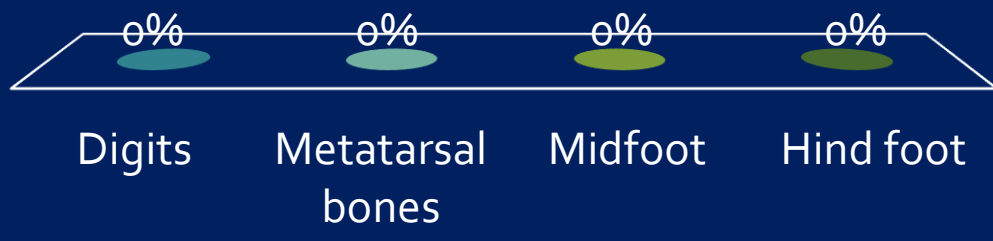
A false negative is a test result that indicates a person does not have a disease or condition when the person actually does have it, according to the National Institute of Health (NIH)

A false positive test incorrectly states that a person does have a disease or condition when the person actually does not have it.

24 year old male with Mosh Pit injury to the right foot.

Radiology of Foot Fractures
The highest percentage missed fractures of the foot occur in the

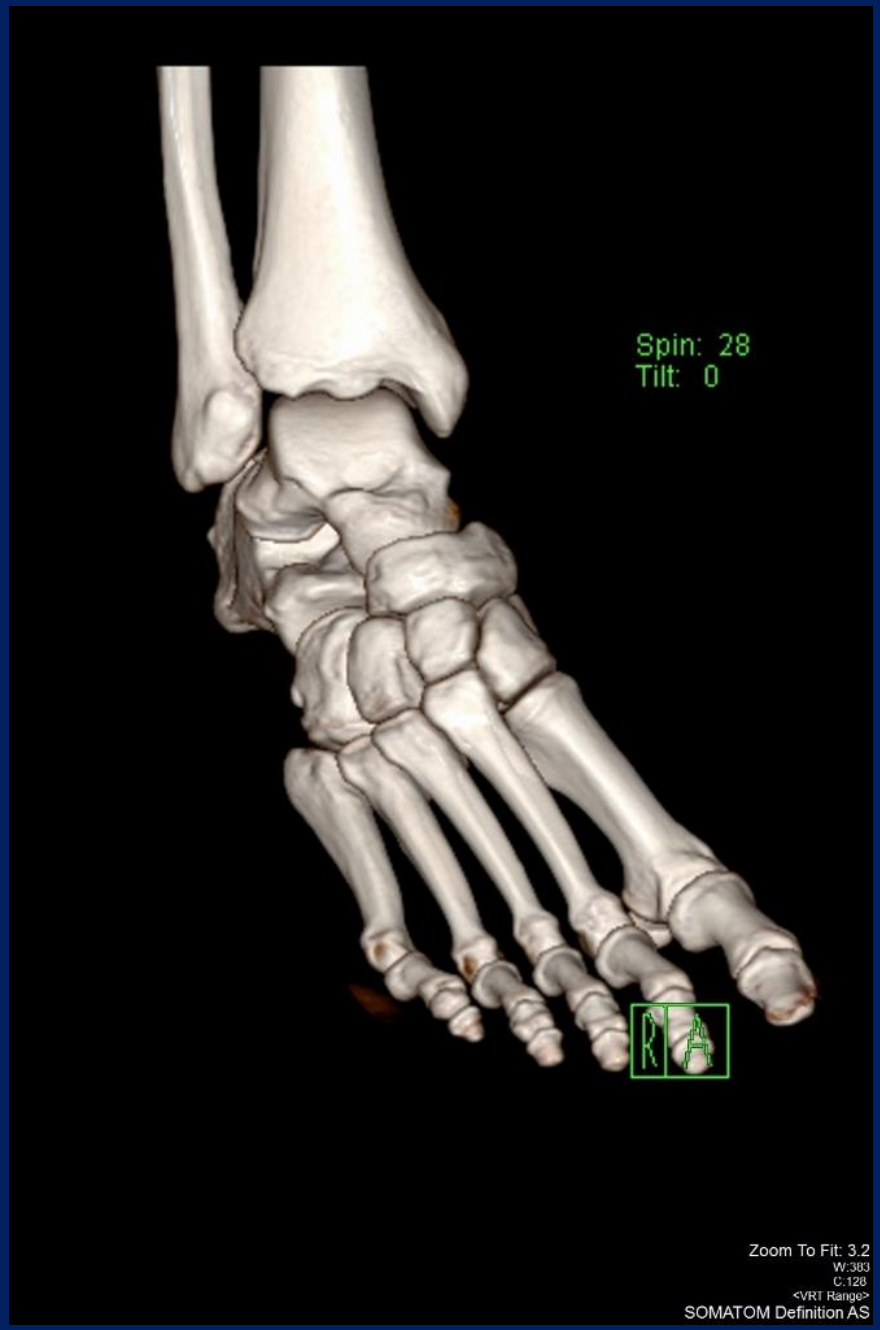
A. Digits
B. Metatarsal bones
C. Midfoot
D. Hind foot



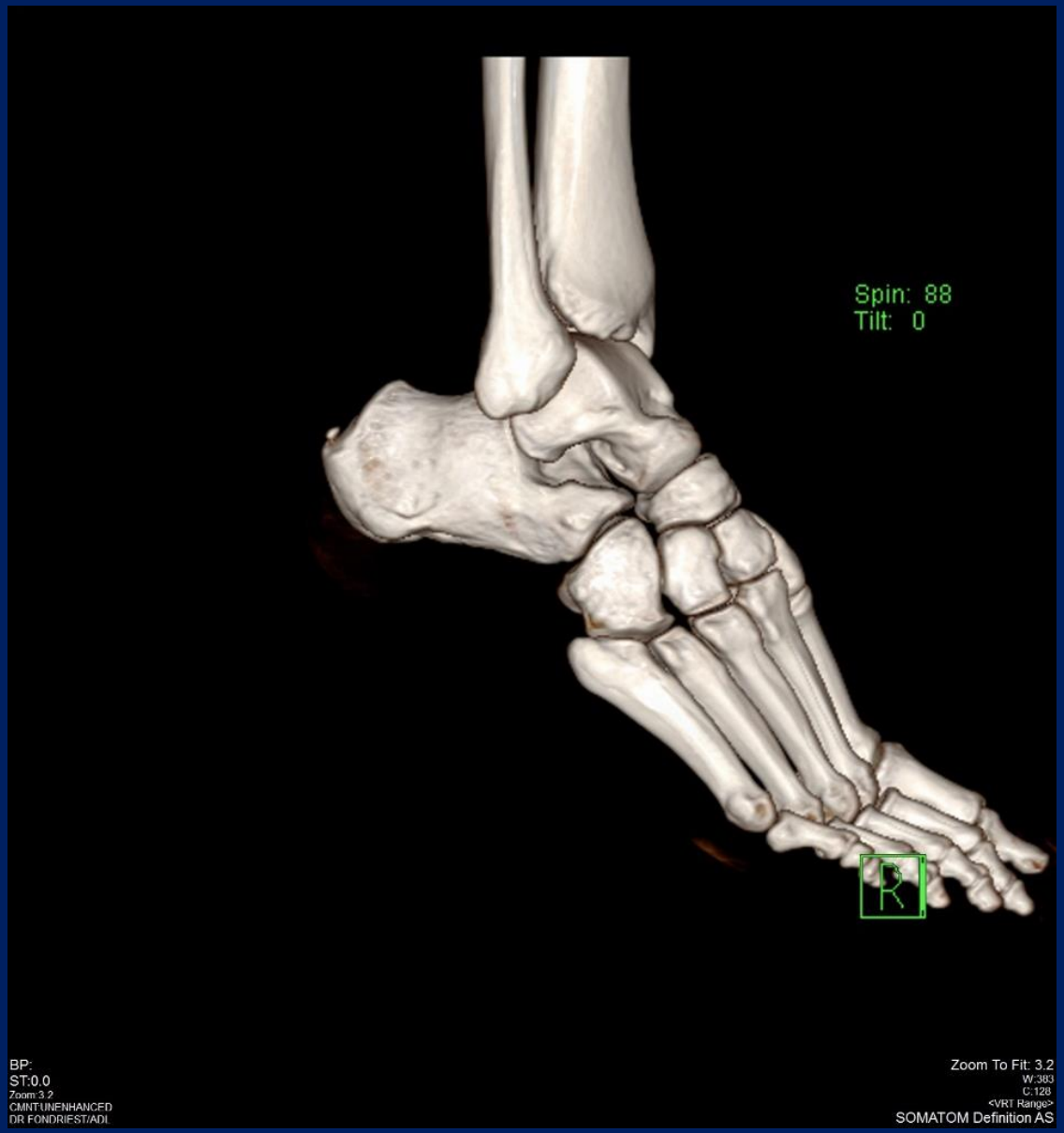
24 year old male with Mosh Pit injury

24 year old male with Mosh Pit injury

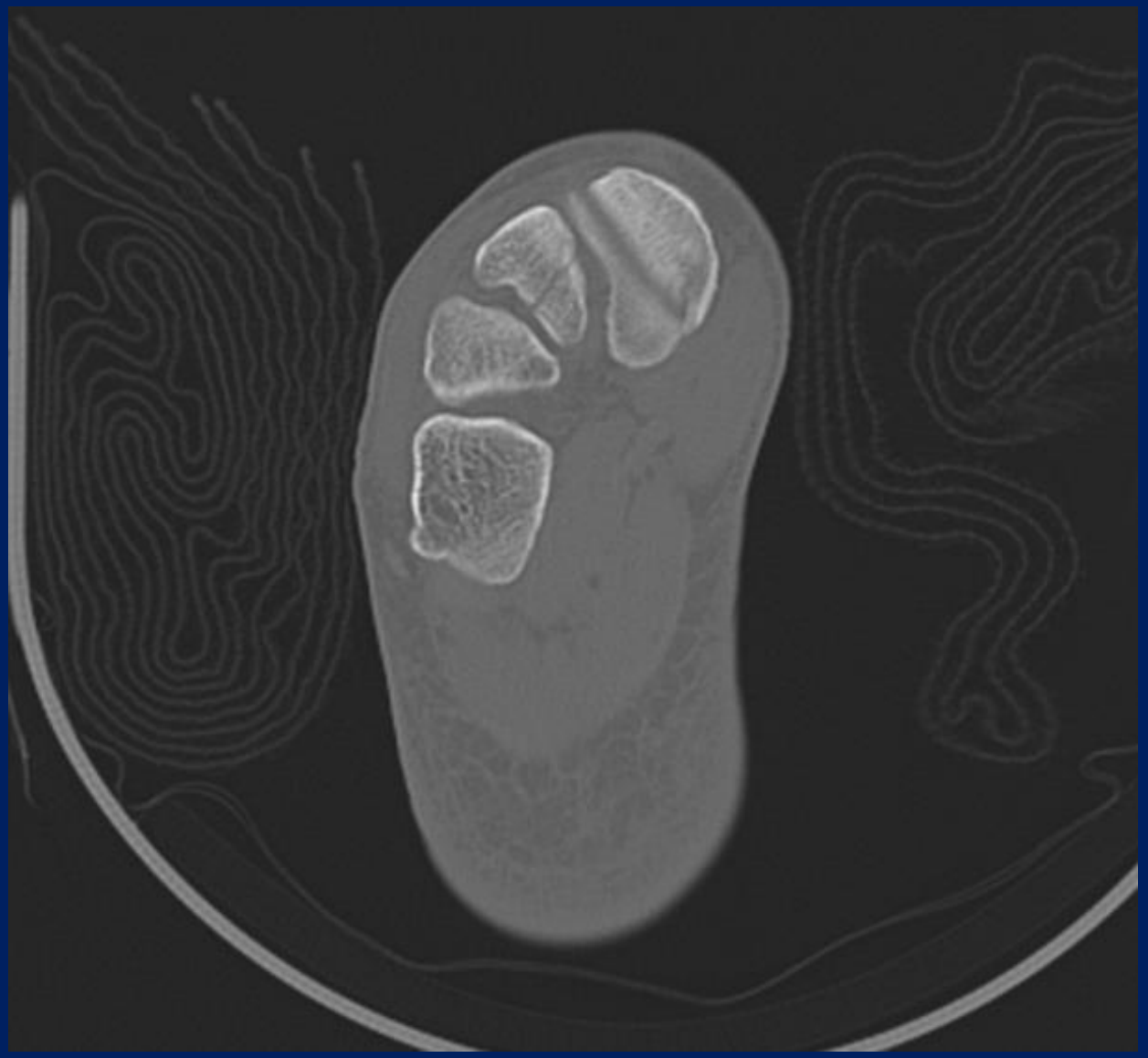
CT exam of the foot and ankle, unable to bear weight on foot.



CT exam of the foot and ankle



CT exam, fracture of the 2nd cuneiform bone

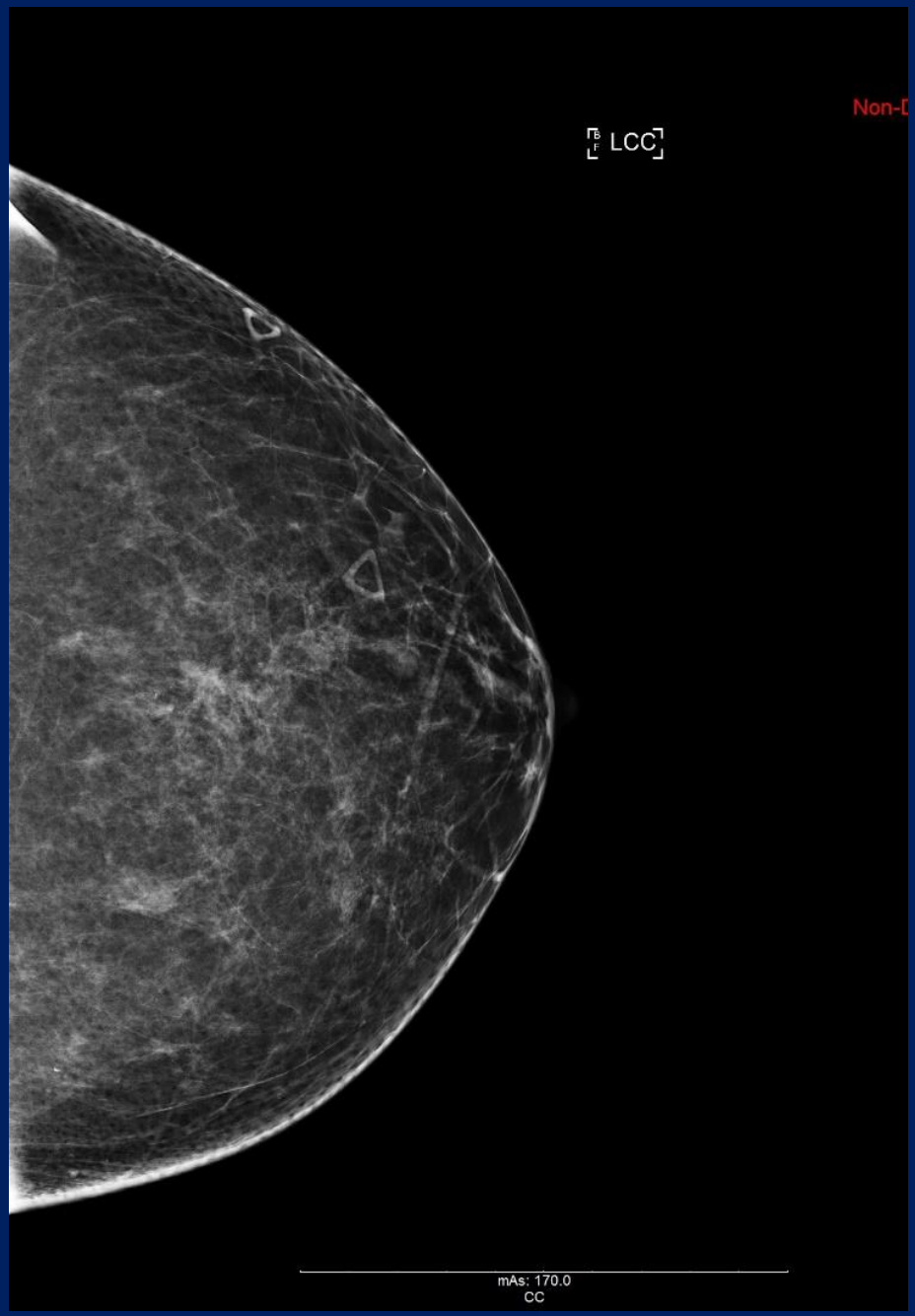


CT exam, fracture of the 1st cuneiform bone

Bottom Line

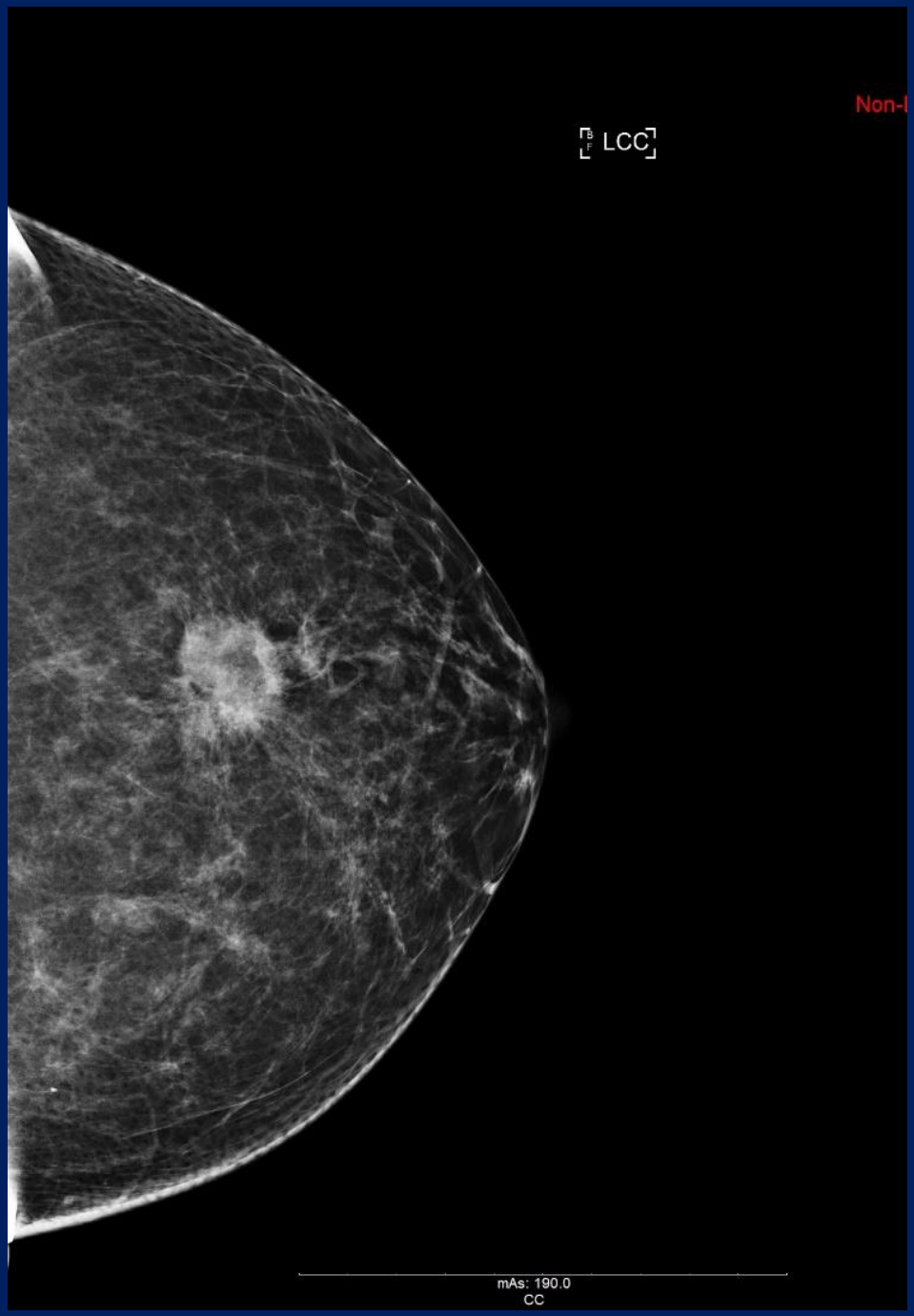
- A normal radiograph does not exclude a fracture, particularly of the midfoot.
- Up to 46 % of midfoot fractures are not detected on standard radiographs.

37 y.o. with palpable left breast lesion Left CC image



37 y.o. with palpable left breast lesion Left MLO image

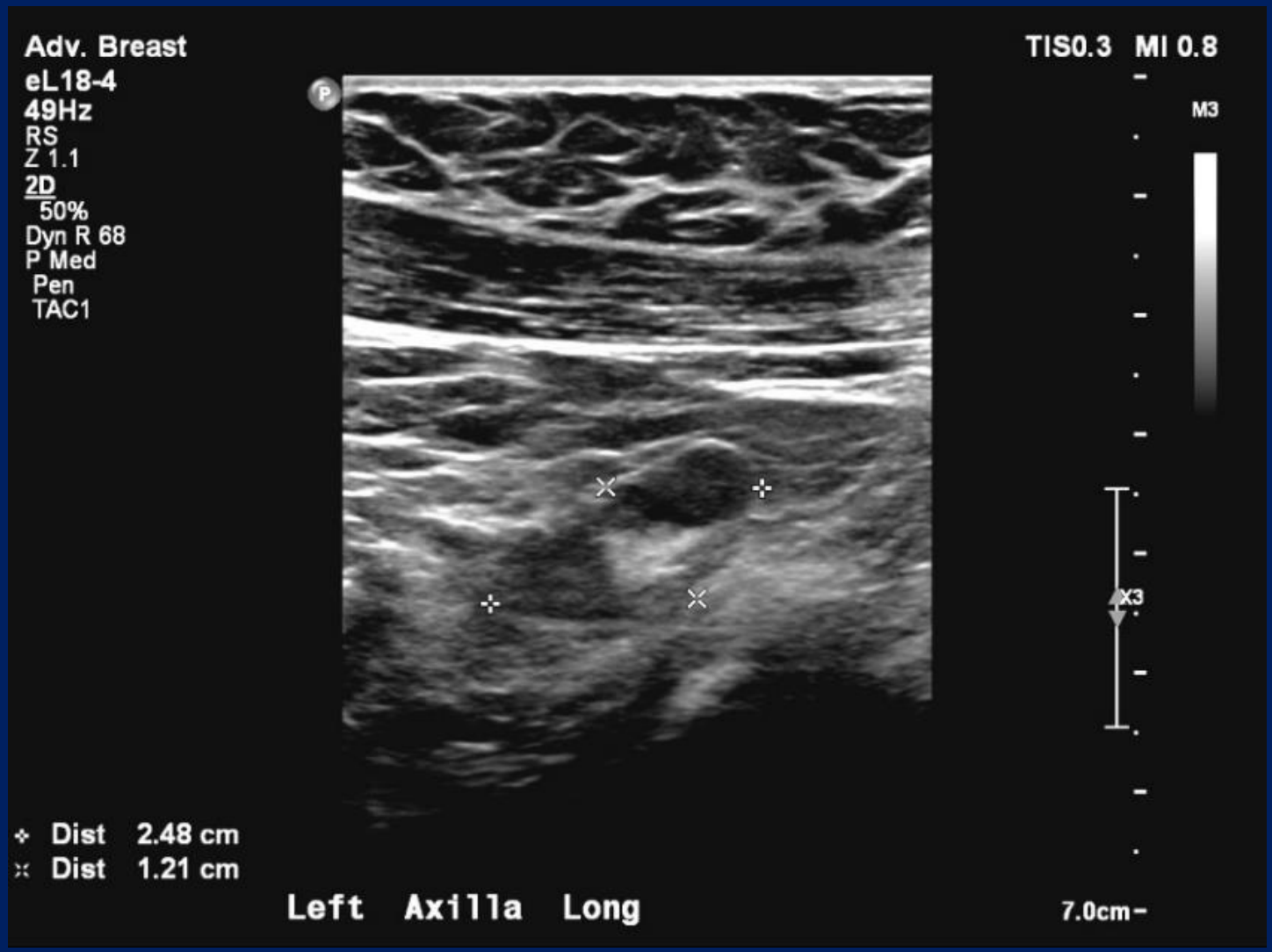
38 y.o. with palpable left breast lesion Left CC image



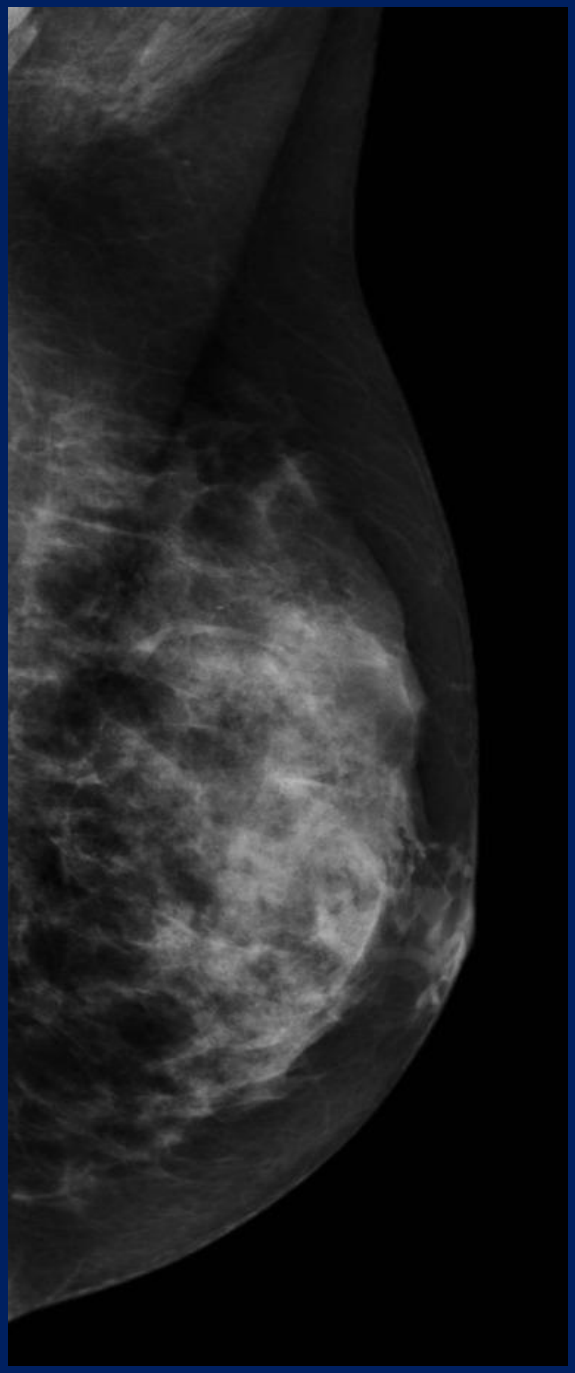
38 y.o. with palpable left breast lesion Left MLO image

38 y.o. with palpable left breast lesion, ultrasound exam

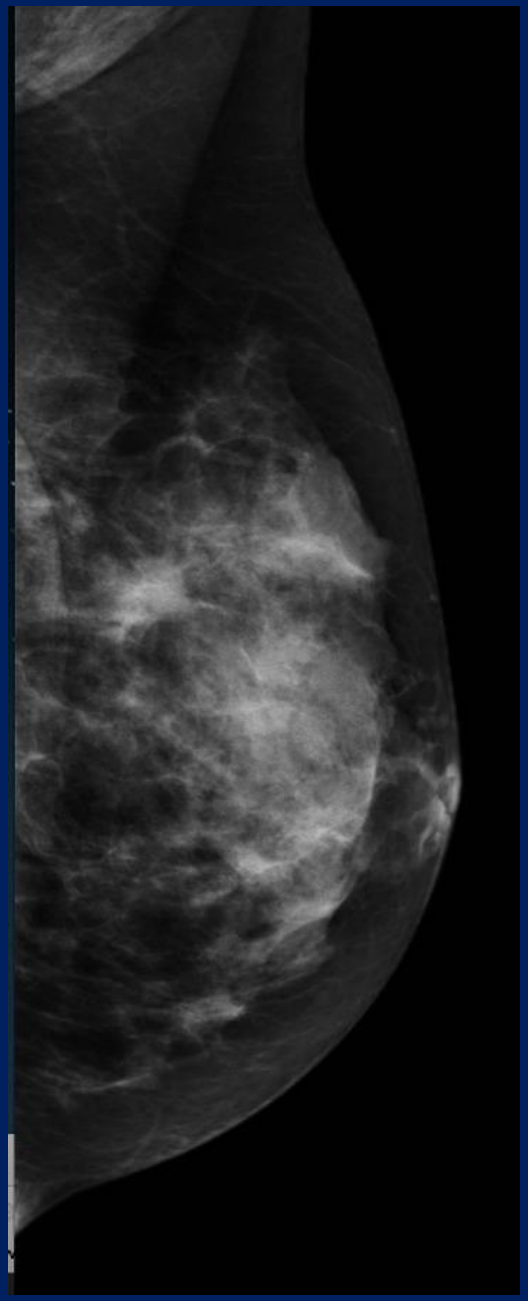
38 y.o. with palpable left breast lesion, left axillary lymph node



44 y.o. for annual screening mammogram.
Left MLO image, normal



9 months later, interval left breast cancer



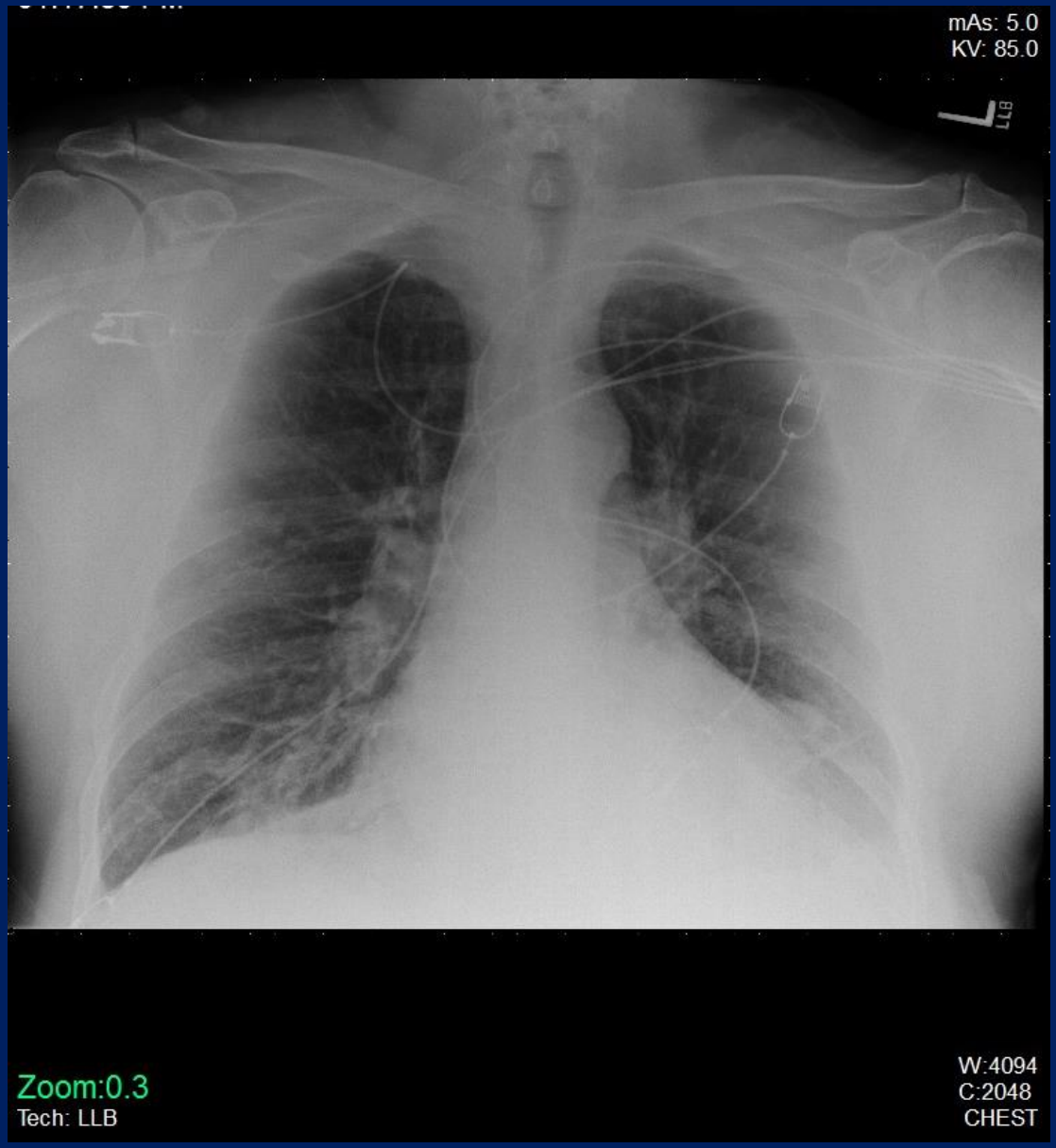
Interval breast cancer, ultrasound exam

Summary

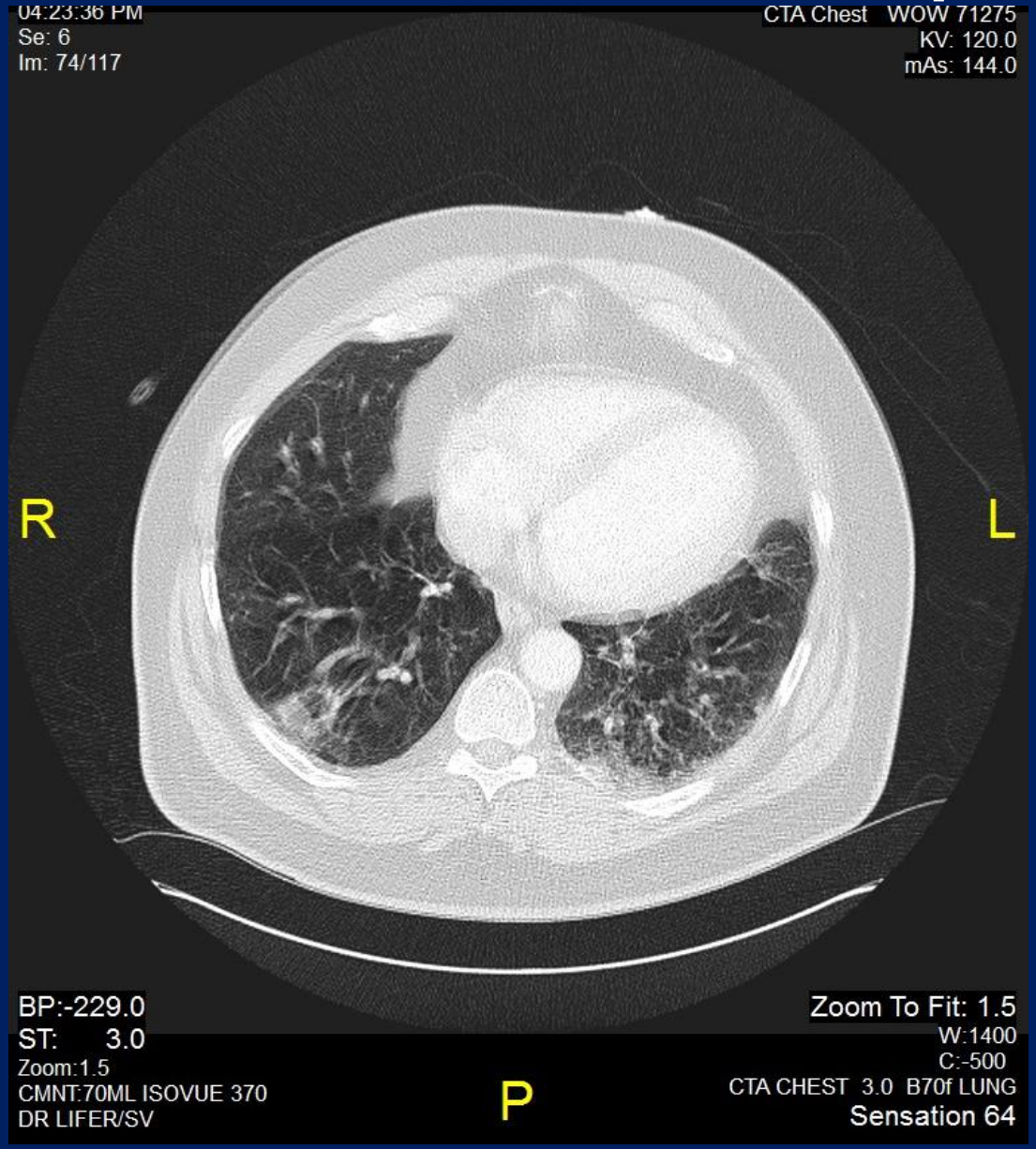
- A normal mammogram and/or ultrasound exam of the breast does not exclude the possibility of breast cancer.

- Suspicious palpable abnormalities of the breast should be considered for possible biopsy, additional imaging or short term follow up.

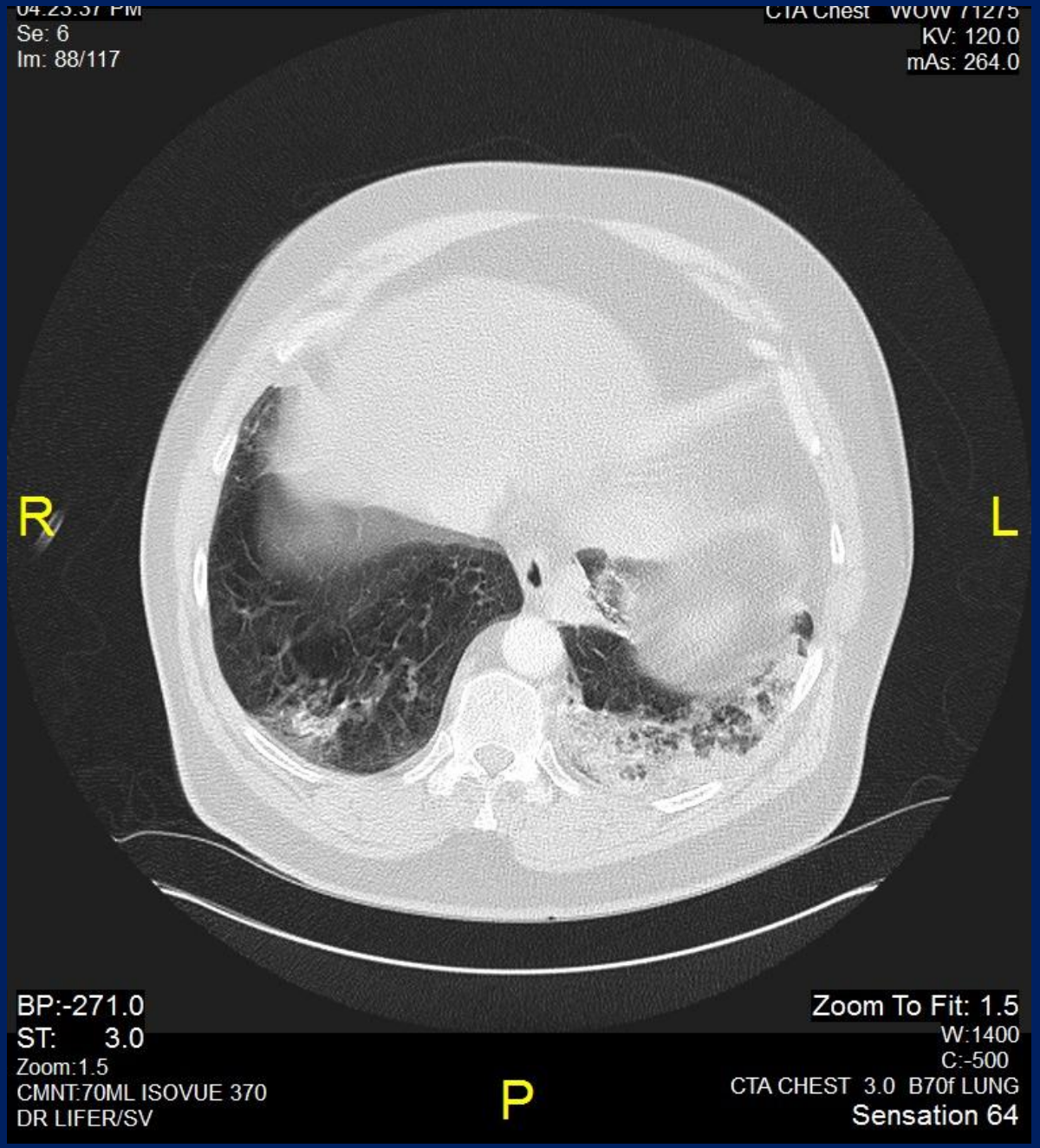
56 y.o. male with fever, cough and shortness of breath. Bilateral lower lobe airspace disease



CT exam, bilateral lower lobe airspace disease

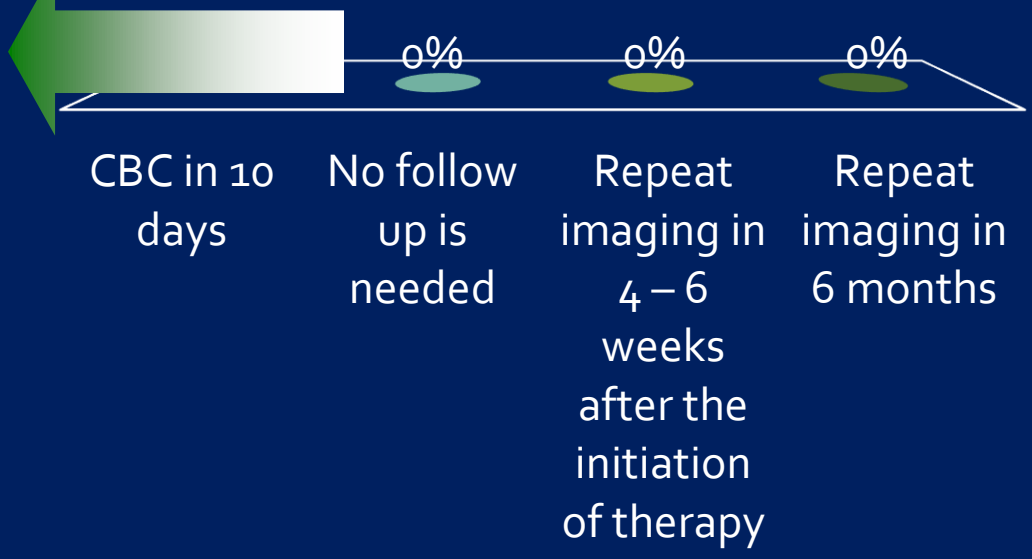


CT exam, bilateral lower lobe airspace disease

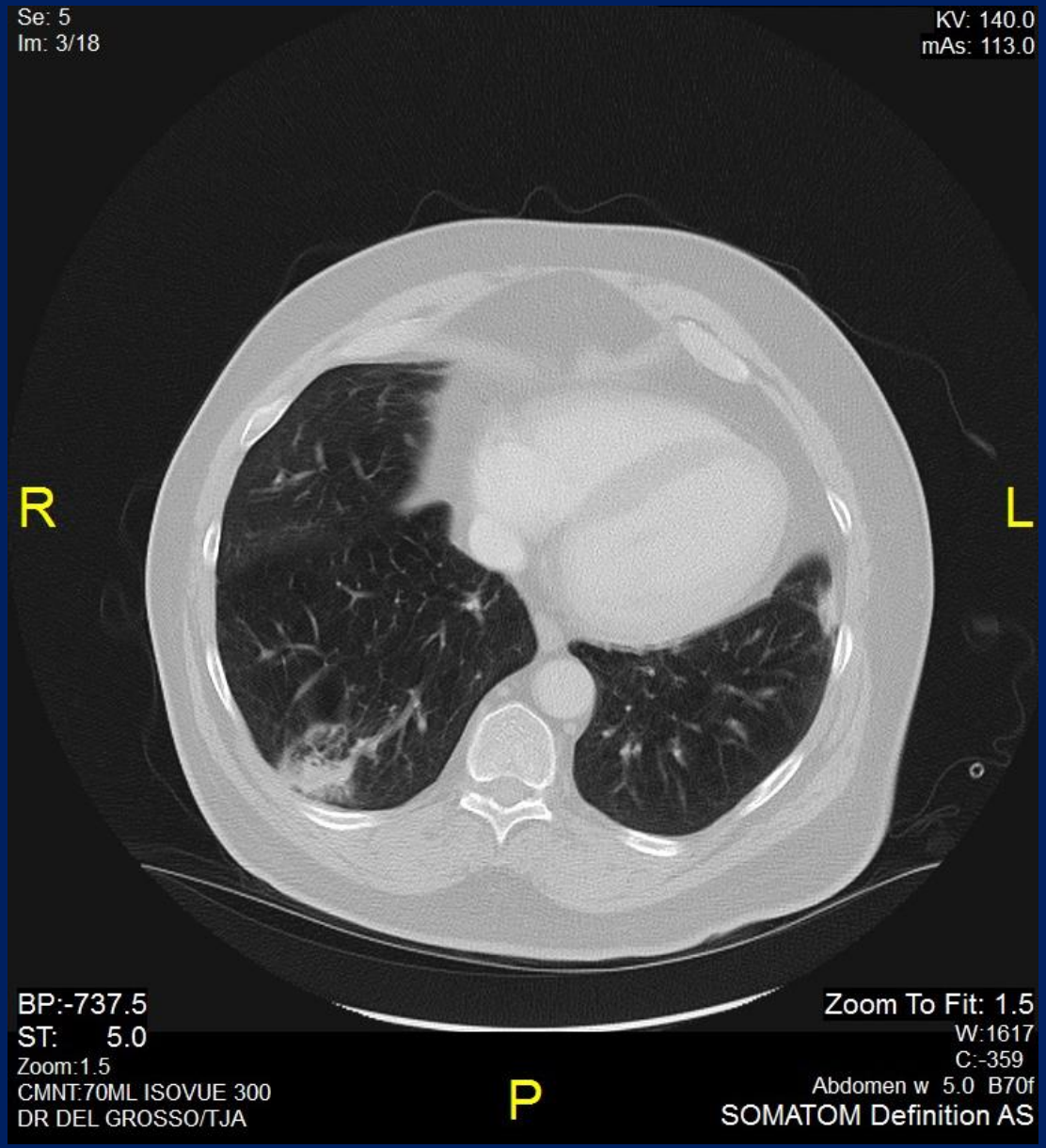


Recommended follow up of possible pneumonia in an adult is

A. CBC in 10 days
B. No follow up is needed
C. Repeat imaging in 4 – 6 weeks after the initiation of therapy
D. Repeat imaging in 6 months

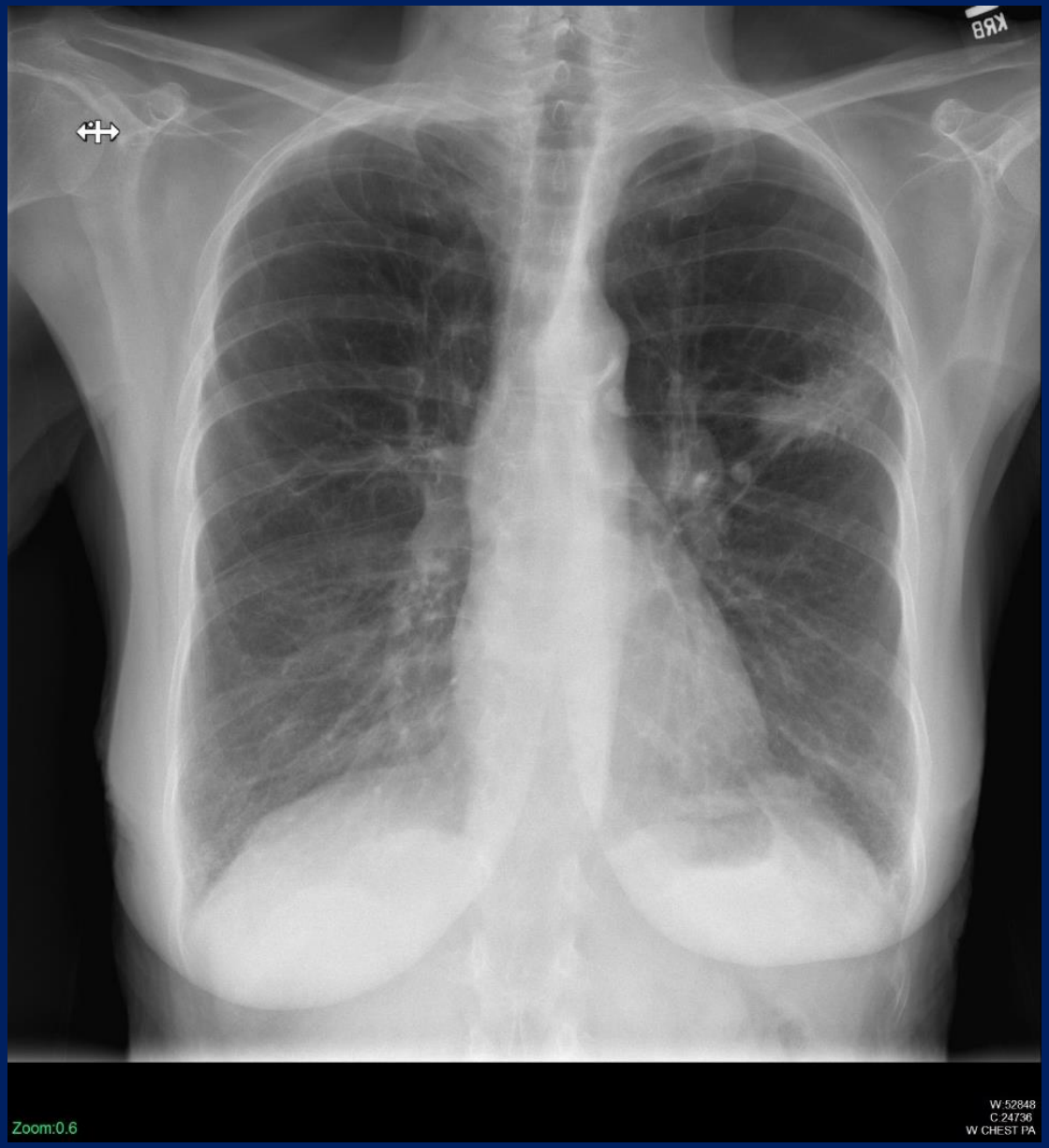


6 months later, CT of the abdomen and pelvis



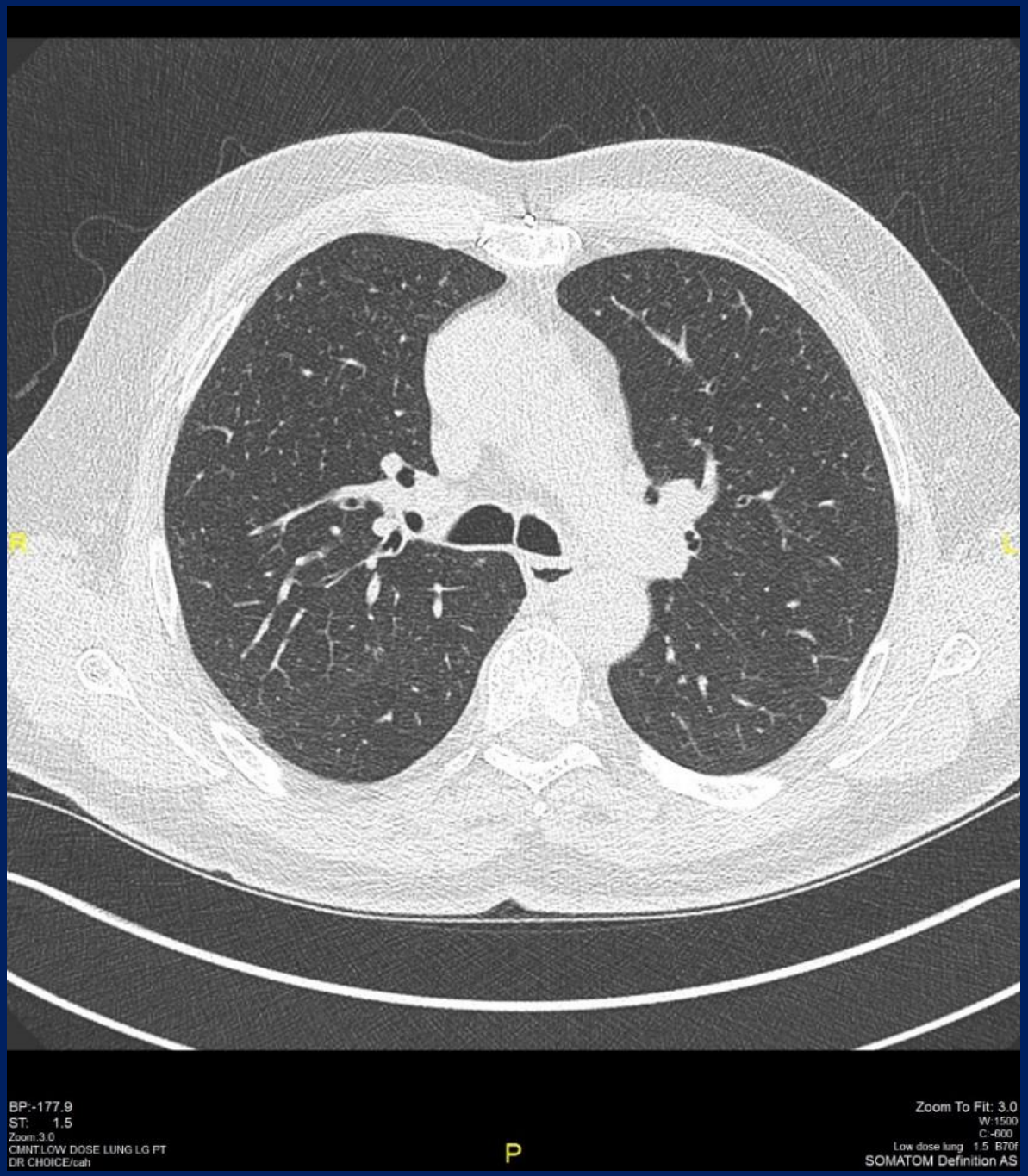
63 y.o. female, with cough and shortness of breath

3 weeks later, no radiographic improvement

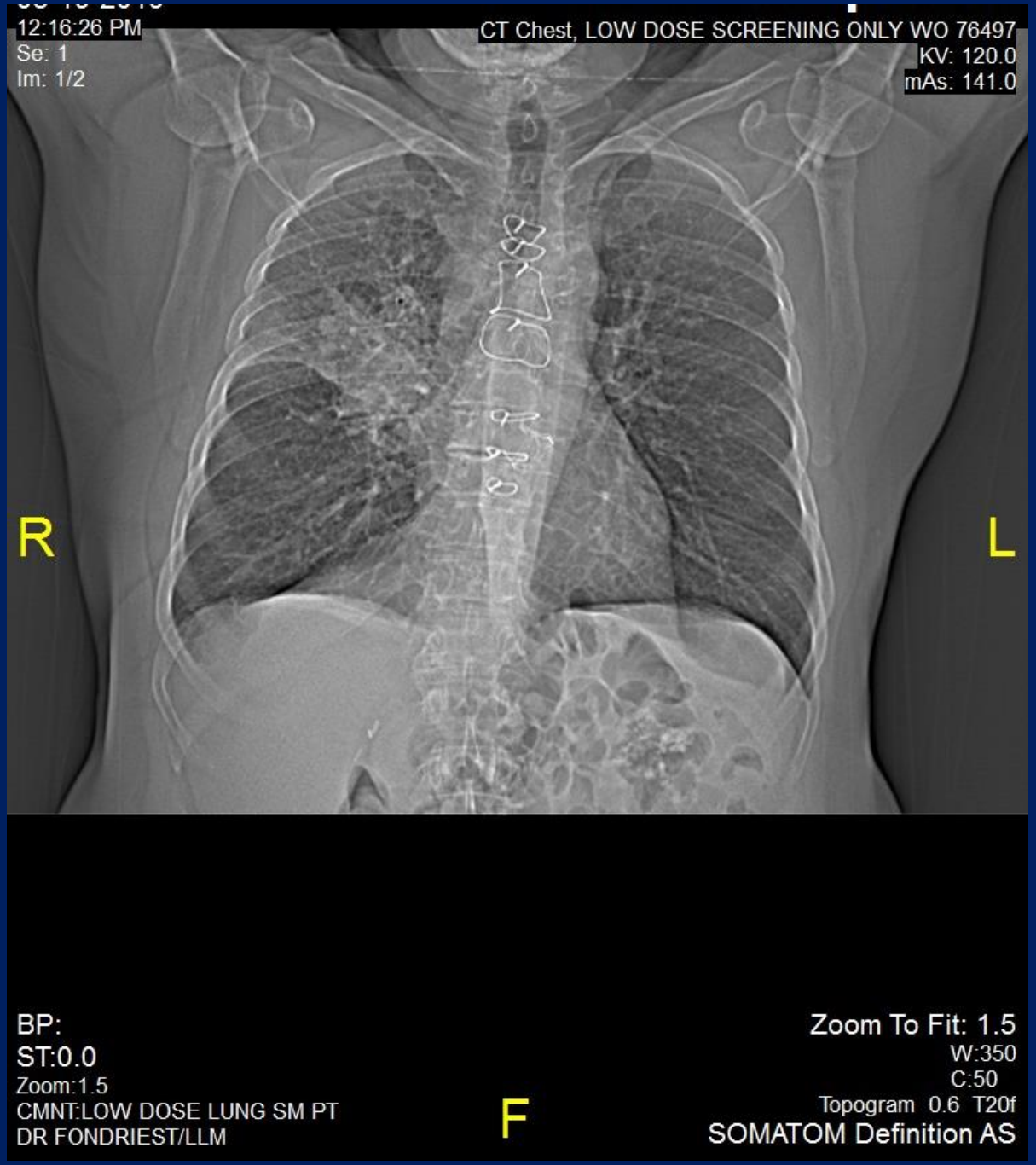


Baseline,
Low dose lung screening exam

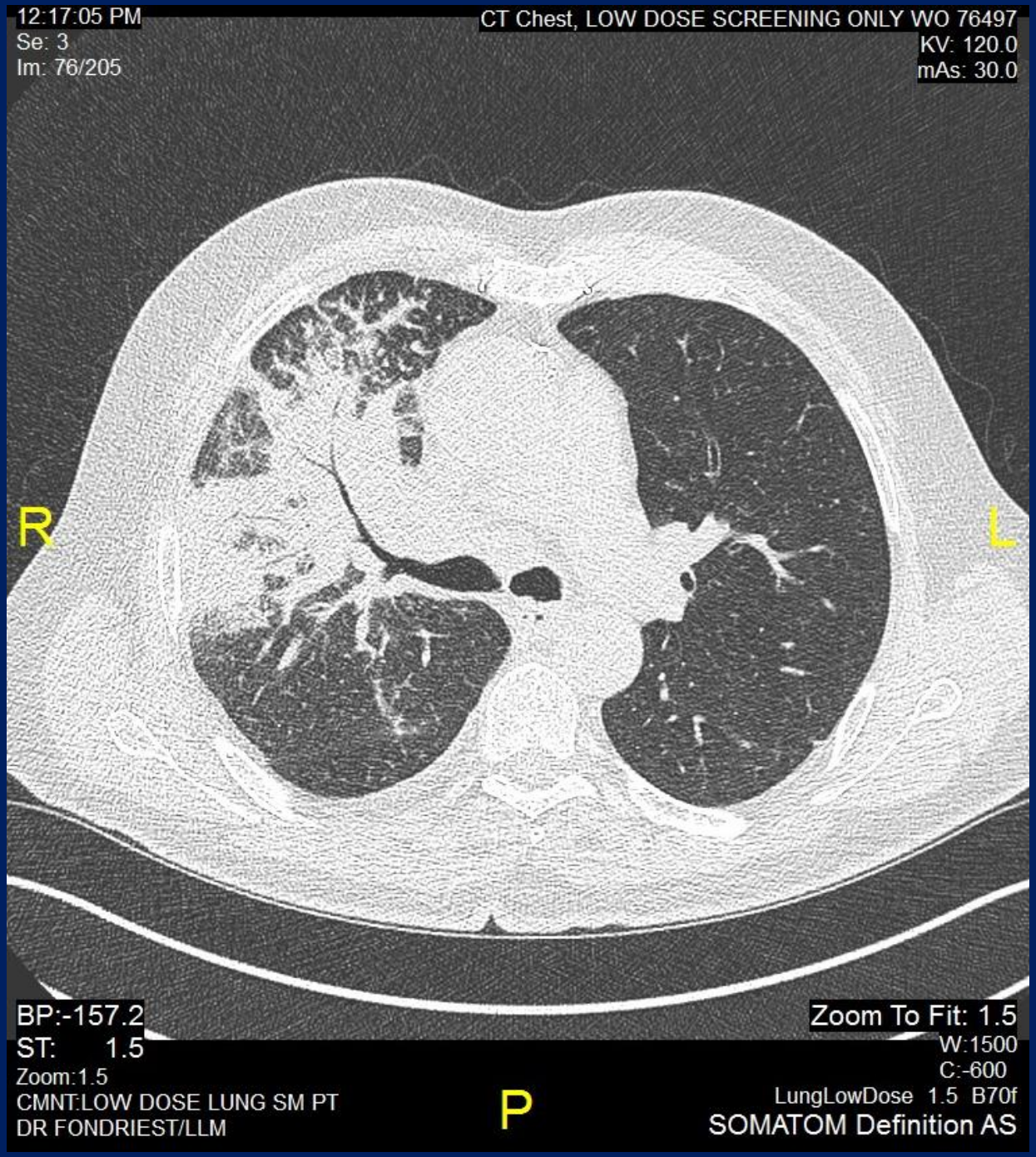
Baseline, Low dose lung screening exam



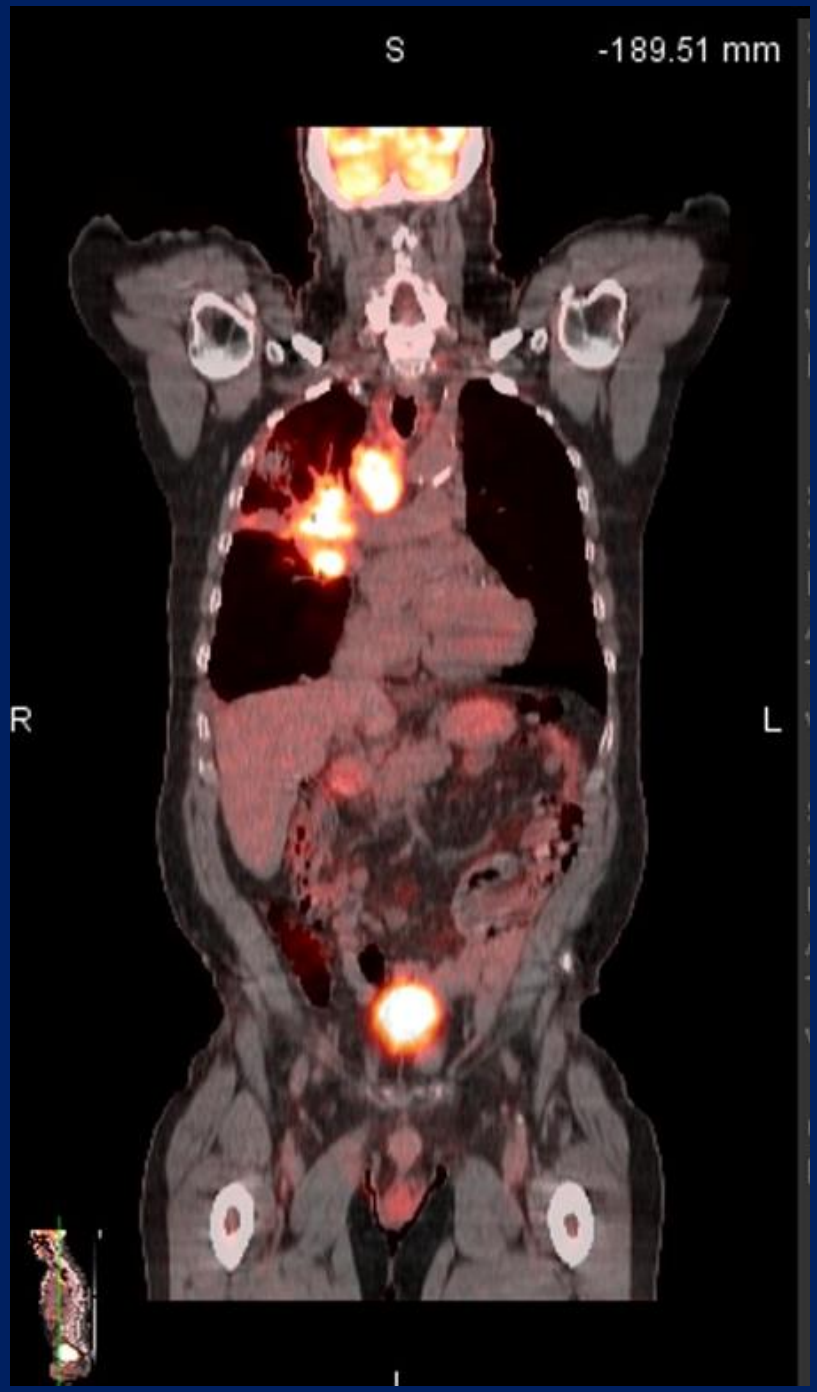
1 year later, Low dose lung screening exam



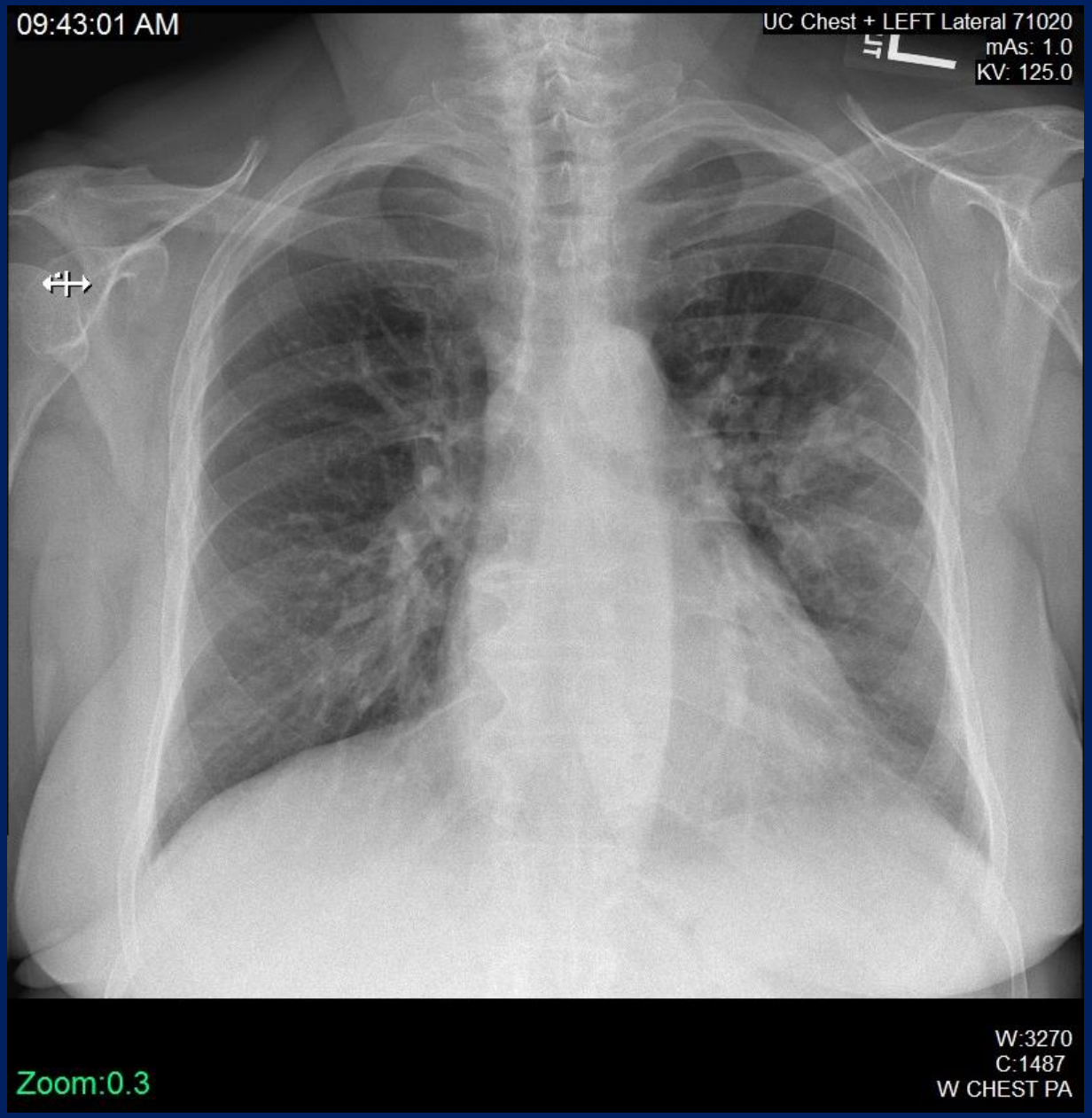
1 year later, Low dose lung screening exam



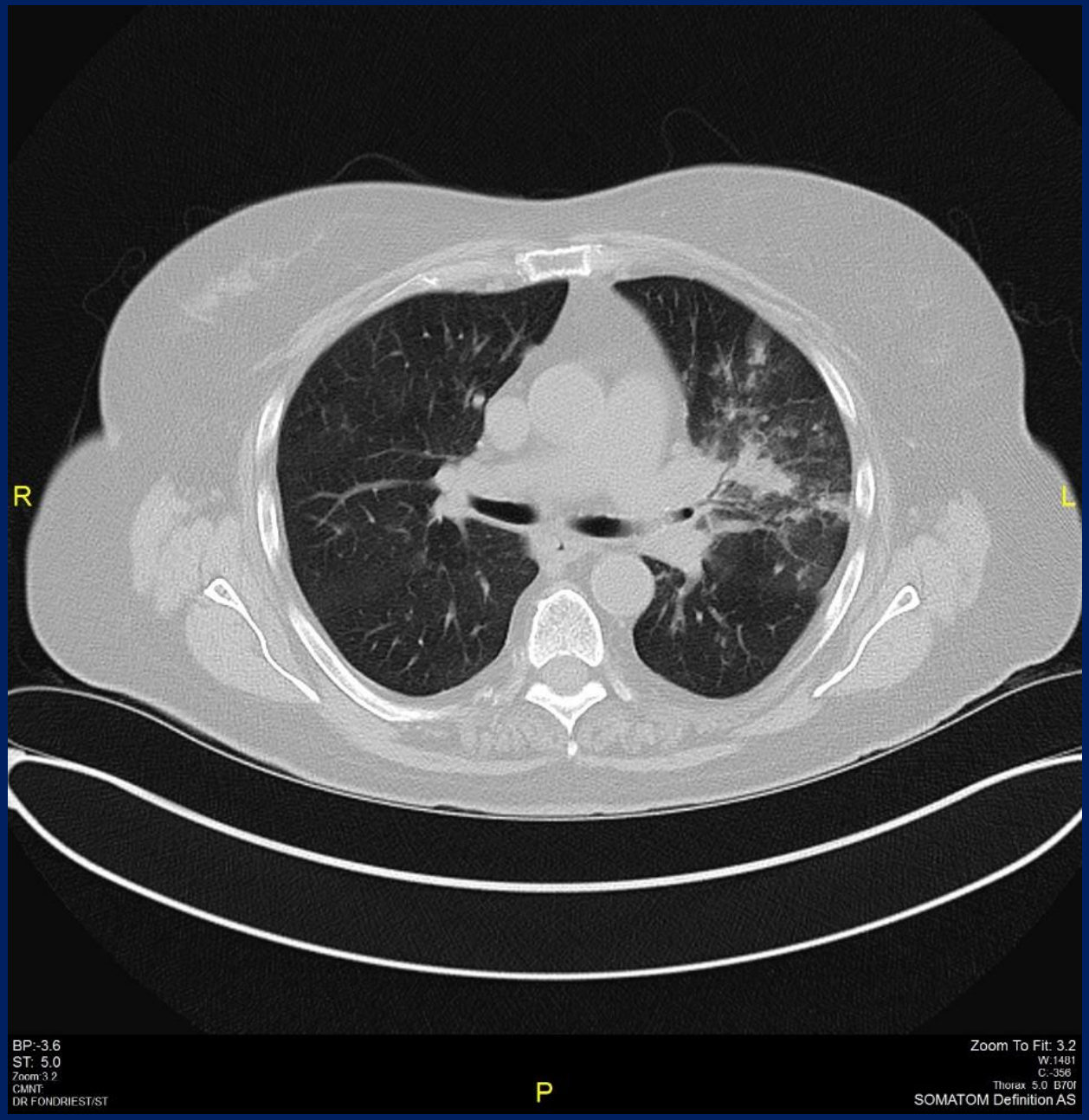
PET exam, Lung cancer and metastatic lymphadenopathy



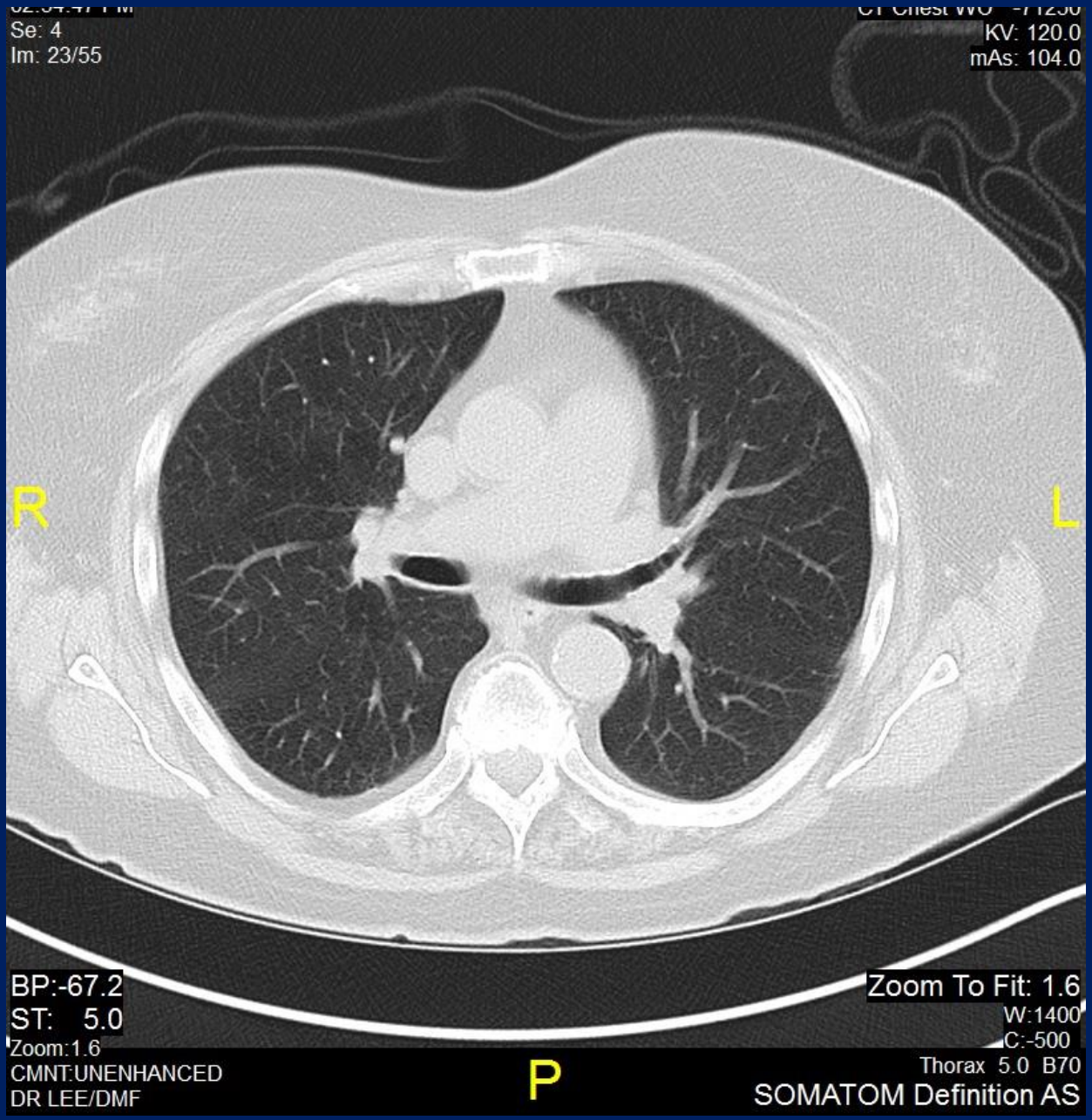
CXR, Cough and shortness of breath



CT chest, Cough and shortness of breath



CT chest, 4 weeks later

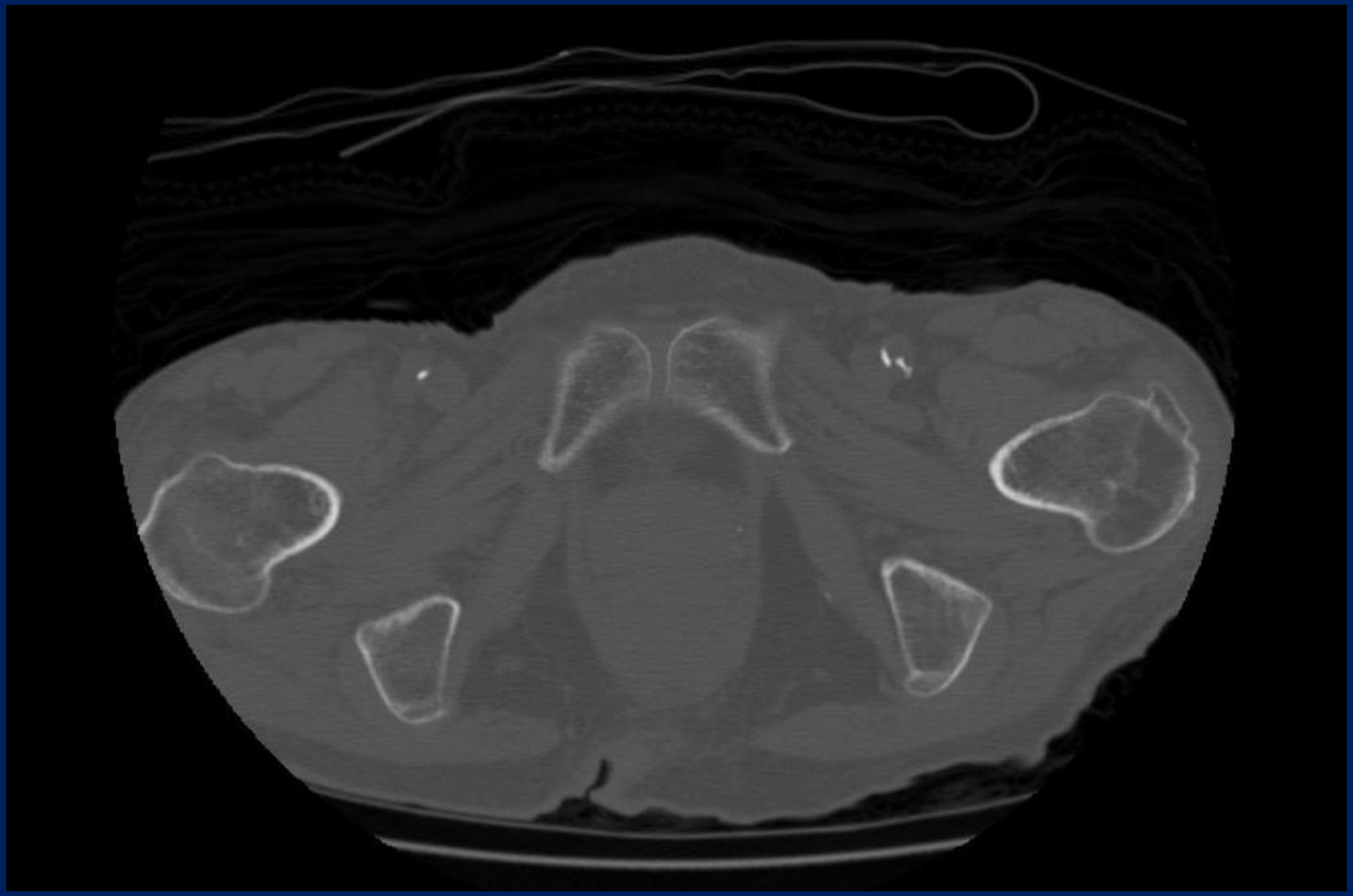


Take home points

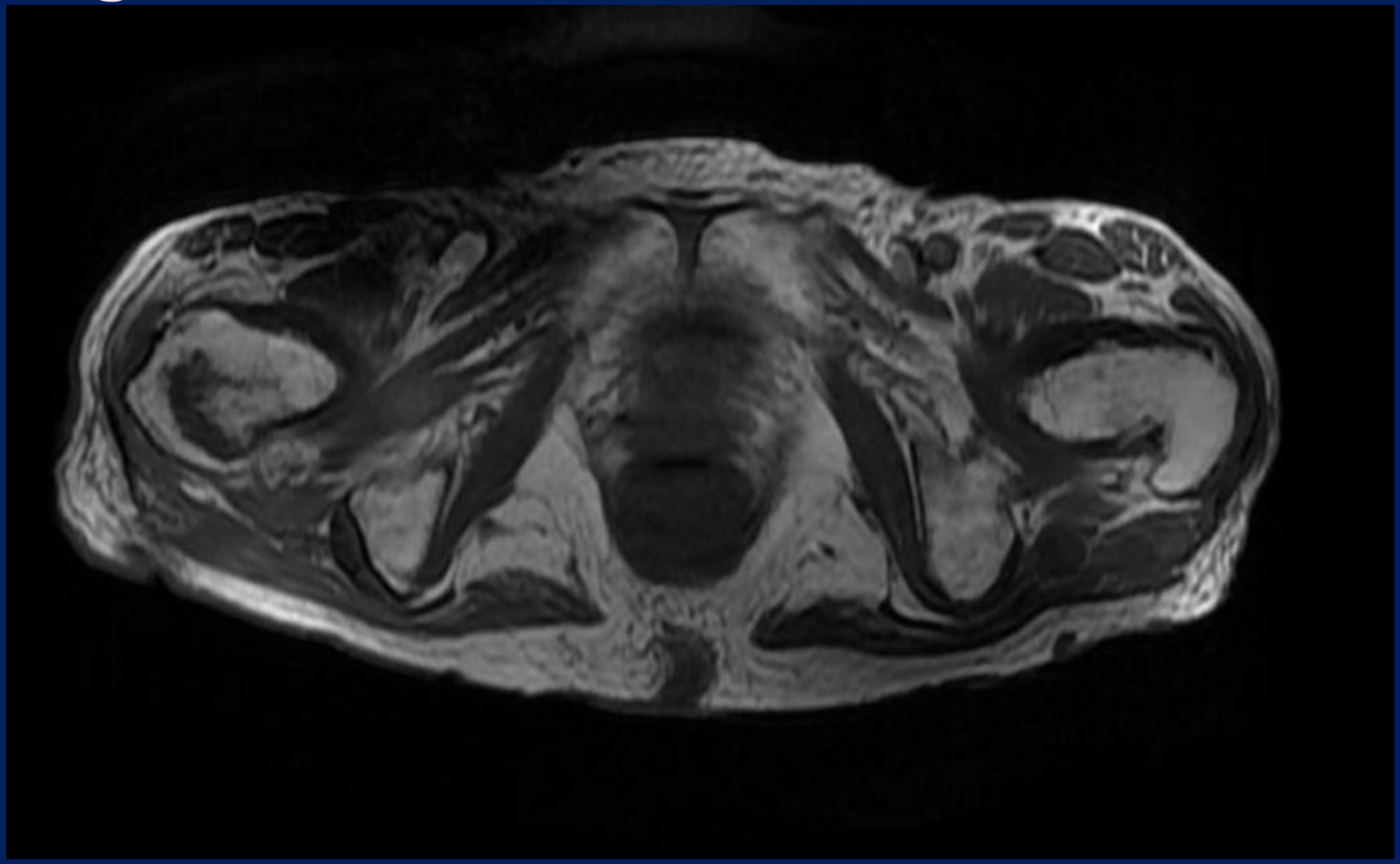
- Pneumonia and lung cancer can look identical on radiographic imaging.
- In such cases, follow up imaging is recommended in 4 – 6 weeks after the initiation of therapy.
- Some studies have shown a > than 5% cancer detection rate on follow up imaging, particularly those patients with greater than 50 years of age, smoking history and recurrent pneumonia.

Pt fell,
right hip pain,
r/o fracture

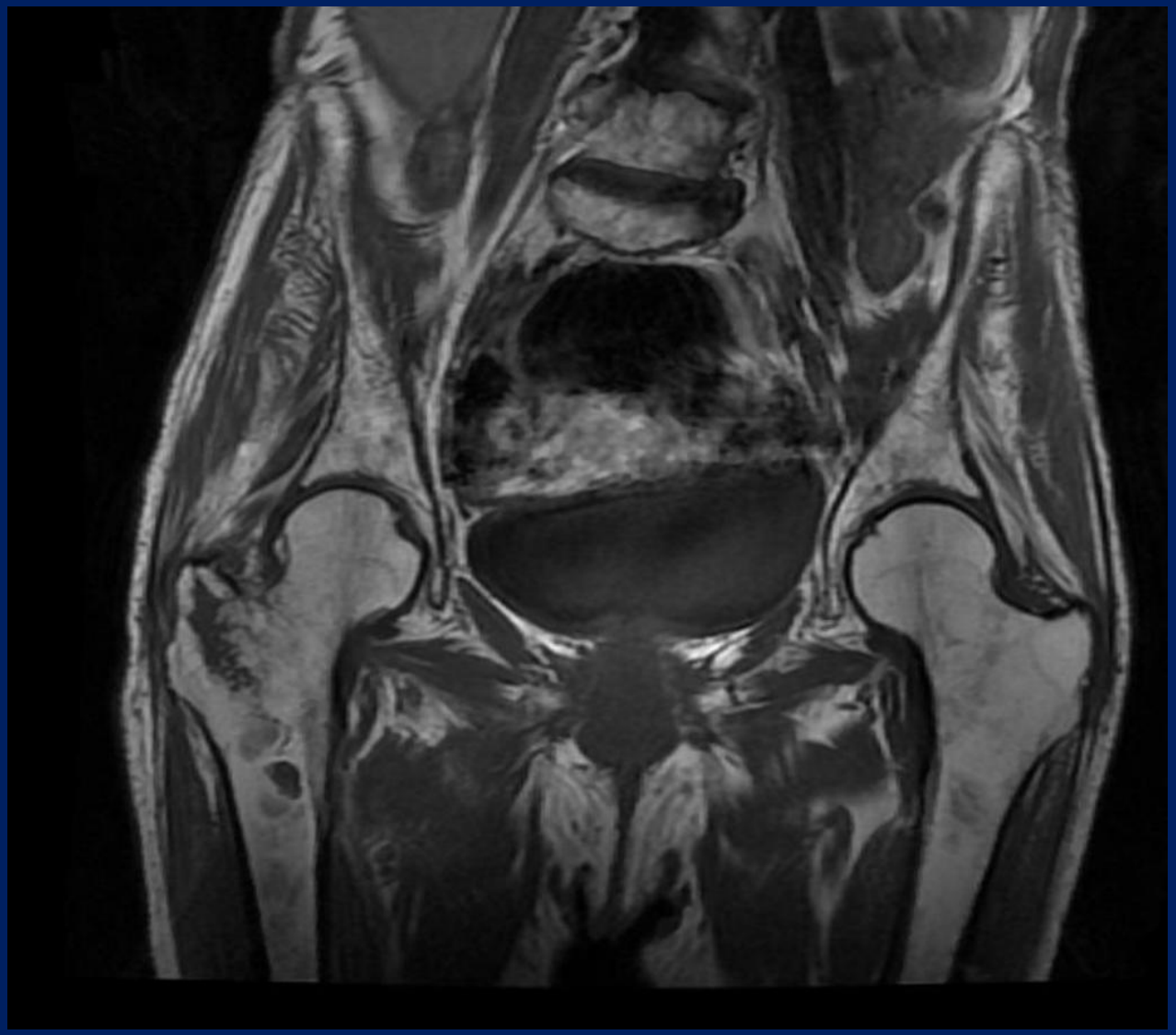
CT of the pelvis, r/o fracture



MRI of the pelvis, right intertrochanteric fracture



MRI of the pelvis, right intertrochanteric fracture

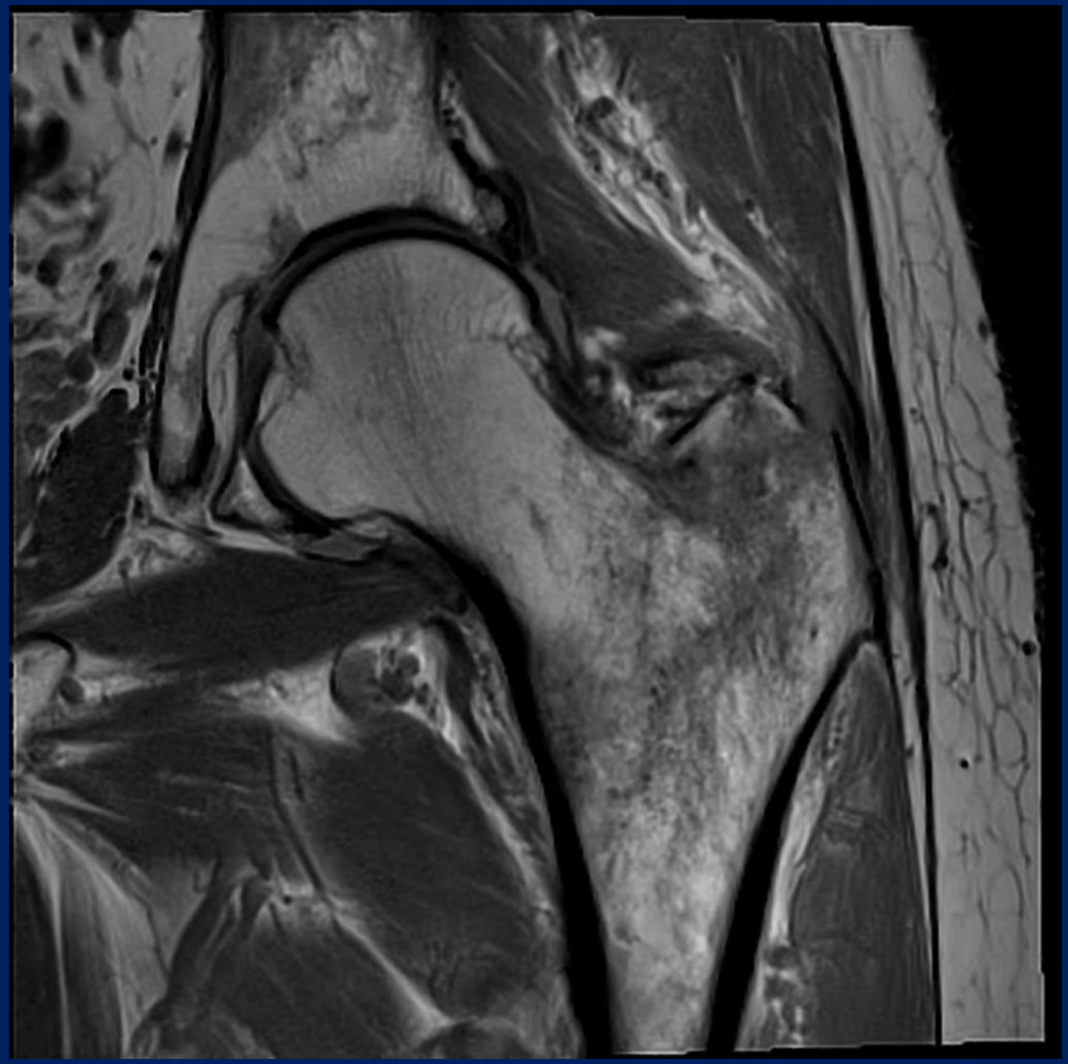


Pt fell, left hip pain

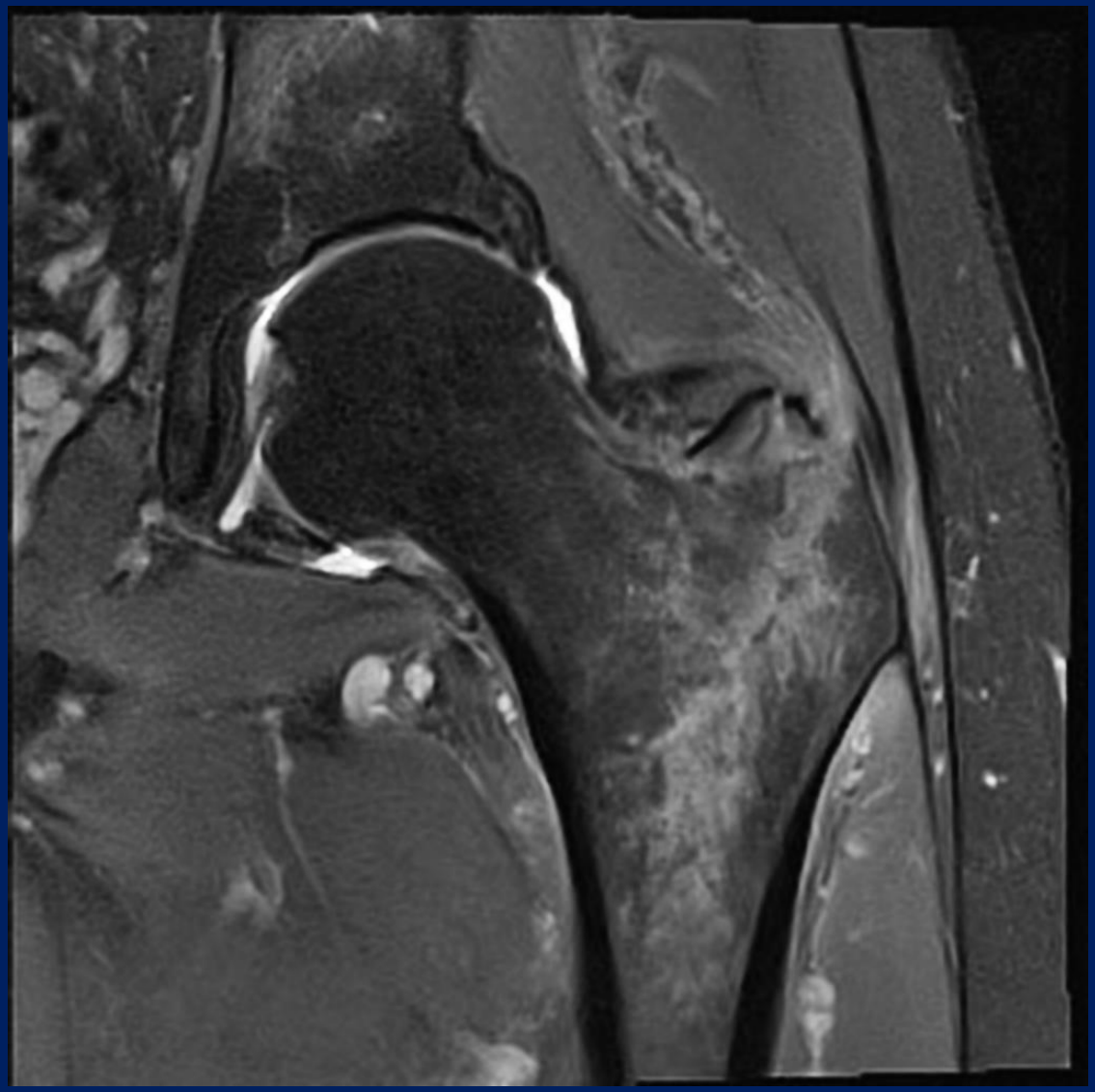
Pt fell,
left hip pain

Pt fell, left hip pain

MRI of the pelvis, left intertrochanteric fracture

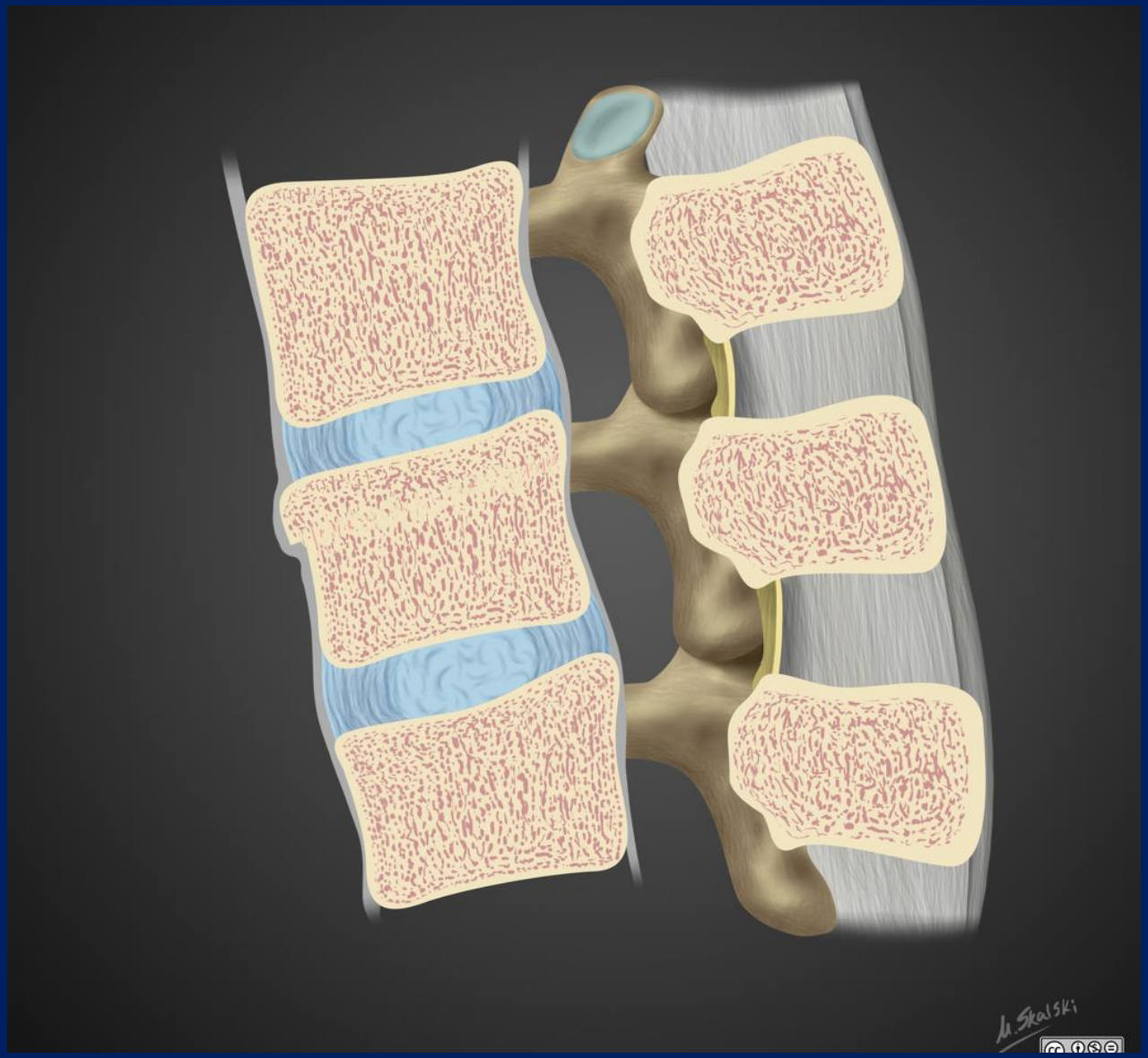


MRI of the pelvis, left intertrochanteric fracture

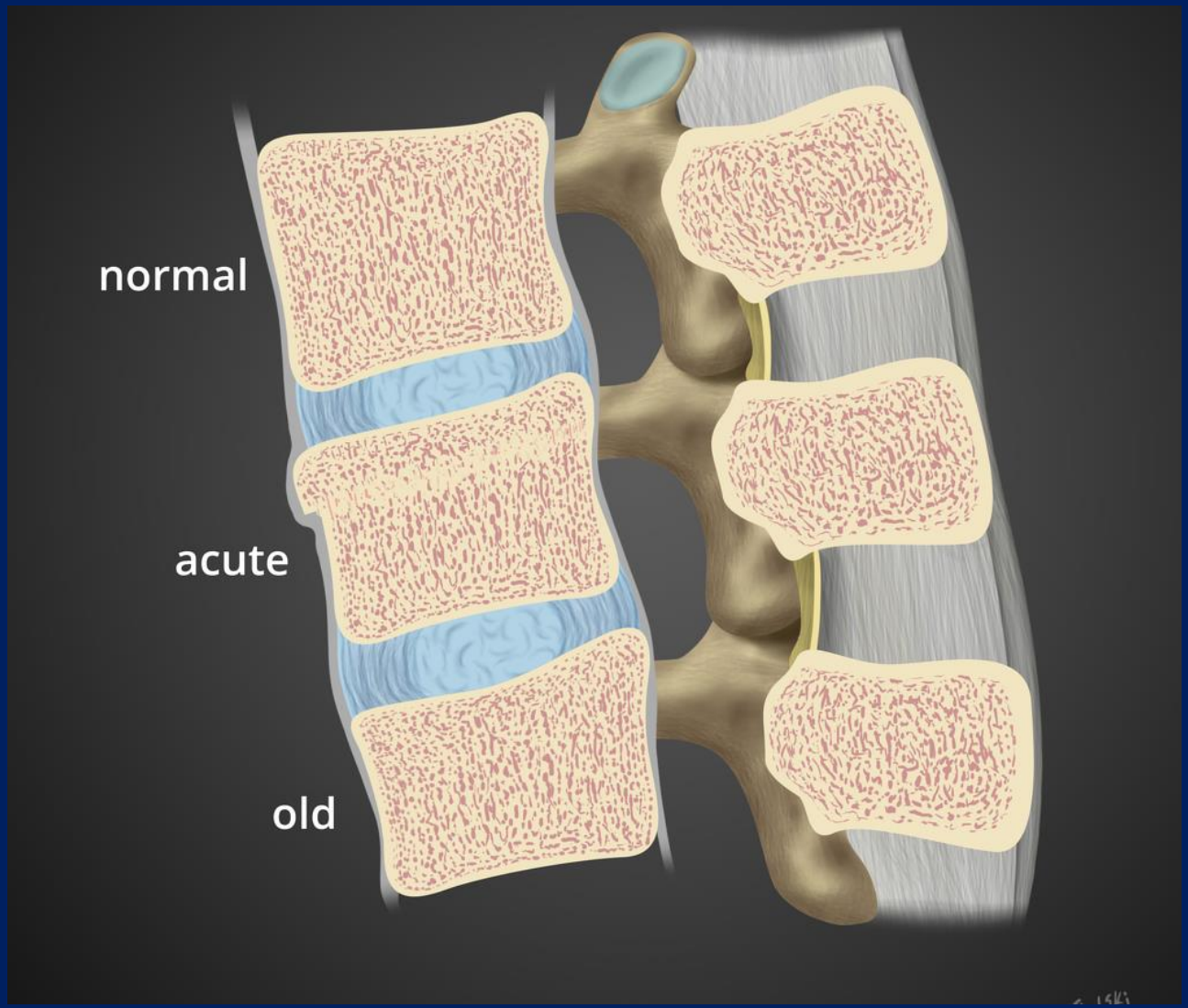


Back pain, r/o compression fracture

Compression fractures



Compression fractures

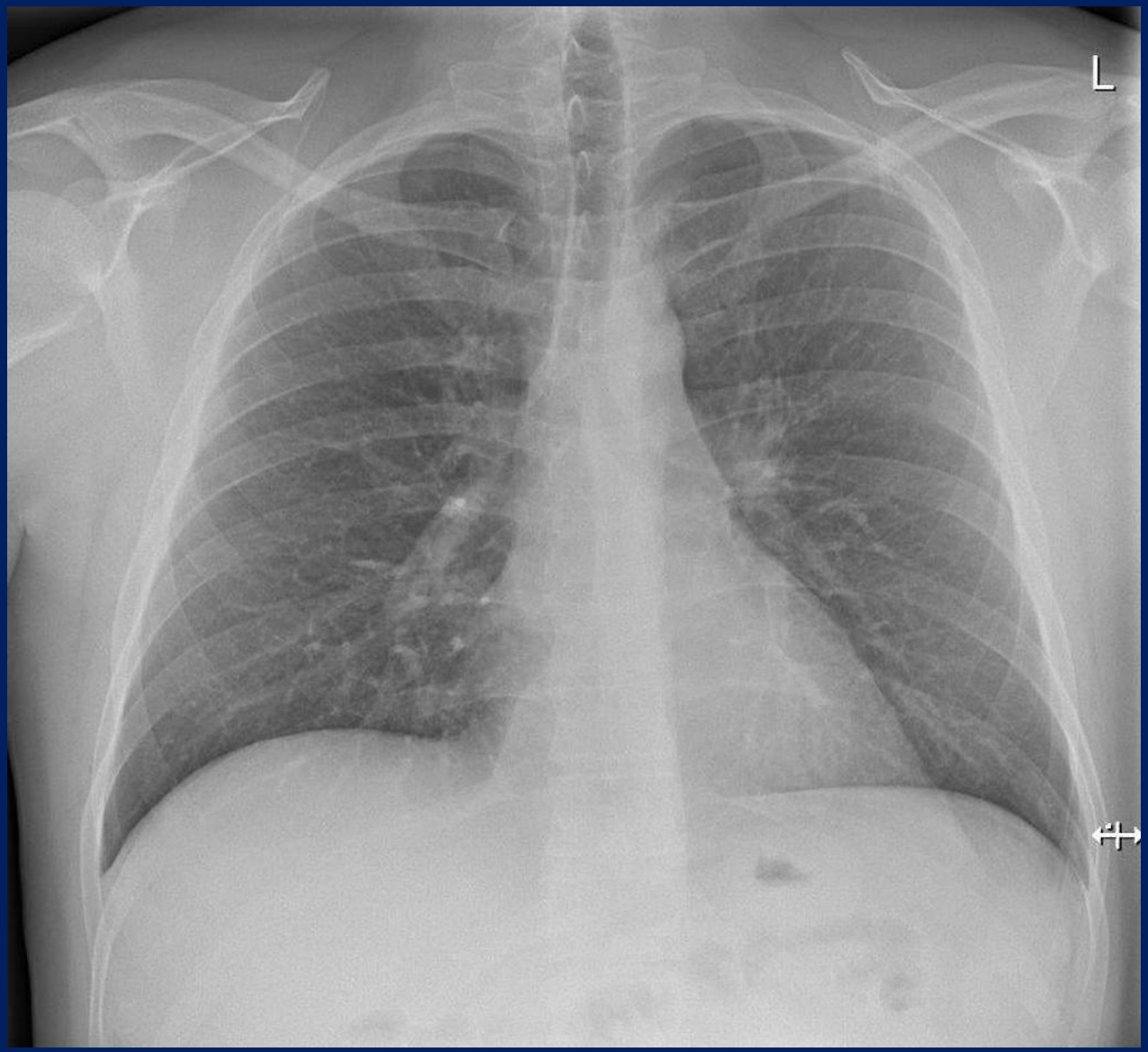


MRI, Acute L1 compression fracture

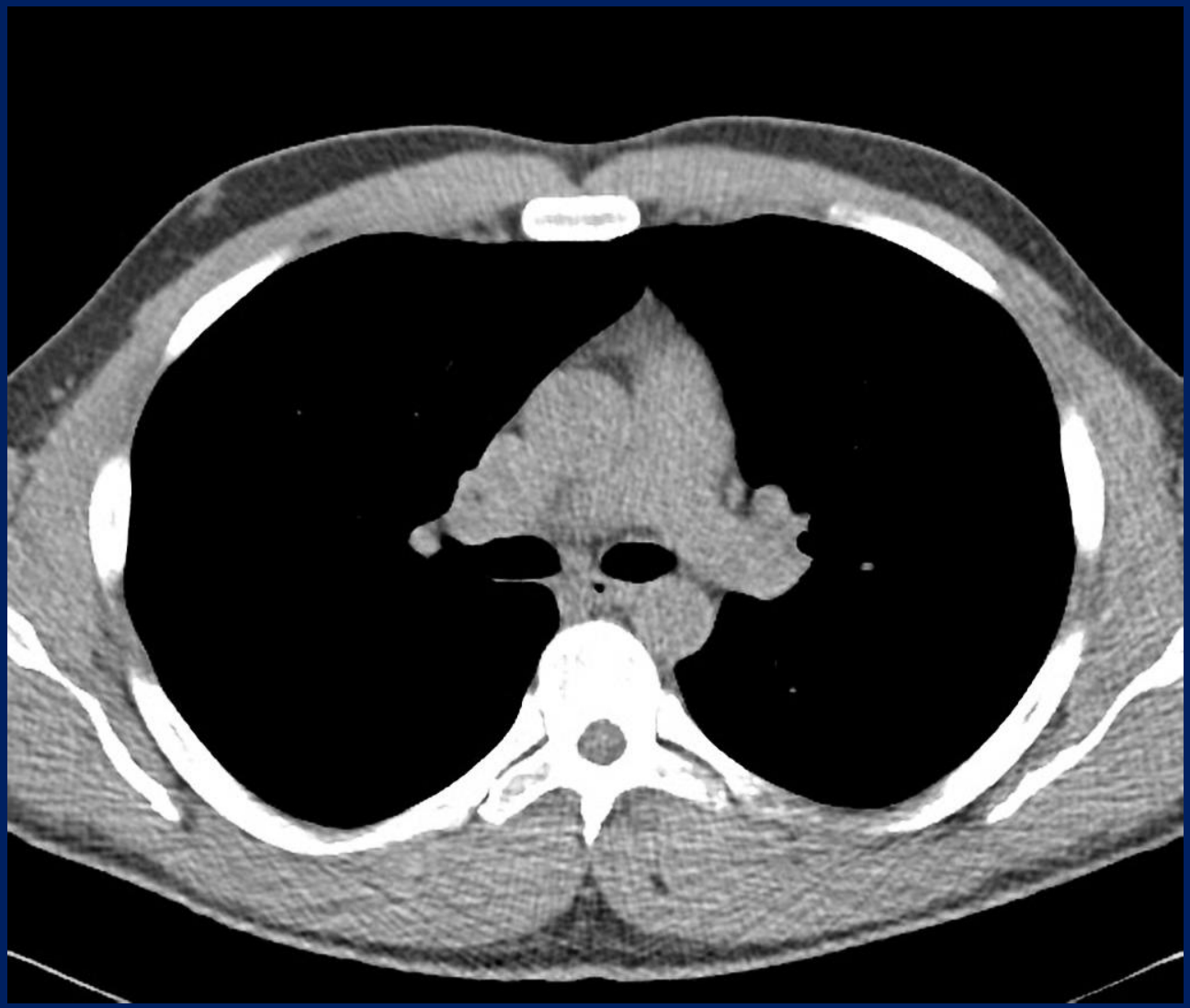
Summary

- MRI is a highly sensitive and specific imaging modality in the evaluation of musculoskeletal disease.
- CT remains a first line modality in the evaluation of occult hip fractures.
- In those cases where a clinical suspicion remains, MRI is warranted.

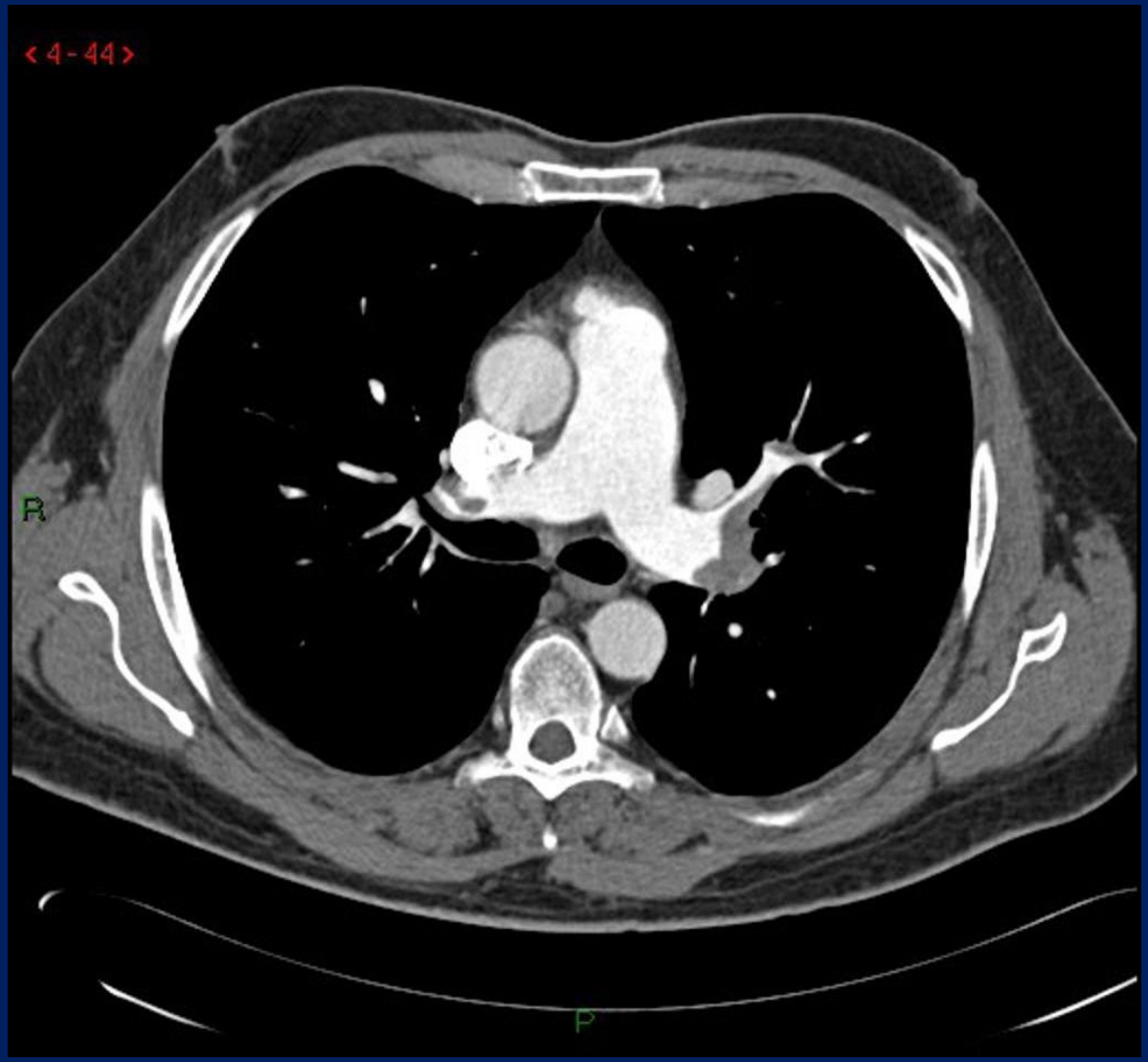
44 y.o. male with shortness of breath CXR



44 y.o. male with shortness of breath CT chest, non contrast. Normal study



44 y.o. male with shortness of breath CT chest, with iv contrast. Embolism

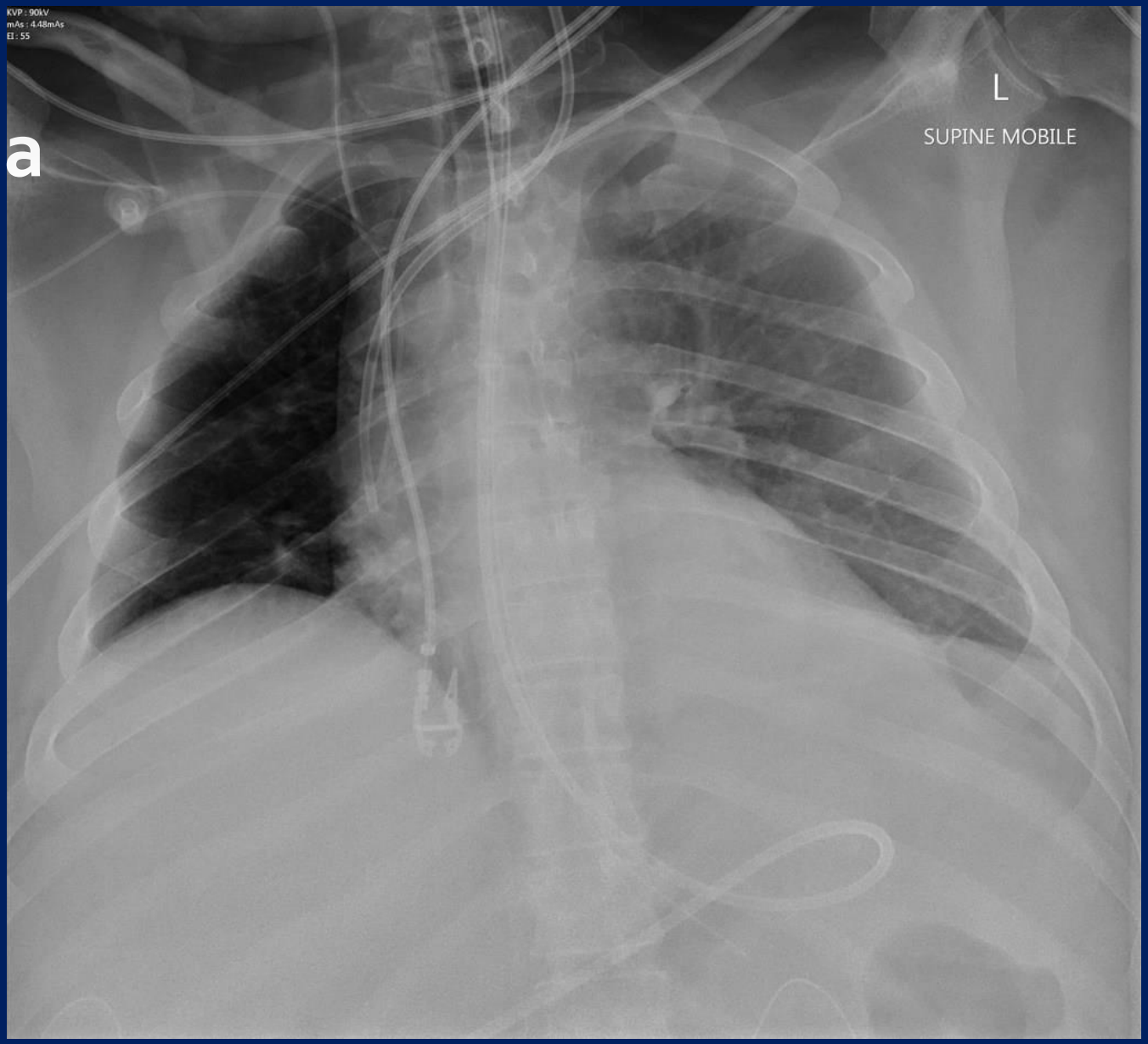


CT of the chest of a lung mass, without(A), and with (B,C) iv contrast

Conclusion

- The use of intravenous contrast is highly beneficial in the CT evaluation of the chest, particularly the hila, mediastinum and vasculature.

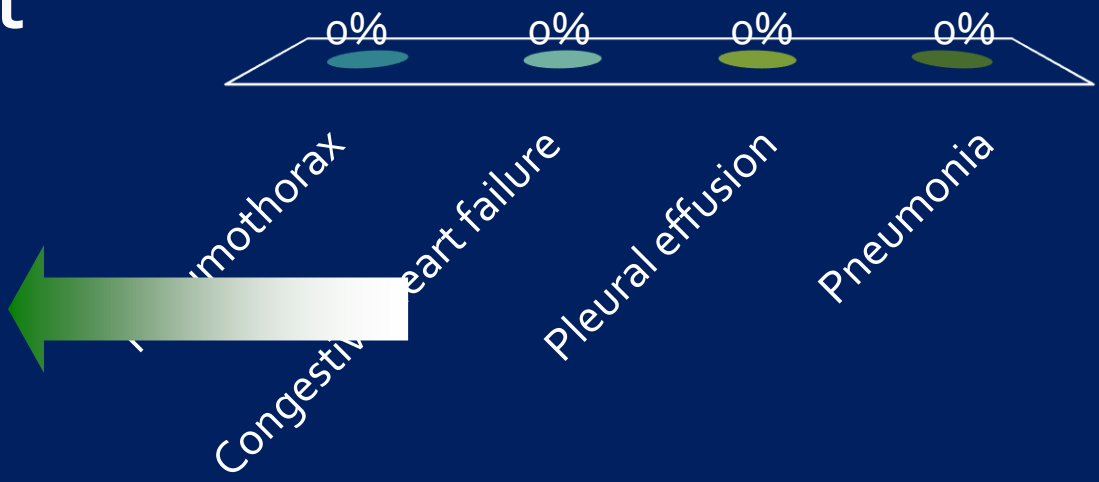
Portable CXR, Hypoxemia



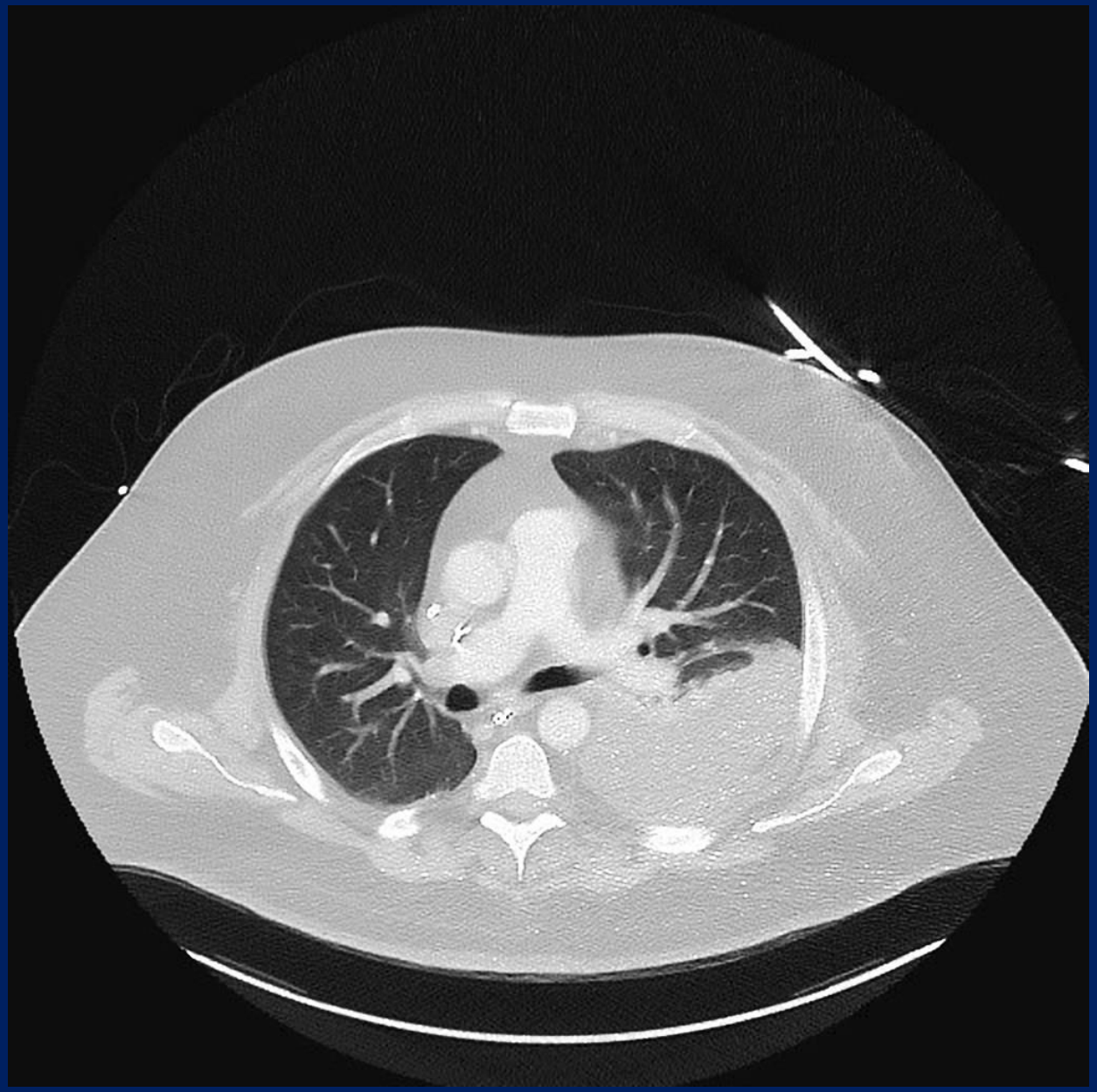
Portable CXR, Hypoxemia

The most likely cause of the hypoxemia is:

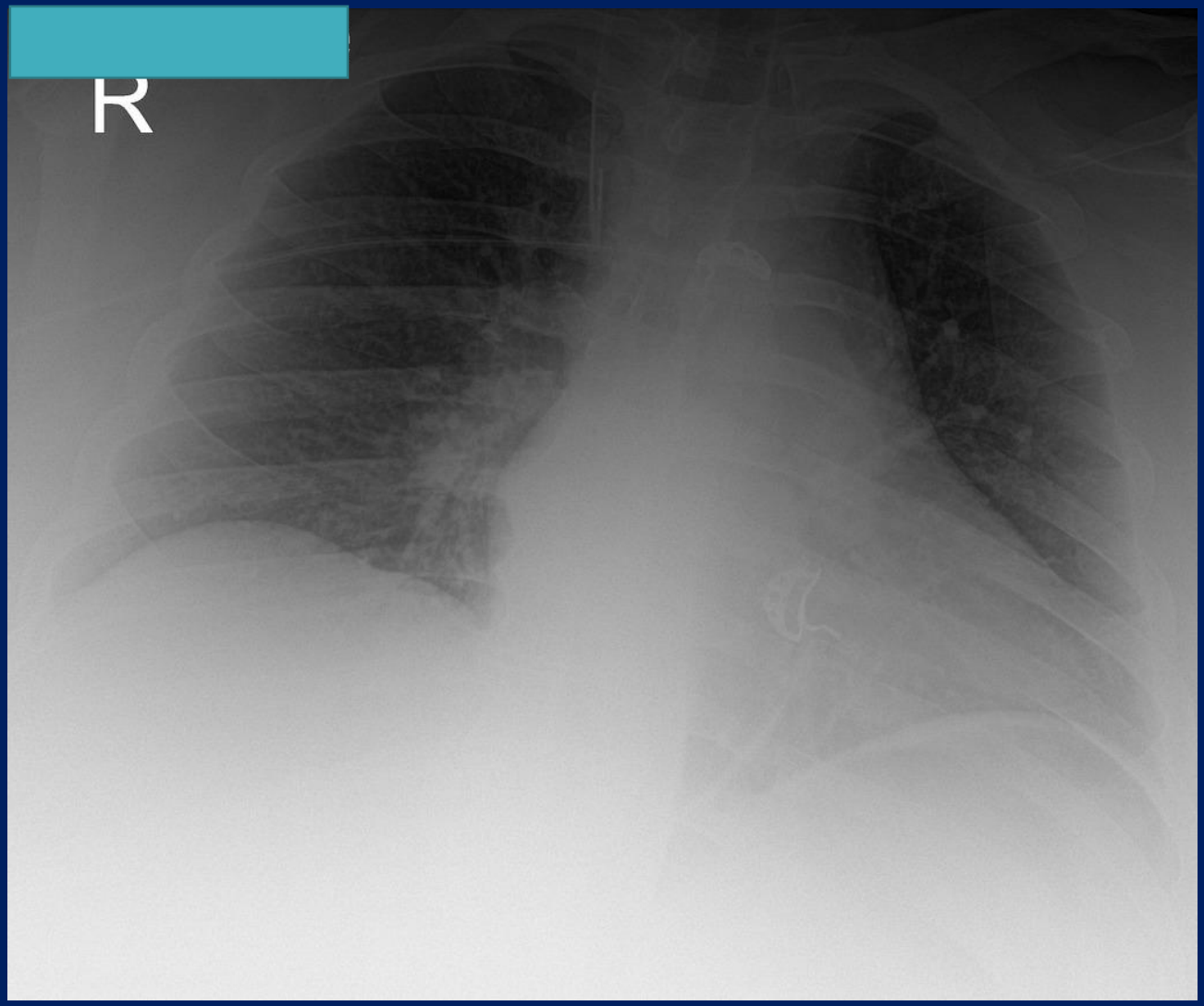
A. **Pneumothorax**
B. **Congestive heart failure**
C. **Pneumonia**
D. **Pleural effusion**



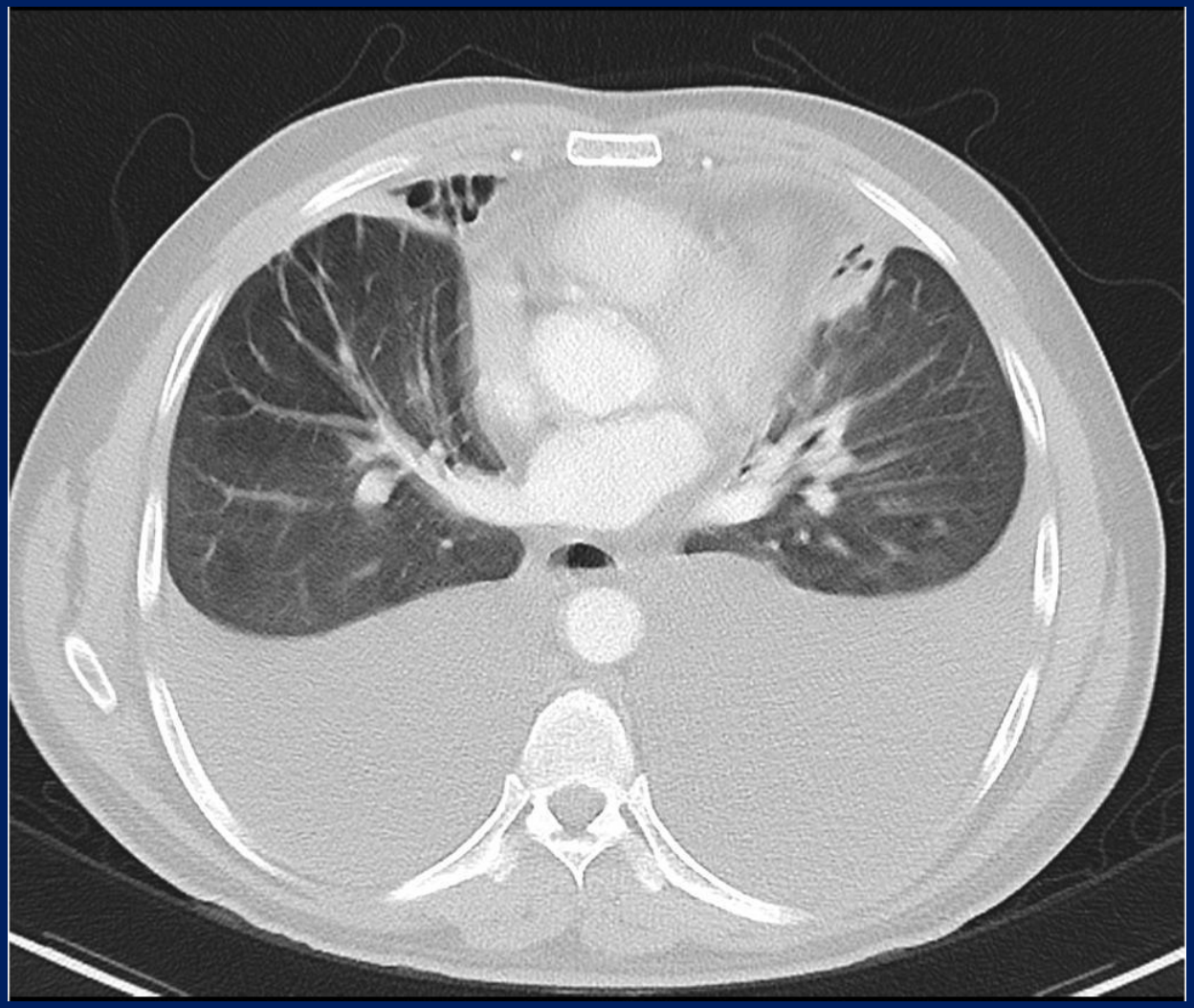
CT of the chest, left pleural effusion



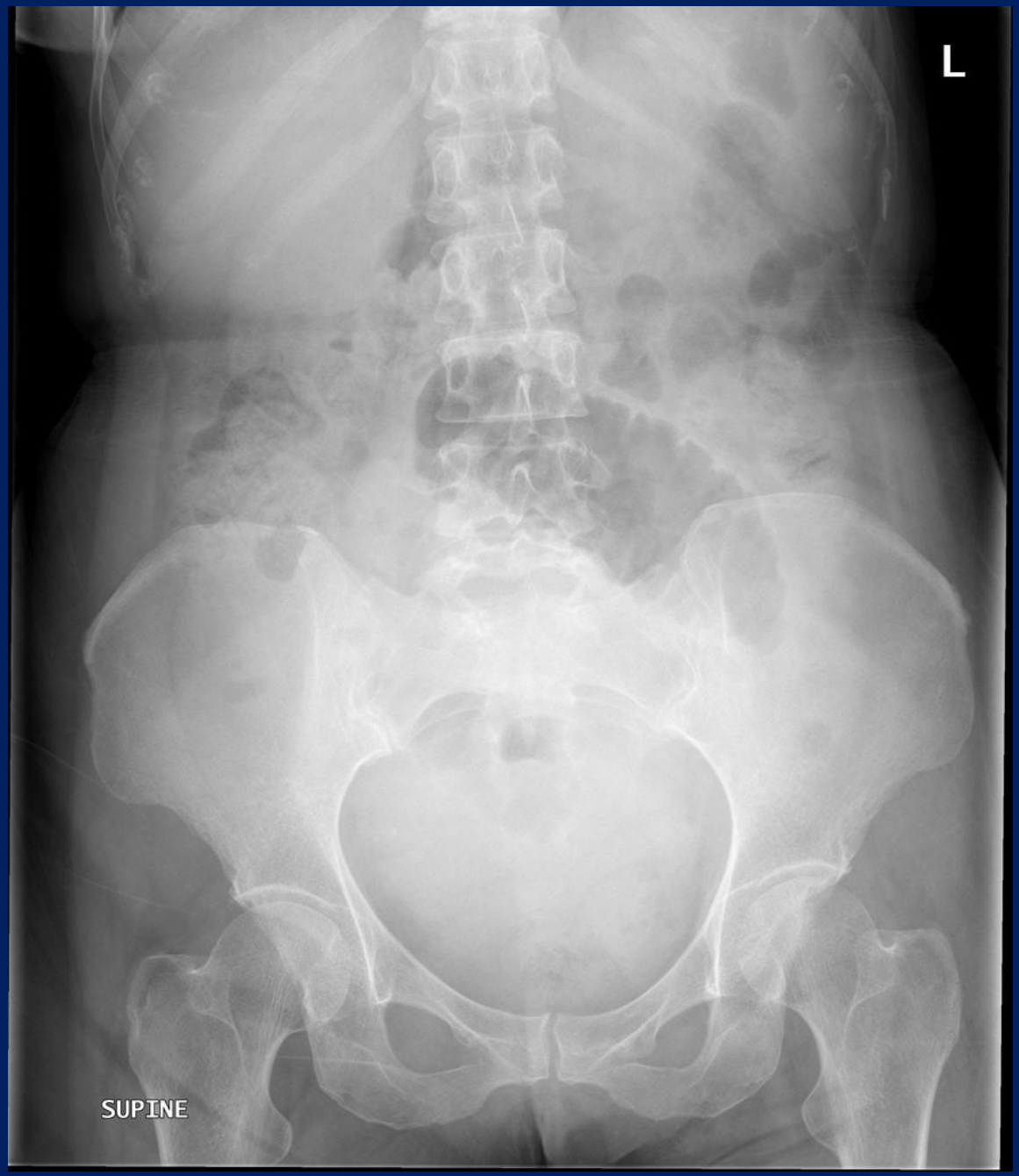
Portable CXR,
Shortness of breath, hypoxemia



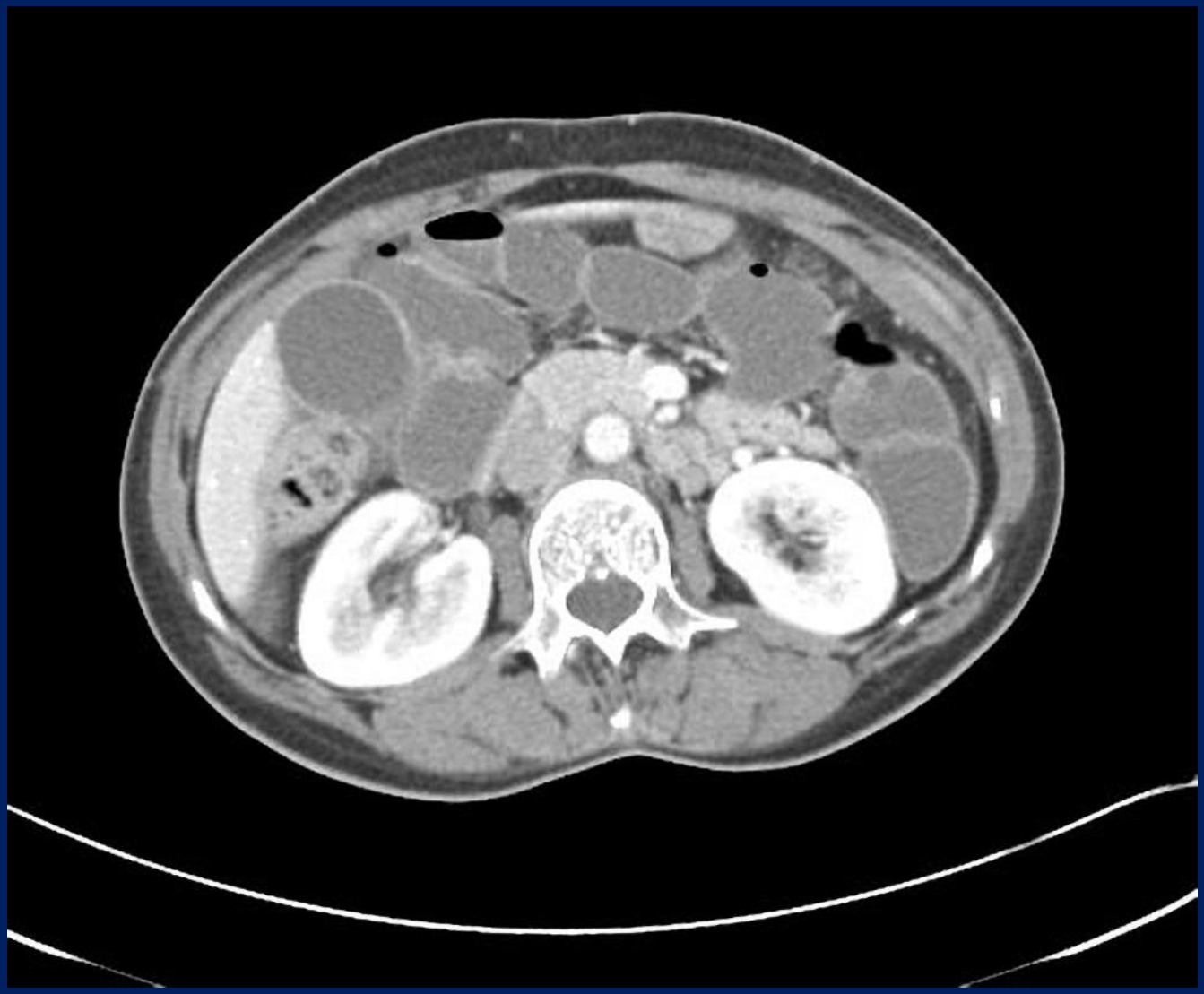
CT of the chest, bilateral pleural effusions



32 y.o. male, with flu like symptoms



CT of the abdomen, fluid filled small bowel obstruction



CT of the abdomen, fluid filled small bowel obstruction

Typical small bowel obstruction, gas filled loops of small intestine

Learning point

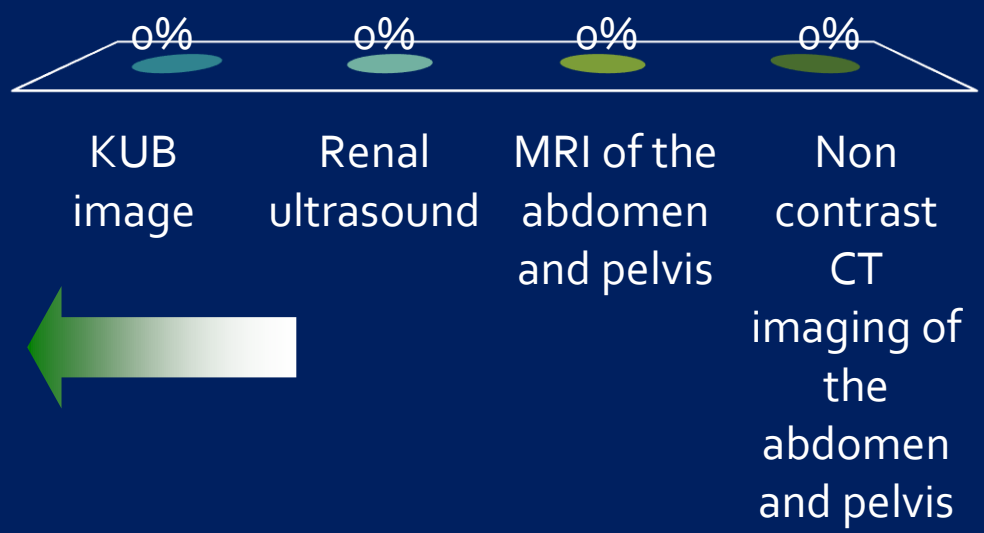
- Digital processing algorithms used in radiography optimize optical density.

- Evenly distributed fluid collections in the body may be very difficult to identify on plain film radiography.

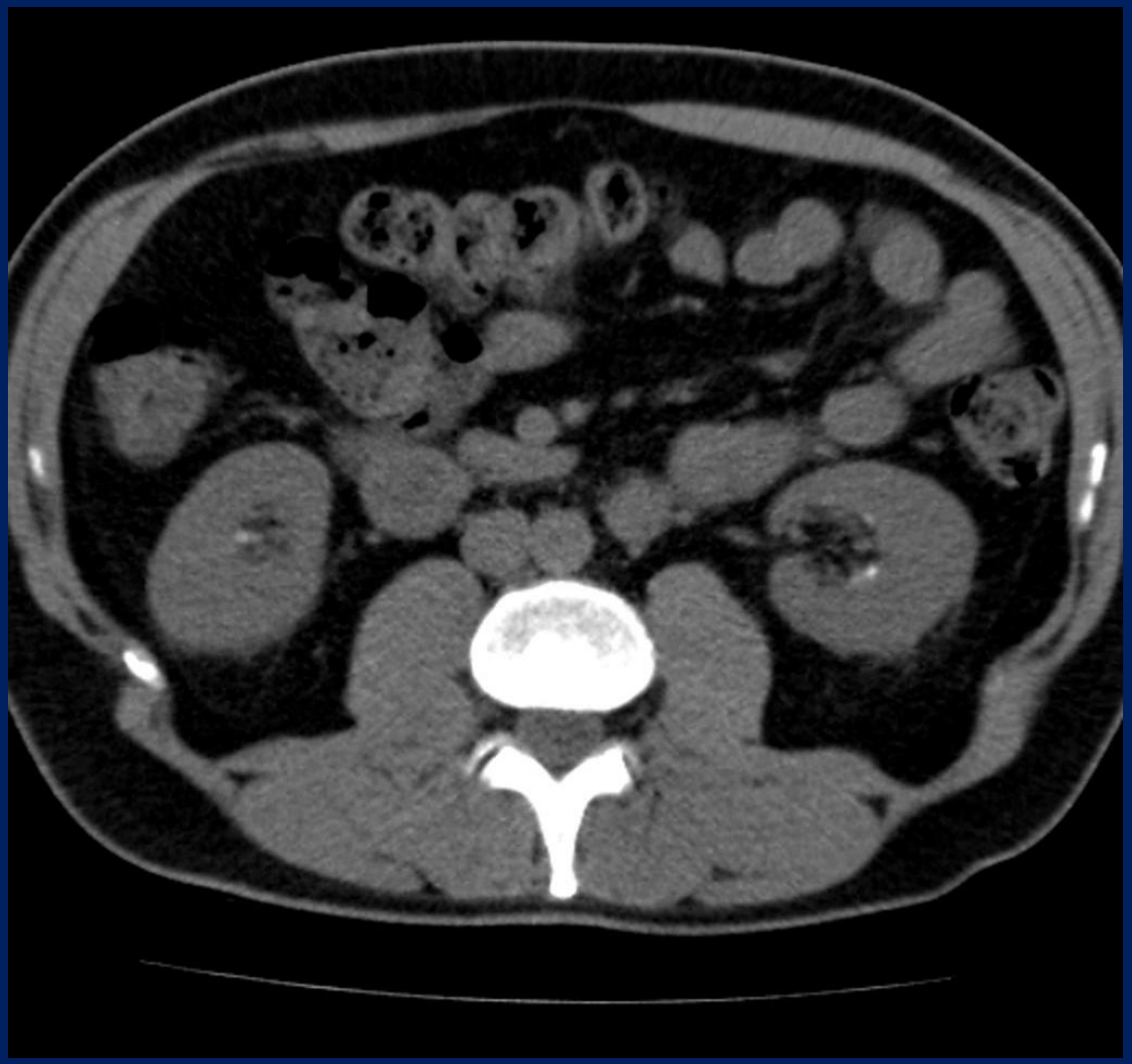
44 y.o. male with renal colic, mild fever, leukocytosis

What is the imaging modality of choice to evaluate for obstructive ureteral calculi?

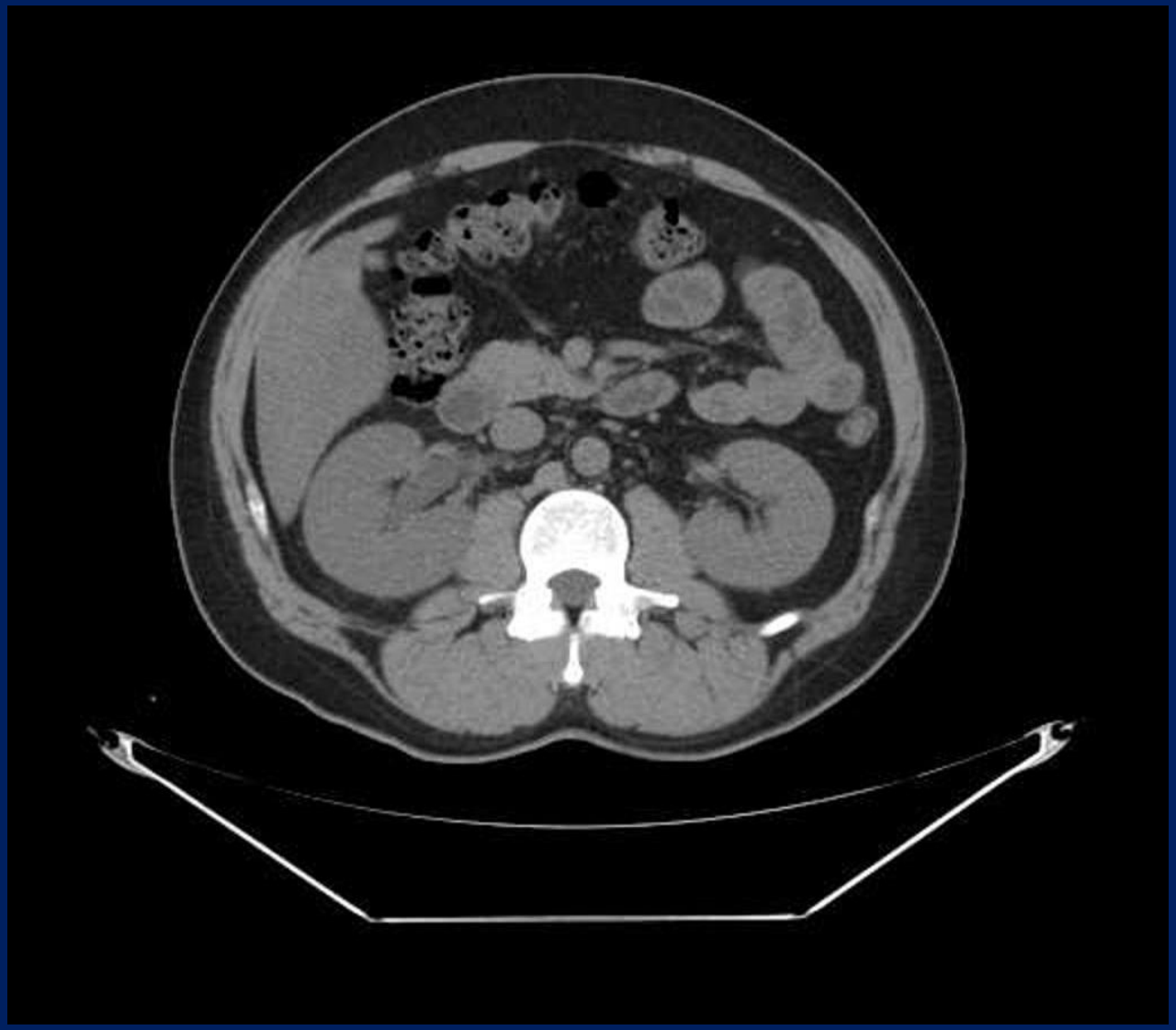
A. **KUB image**
B. **Renal ultrasound**
C. **MRI of the abdomen and pelvis**
D. **Non contrast CT imaging of the abdomen and pelvis**



44 y.o. male with renal colic, mild fever, leukocytosis



44 y.o. male with renal colic, mild fever, leukocytosis



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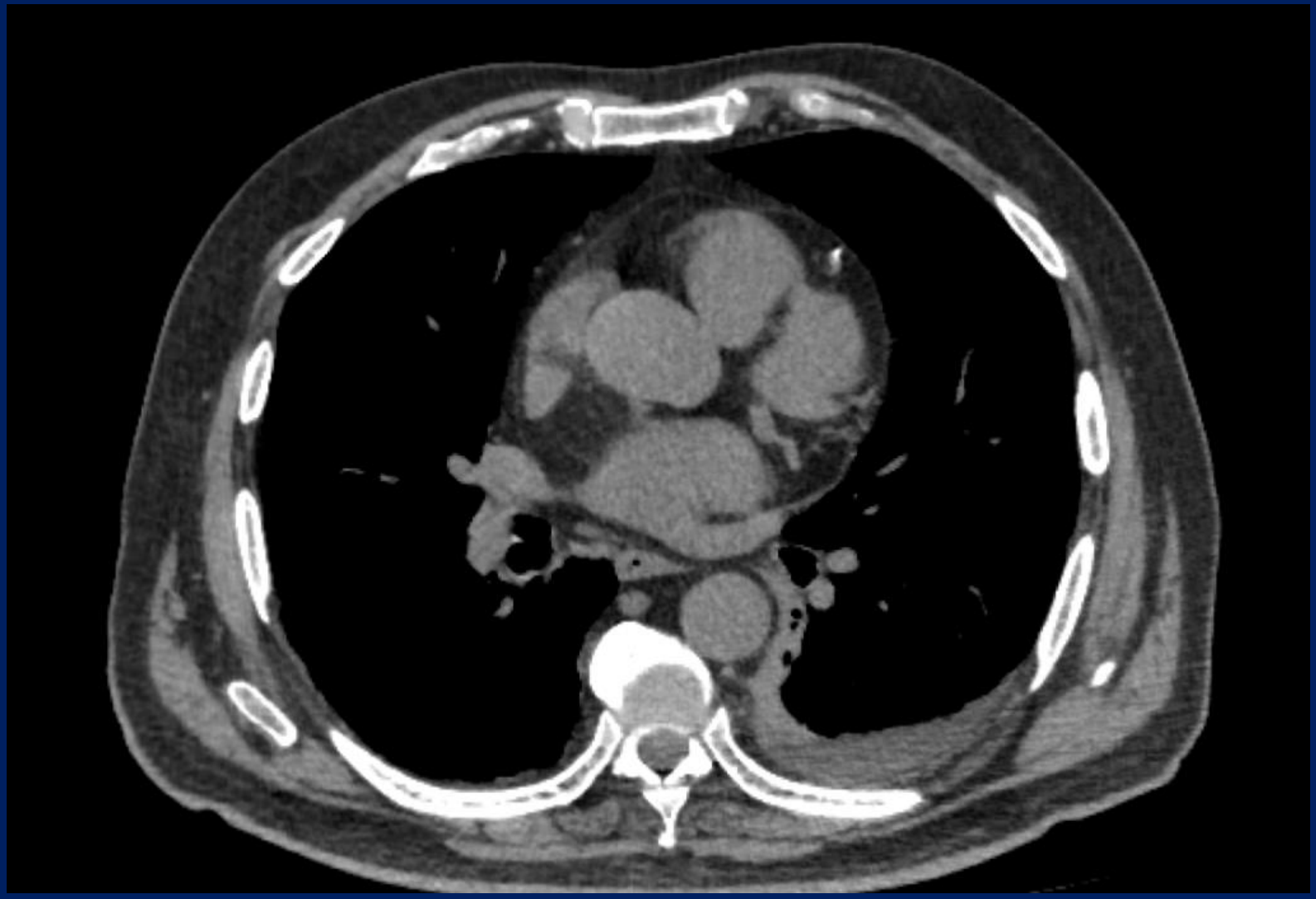
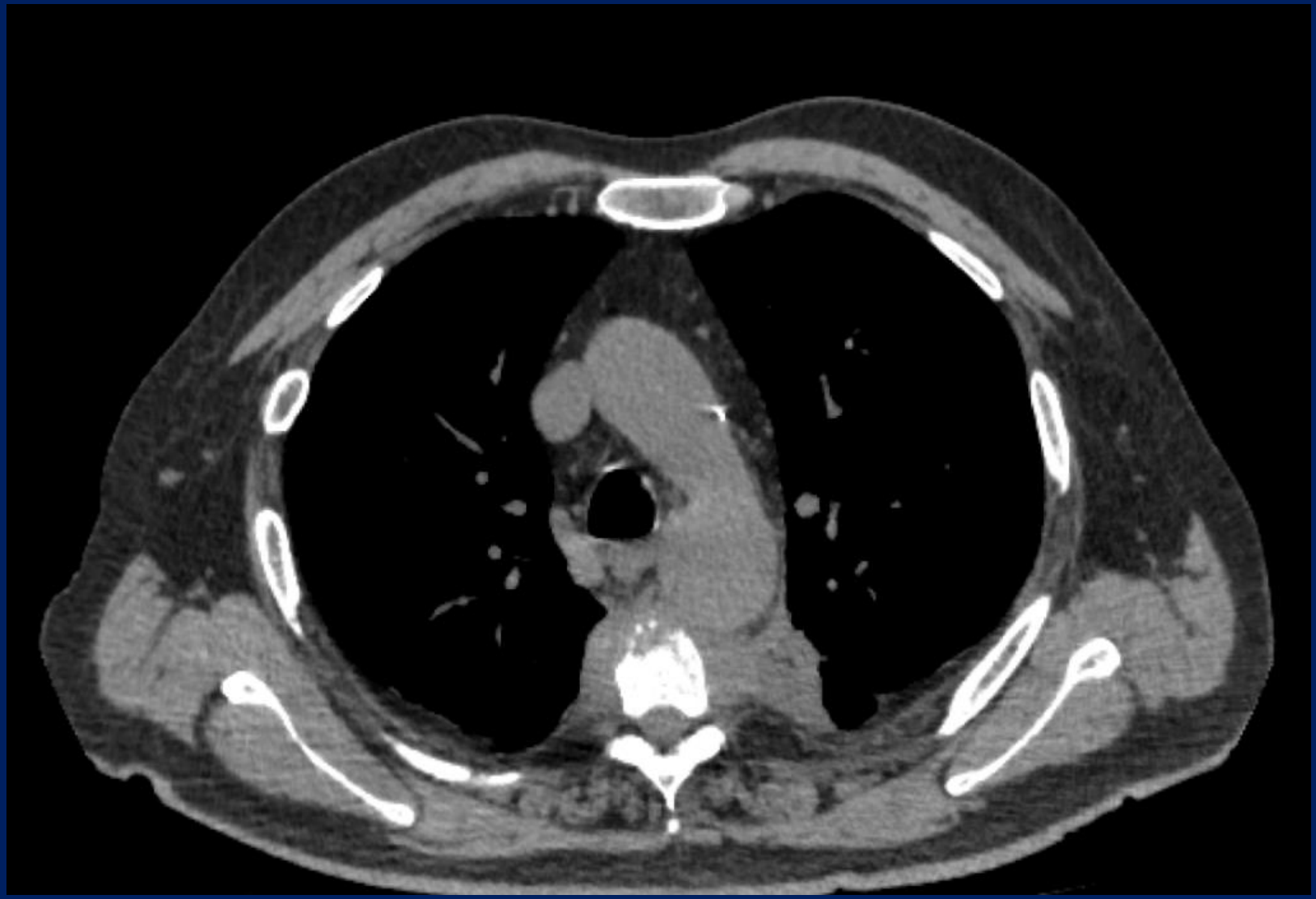
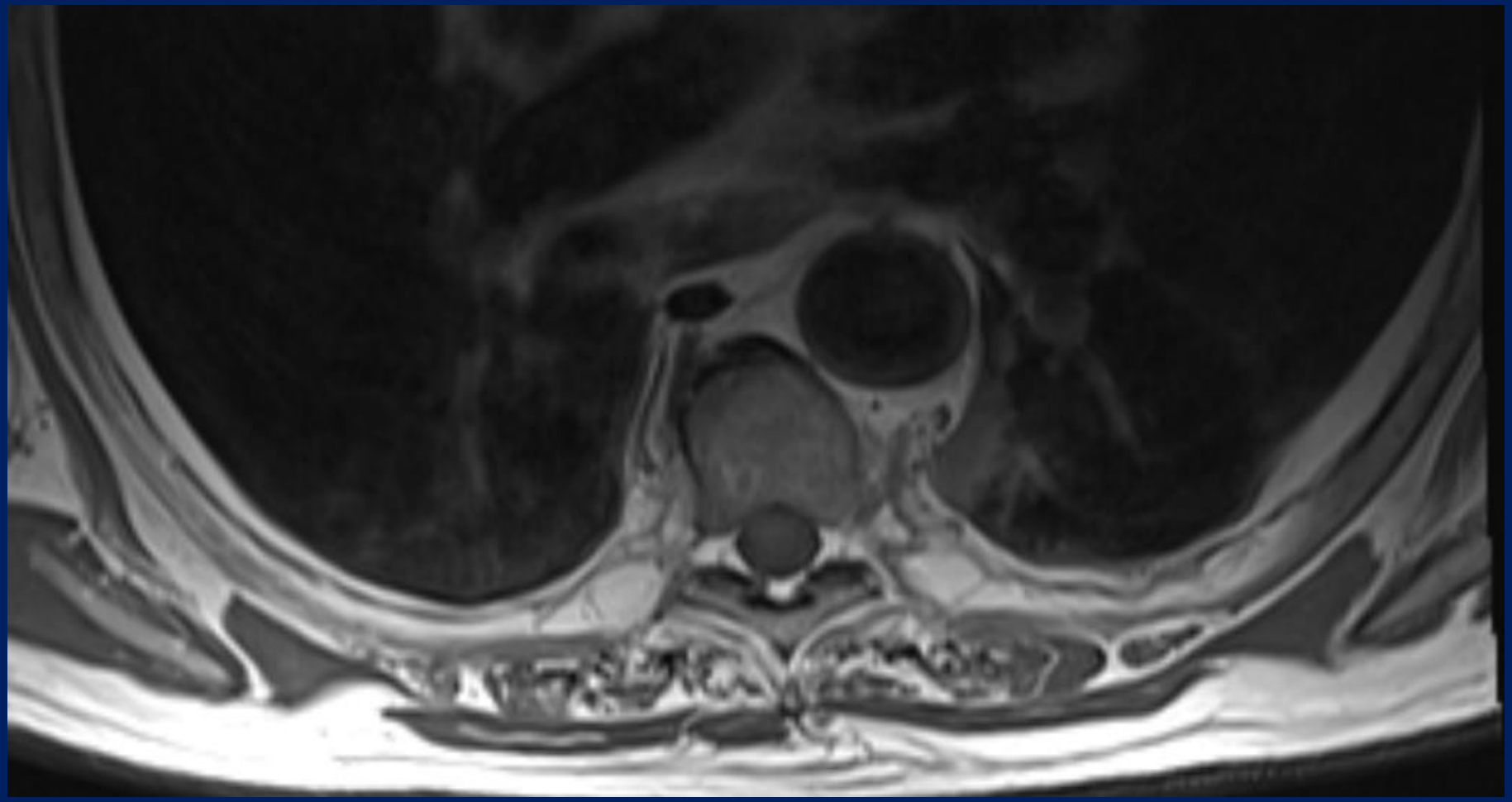


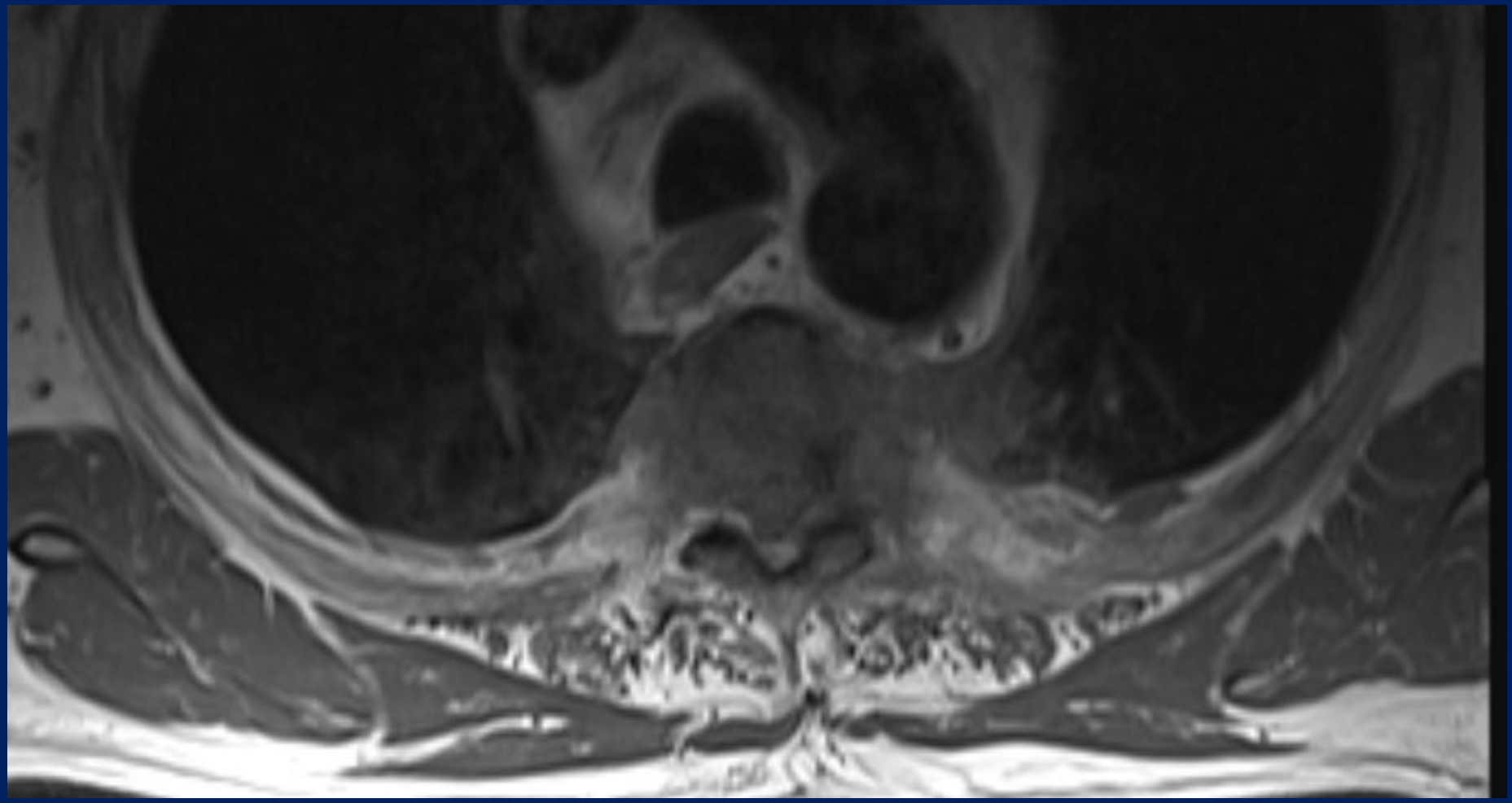
44 y.o. male with discitis and osteomyelitis



MRI – Normal thoracic spine



MRI of the thoracic spine, discitis and epidural abscess

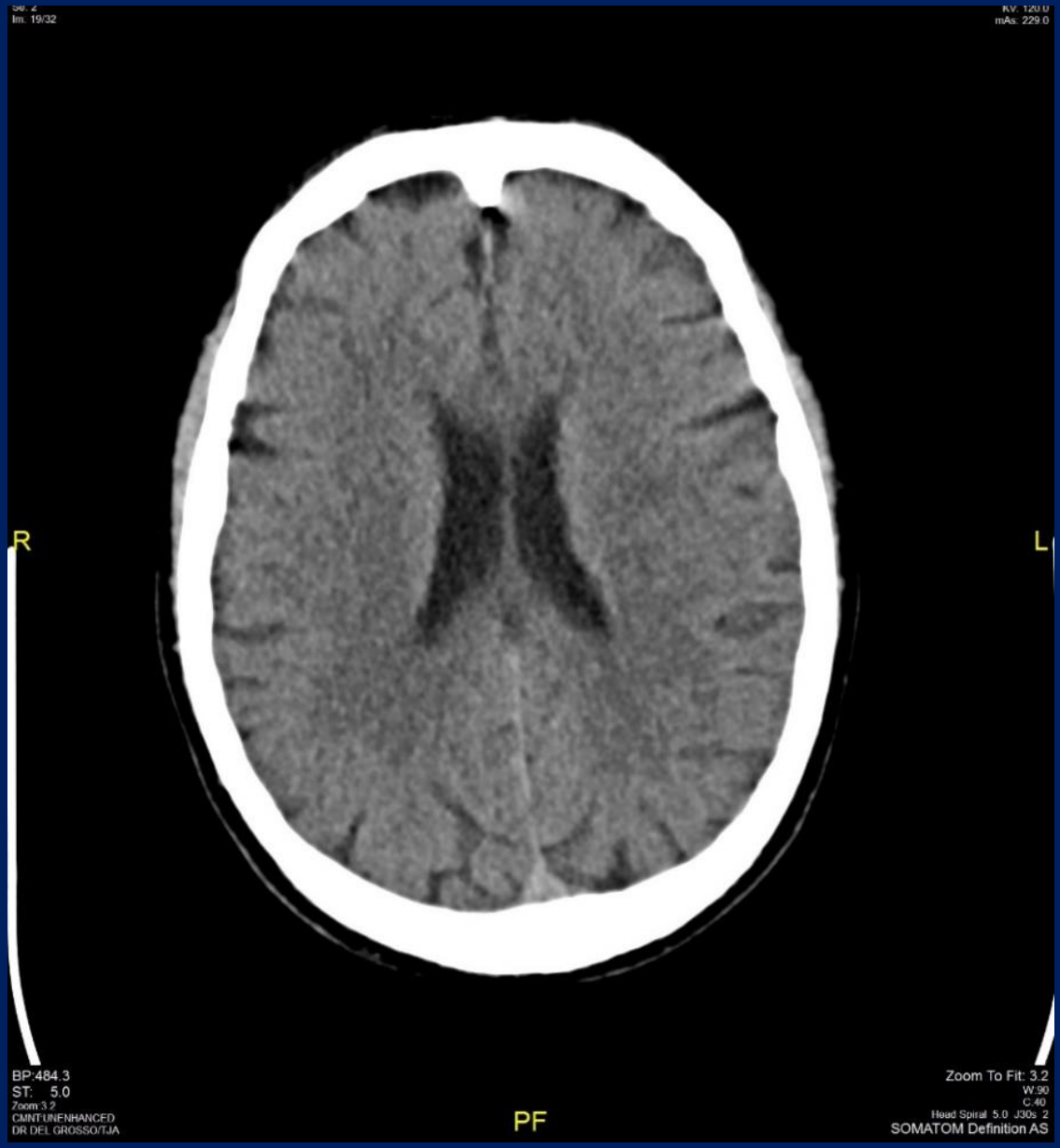


Conclusion

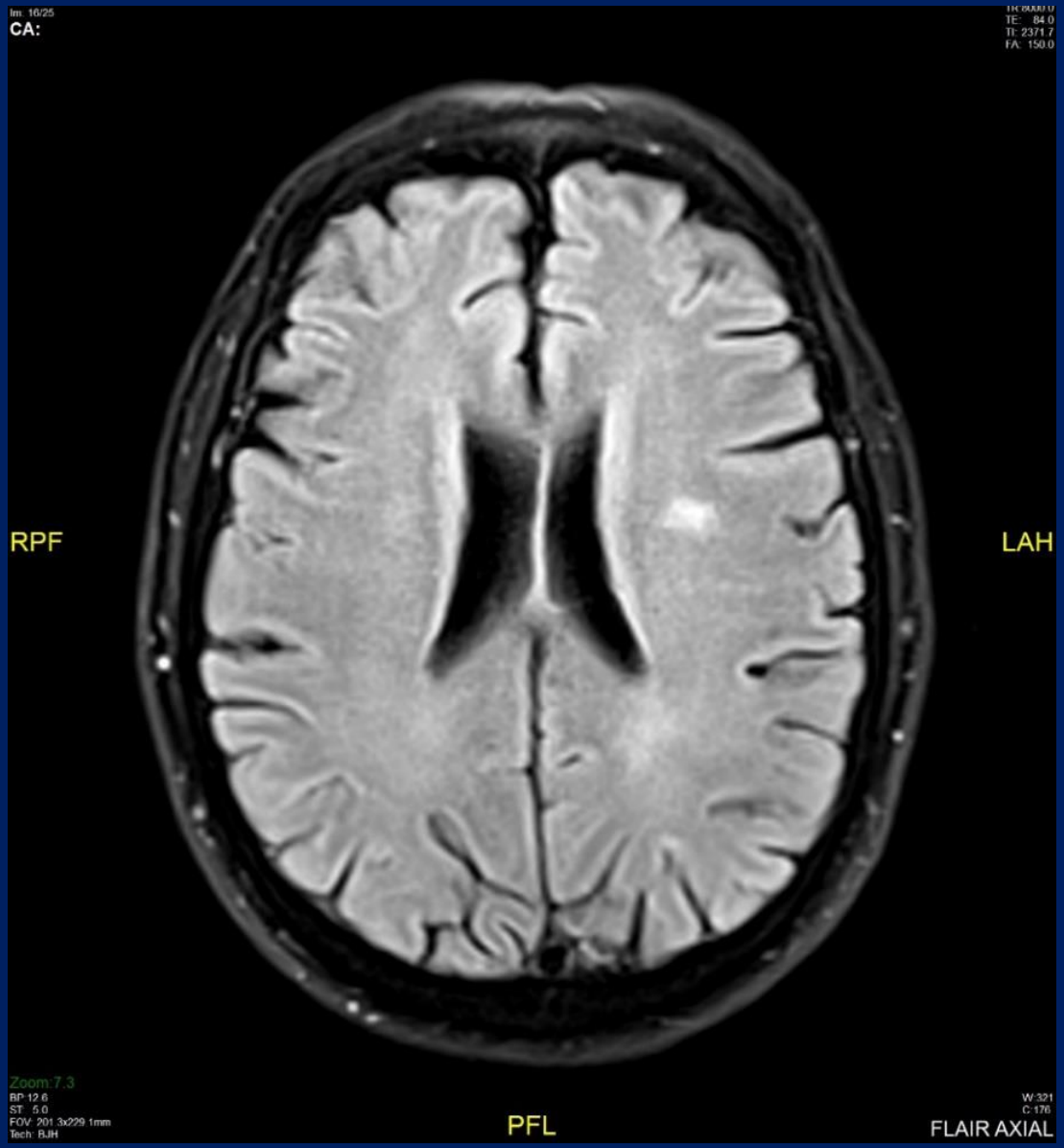
- False positive studies may be the most difficult to discern, especially if there are corresponding "satisfaction of search" findings.

- A high level of suspicion is needed to reveal a false positive.

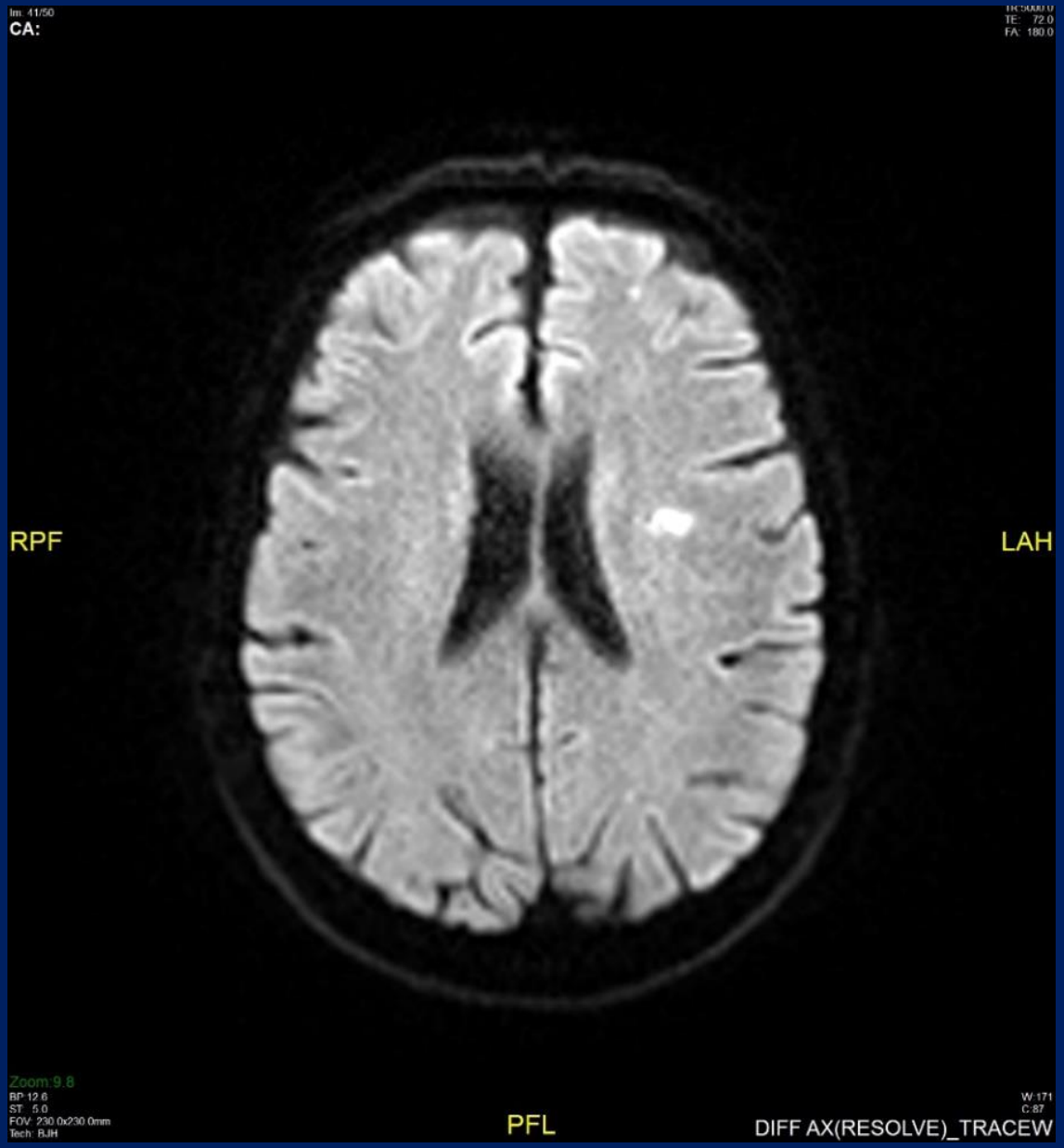
72 year old male, reported weakness. Non contrast CT of the head



72 year old male, MRI FLARE images, subacute infarct



72 year old male, MRI diffusion images, subacute infarct



Important Points

- CT examination is the procedure of choice in the acute setting of stroke, essentially to exclude other pathology (i.e. hemorrhage, edema, tumor, subacute stroke, hydrocephalus)

- MRI is a much more sensitive and specific modality in the evaluation of the acute, subacute or chronic stroke.

Summary

- False positive and false negative errors occur in all fields off medicine.
- It is important to remain suspicious of test results that don't seem to match the clinical findings.
- Consider repeat, additional or follow up testing when appropriate.

Thank you!

References

- The Radiology M and M Meeting: Misinterpretations, Misses and Mimics, The American Roentgen Ray Society, 2014.
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