Lung Cancer Screening

Dr. Al Porambo
President, Community Radiology Associates
Rockville, Maryland

What is Screening?

- A way to find a disease or condition before symptoms occur.
- Lung, Breast, and Colon Cancer are common
- Breast: Mammography
- Colon: Colonoscopy and other tests
- Lung: Low Dose Lung CT

Why Screen?

- The conditions are treatable.
- Early detection is preferred over late detection because treatment is more effective.

Whom to Screen?

- Those at highest risk...smokers.
- Medicare Parameters: Asymptomatic, Age 55-77, currently smoking or quit within the last 15 years. Smoking history of at least 30 pk-yr.
- National Comprehensive Cancer Network Guidelines: at least 50 yo and 20 pk-yr smoking history.

Risk factors for Lung cancer

- Tobacco Smoking (85 out of 100)
- Contact with second hand smoke
- Contact with Radon, Asbestos or other cancer causing agents (arsenic, beryllium, cadmium, chromium, nickel, soot, coal smoke, silica and diesel fumes)
- History of Lung Disease (Pulmonary Fibrosis and COPD)
- Family History of Lung Cancer
- History of other Cancers (Head and Neck, Lymphoma, and treatment with alkylating agents and radiation)

How to screen

- Lung Cancer Screening Program:
  - CT and LDCT (Low-dose Computed Tomography)
  - Run with a variety of clinicians including Primary Care, Pulmonologists, Oncologists, Radiologists, Interventional Radiologists, Thoracic Surgeons, and Pathologists.
  - Not a substitute for Smoking Cessation

What is your level of risk? (at present we only screen those at high risk)

- High: 55-74 yo
  - 30 or greater pack-yrs
  - Quit less than 15 years ago
- Moderate: 50 yo or greater
  - 20 or greater pack-yrs or second hand smoke exposure
- Low: less than 50 yo
  - Less than 20 pack yrs

Levels of Risk

- High

- >/= 55-74 yo
- >/= 30 pack-years
- Quit < 15 years ago

- High

- >/= 50 yo
- >/= 20 pack-years
- Other risk factor(s) (other than second hand smoke)

Levels of Risk

- Moderate

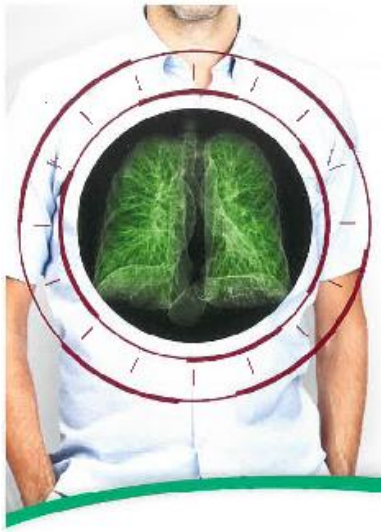
- >/= 50 yo
- >/=20 pack years or
- Contact with second hand smoke
- No other risk factors

- Low

- <50 yo and/or
- < 20 pack years

Best Screening Test

- Helical LDCT is the only screening test proven to reduce the number of deaths from lung cancer.
- In 100 patients screened with LDCT, 2 cancers detected, compared to only 1 with CXR.
- In 100 patients whose cancer was detected with LDCT, more than 98 lived.
- In 100 patients whose cancer was detected with CXR, fewer than 98 lived.



COMMUNITY RADIOLOGY ASSOCIATES

Low-Dose CT Lung Cancer Screening

Now Covered by MEDICARE!

Lung Cancer is the **leading cause of cancer death** in the United States.

Low-dose CT lung cancer screening (LDCT) is a quick, painless screening tool that uses low doses of radiation (no more than a mammogram) to make detailed images of your lungs. Those images can help detect lung cancer at its earliest stages.

Who is at Risk?

The U.S. Centers for Medicare and Medicaid Services (CMS) approved low-dose CT lung screening for asymptomatic patients meeting the following criteria:

- Are 55 to 77 years old
- Have a smoking history of at least 30 pack years (one pack per day for 30 years, 2 packs per day for 15 years, etc.)
- Are either current smokers or have quit within the last 15 years

For free help to quit smoking, visit **www.smokefree.gov** or call **1-800-QUIT NOW**.

Scheduling: 240-405-1942 • www.communityradiology.com

ADVANCED RADIOLOGY

Low-Dose CT Lung Cancer Screening

Patient Name: _____ Date: ____/____/____

Date of Birth: / / _

Packs/day (20 cigarettes/pack): _____ x Years smoked: _____ = Pack years*: _____

*Pack years is the # of cigarettes smoked per day, multiplied by the # of years smoked, divided by 20.

Currently Smoking: Yes No If not smoking, how many years since quitting? _____

Asymptomatic (no signs or symptoms of lung cancer): Yes No

Referring Physician: _____ NPI#: _____

Phone: _____-_____-_____ Fax: _____-_____-_____

By signing this order, you are certifying that:

- The patient has participated in a shared decision making session during which potential risks and benefits of CT lung screening were discussed.
- The patient was informed of the importance of adherence to annual screening, impact of comorbidities, and ability/willingness to undergo diagnosis and treatment.
- The patient was informed of the importance of smoking cessation and/or maintaining smoking abstinence, including the offer of Medicare-covered tobacco cessation counseling services, if applicable.
- The patient is asymptomatic (no symptoms such as fever, chest pain, new shortness of breath, new or changing cough, coughing up blood, or unexplained significant weight loss).

Signature authorizes the order of a CT Lung Cancer Screening Exam to include CAD evaluation.

Physician Signature: _____

Scheduling: 443-579-1800
www.advancedradiology.com

3/16

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Scheduling: 443-579-1800
www.advancedradiology.com

What are the benefits and risks of lung cancer screening?

Benefits

- Because CT scans are able to detect even very small nodules in the lung, Low-Dose CT (LDCT) of the chest is especially effective for diagnosing lung cancer at its earliest, most treatable stage.
- CT is fast, which is important for patients who have trouble holding their breath.
- CT scanning is painless and non-invasive.
- X-rays used in LDCT of the chest scans have no immediate side effects.
- Low-dose CT scans of the chest produce images of sufficient image quality to detect many lung diseases and abnormalities using up to 90 percent less ionizing radiation than a conventional chest CT scan.
- Lung cancer screening with LDCT has been shown to reduce the number of deaths from lung cancer in patients at high risk.
- Lung cancer found by screening with LDCT is often at an earlier stage of disease.
- When cancer is found with screening, patients can more often undergo minimally invasive surgery and have less lung tissue removed.

Risks

- False positive results occur when a test appears to be abnormal but no lung cancer is found. Abnormal findings may require more testing, such as additional CT scans or PET/CT, to determine whether or not cancer is present. A more invasive test in which a sample of lung tissue is removed (biopsy) may also be warranted in certain circumstances.
- Test results that appear to be normal even when lung cancer is present are called false-negative results. A person who receives a false-negative test result may delay seeking medical care.
- Not all of the cancers detected by LDCT will be found in the early stage of the disease. Screening that detects lung cancer may not improve your health or help you live longer if the disease has already spread beyond the lungs to other places in the body.
- LDCT lung screening and all other screening exams can lead to the detection and treatment of cancer which may never have harmed you. This can result in unnecessary treatment, complications, and cost.
- Health insurance companies may not cover the cost of a LDCT scan to screen for lung cancer.

Source: www.radiologyinfo.org

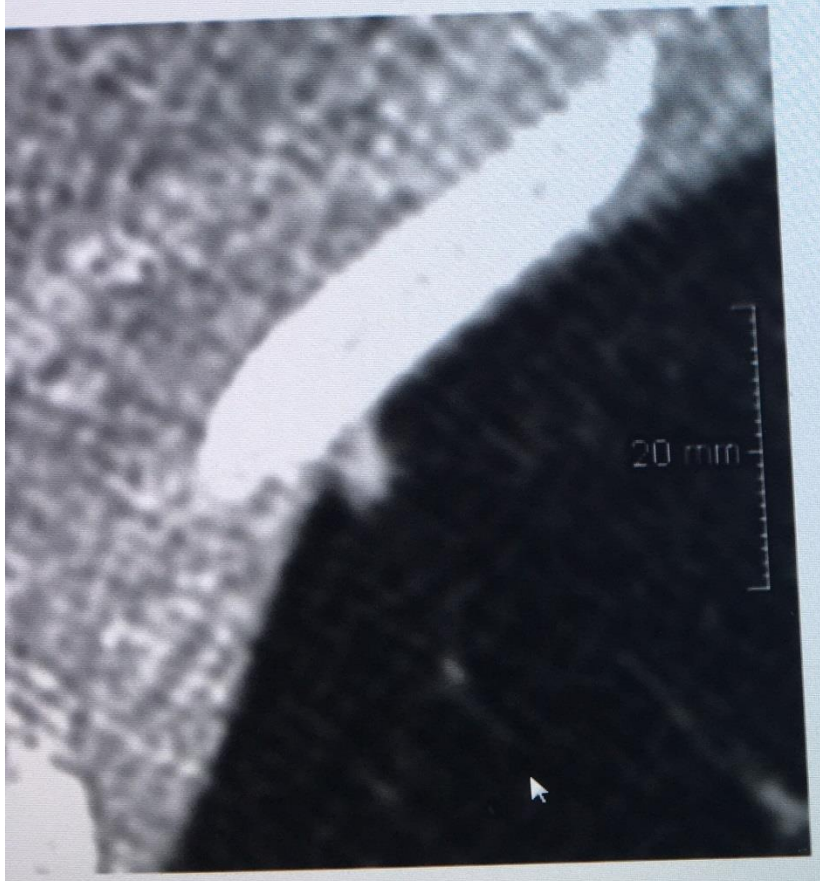
The U.S. Centers for Medicare and Medicaid Services (CMS) approved CT lung cancer screening for patients meeting the following criteria:

- 55 to 77 years of age *and*
- no signs or symptoms of lung cancer, *and*
- have a tobacco smoking history of at least 30 pack-years *(pack-years is the # of cigarettes smoked per day multiplied by the # of years smoked, divided by 20), and*
- currently smoke or have quit smoking within the past 15 years

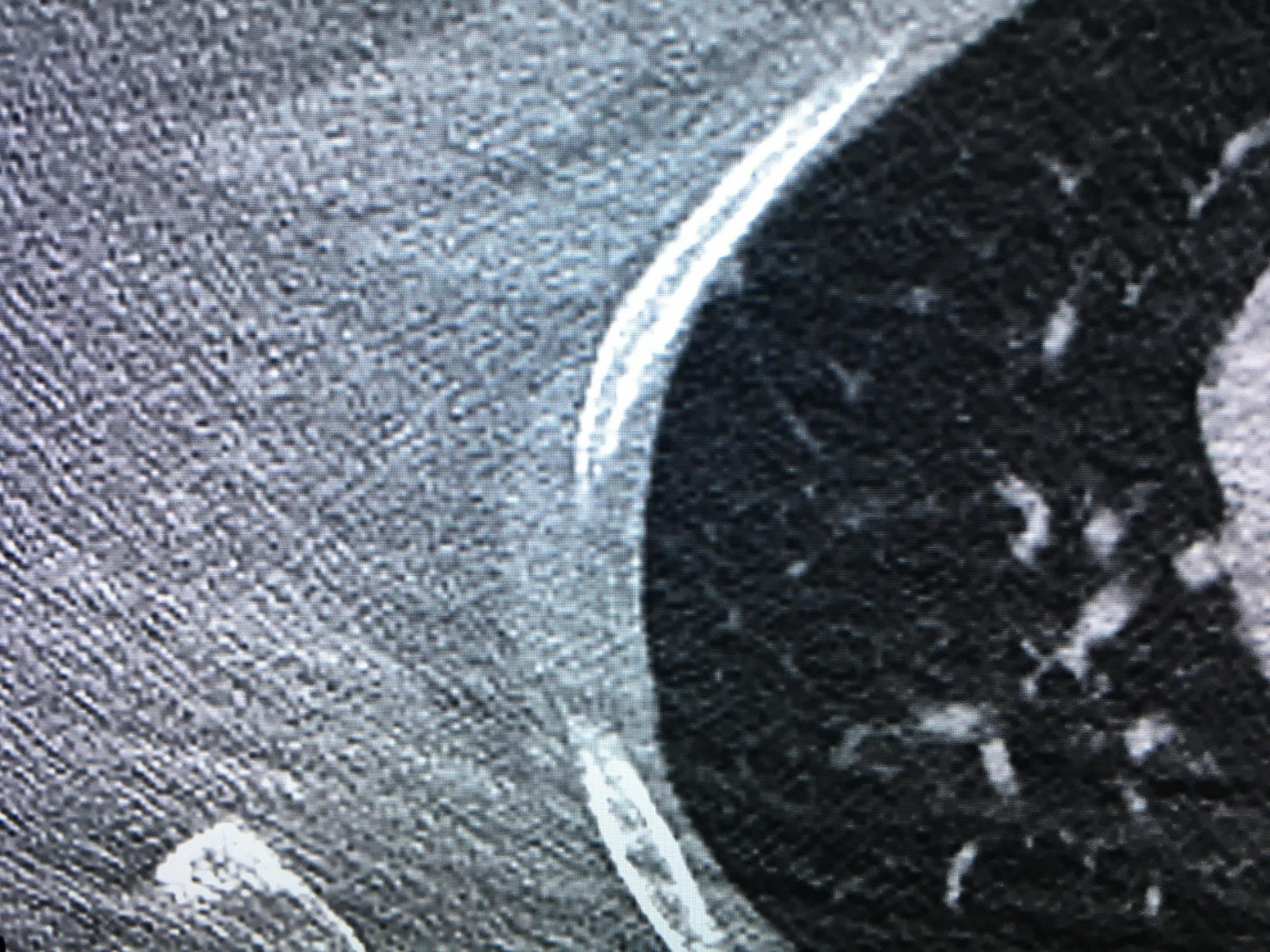
What are we looking for?

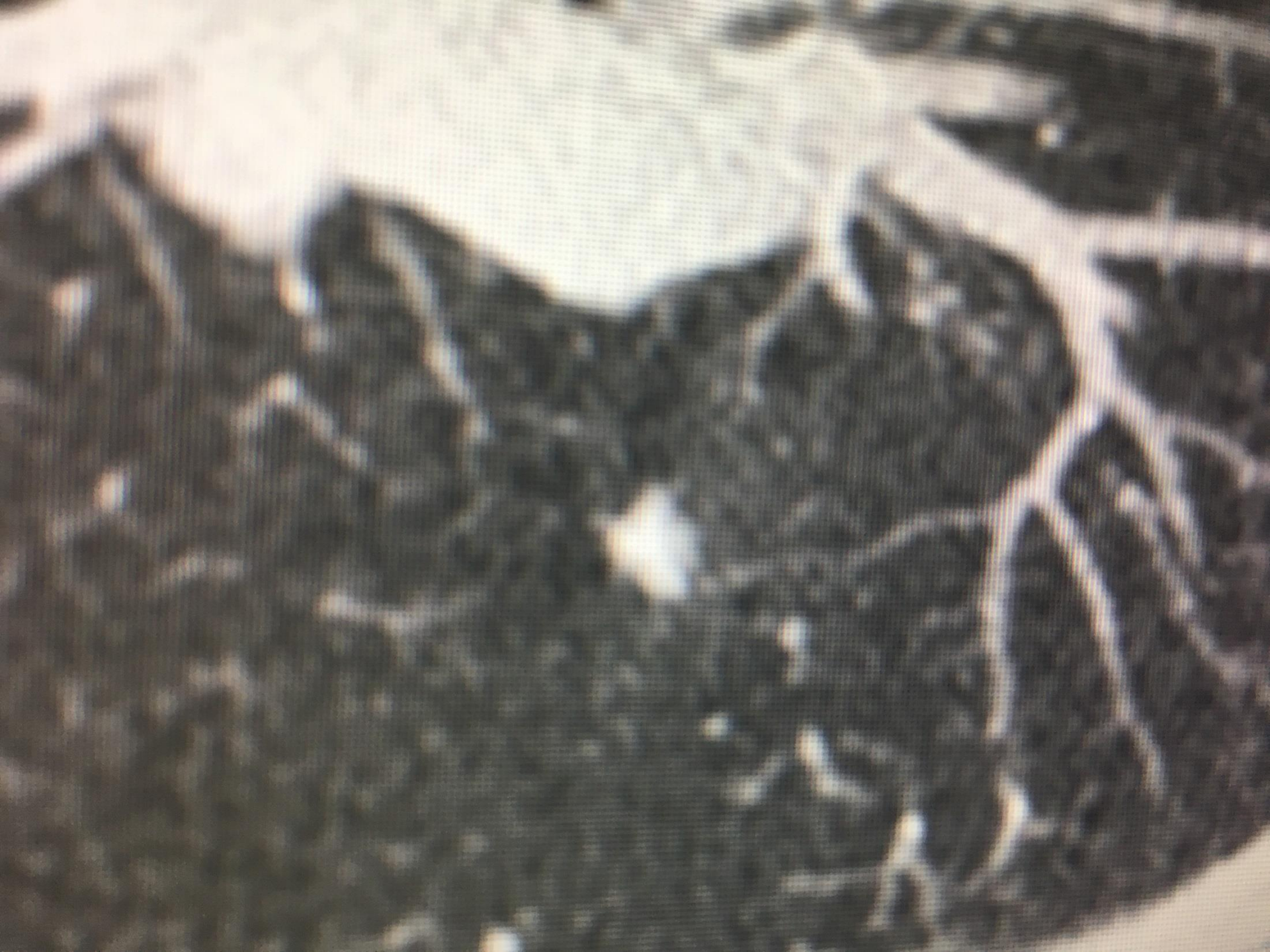
- Nodules! We measure size and describe location, shape and density.
- Solid, Non-Solid and Part-Solid
- Smooth, Spiculated, Round, Ovoid, Triangular

Let’s look at some nodules



Finding	May 06, 2019
Segment/Lobe	Right Upper Lobe
Location	Slice 76 (HTF)
Status	Baseline
Type	Solid
Spiculated	No
Long Axis	6.0 mm
Short Axis	4.2 mm
Average Diameter	5 mm
Equivalent Diameter	5.1 mm
Volume	69.4 mm^3
Mass	53.4 mg
Volume Change	-
Volume Doubling Time	-
Mass Doubling Time	-
Lung-RADS Category	2

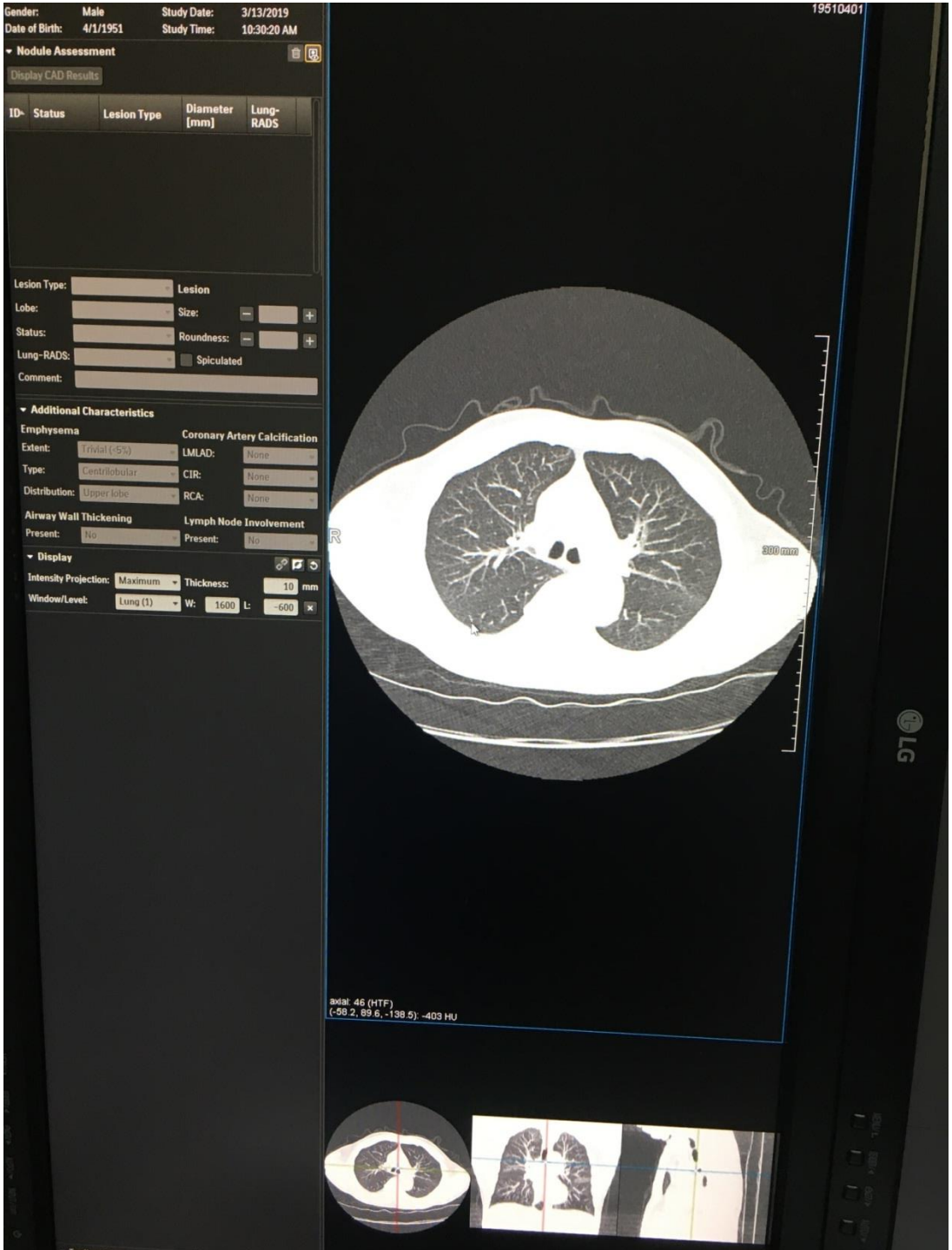


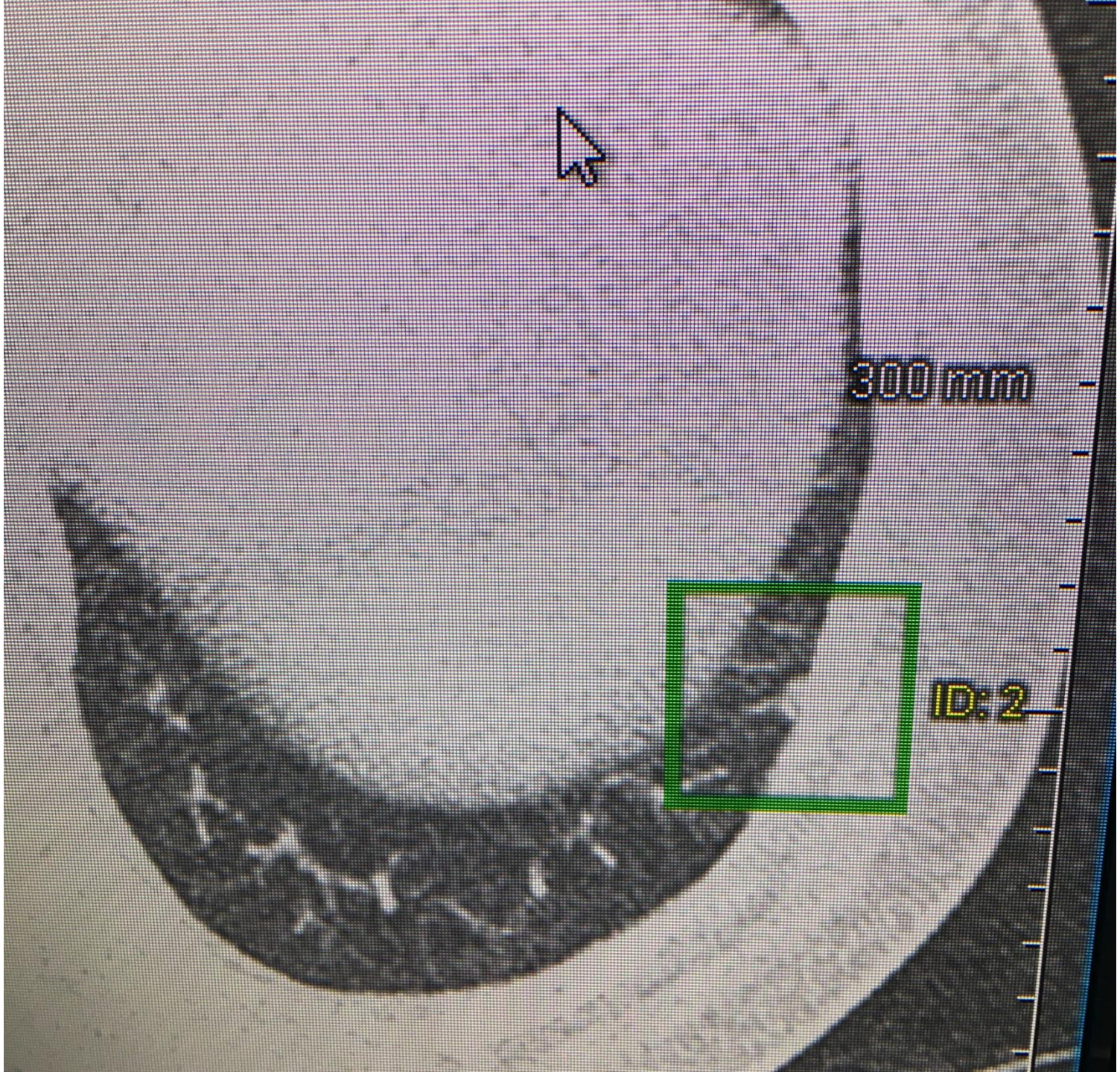


Bonus!

- We also get Computer Aided Detection (CAD)
- Highlights and Measures
- Compares
- Asks the Radiologist Questions like shape, is there fat or calcium on the inside?

- Examples to follow.....

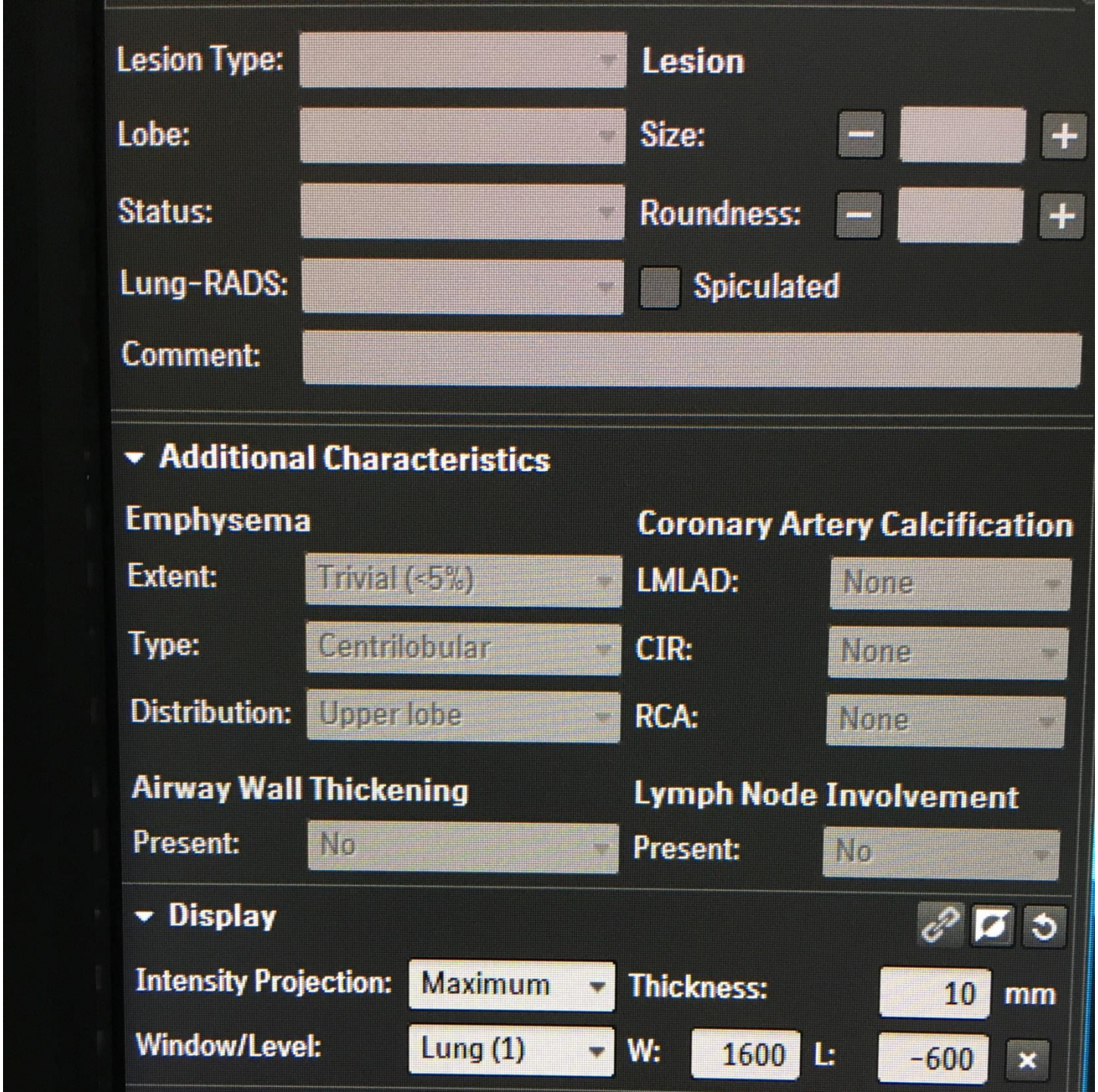

Gender: Male
Study Date: 3/13/2019
Date of Birth: 4/1/1951
Study Time: 10:30:20 AM
Nodule Assessment
Display CAD Results
ID Status Lesion Type Diameter [mm] Lung-RADS
Lesion Type:
Lesion
Lobe:
Size:
Status:
Roundness:
Lung-RADS:
Spiculated
Comment:
Additional Characteristics
Emphysema
Extent: Trivial (<5%)
Type: Centrilobular
Distribution: Upper lobe
Coronary Artery Calcification
LMLAD: None
CIR: None
RCA: None
Airway Wall Thickening
Present: No
Lymph Node Involvement
Present: No
Display
Intensity Projection: Maximum
Thickness: 10 mm
Window/Level: Lung (1)
W: 1600 L: -600
19510401
R
300 mm
axial: 46 (HTF)
(-58.2, 89.6, -138.5): -403 HU
LG

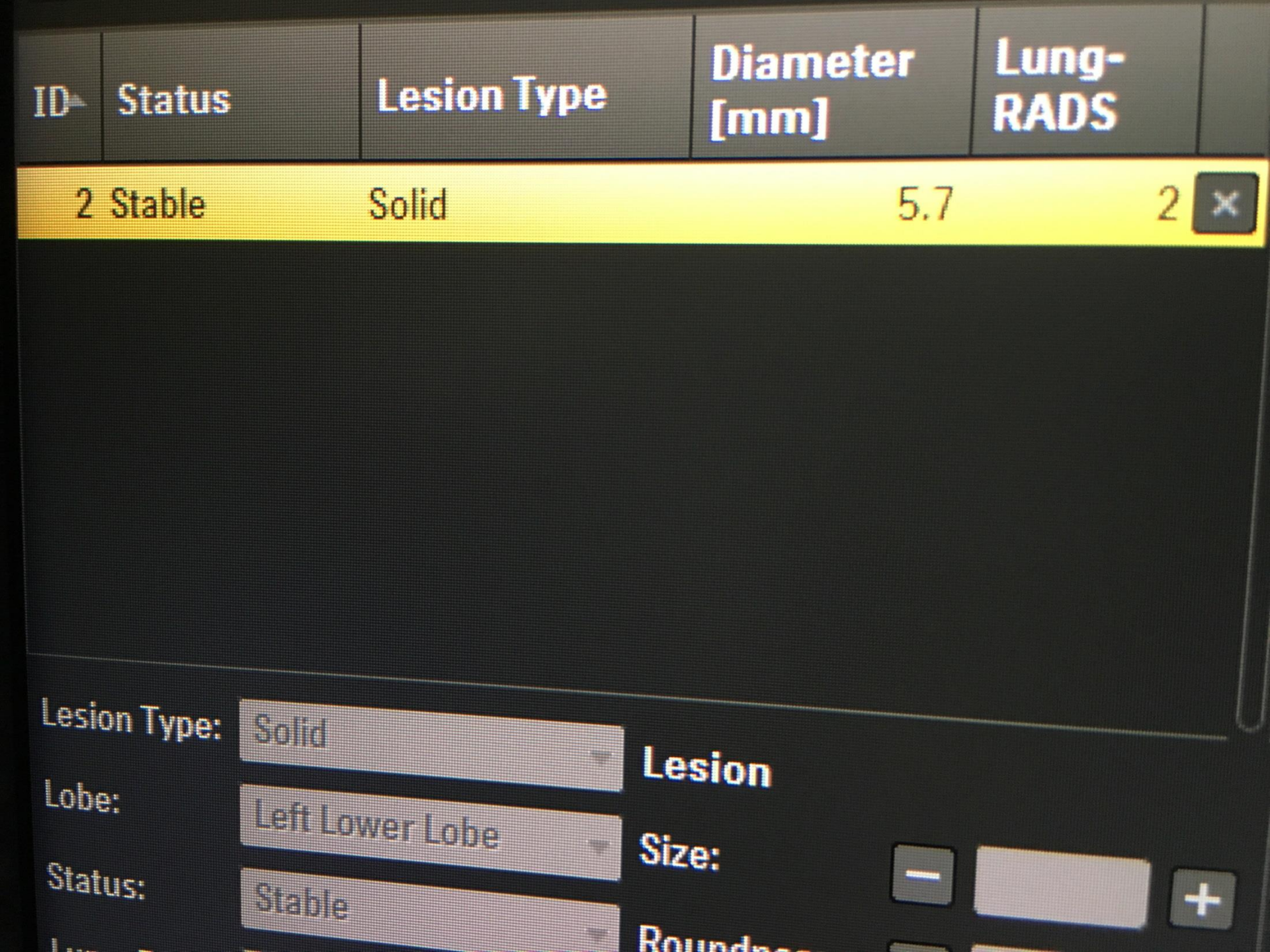

300 mm
ID: 2

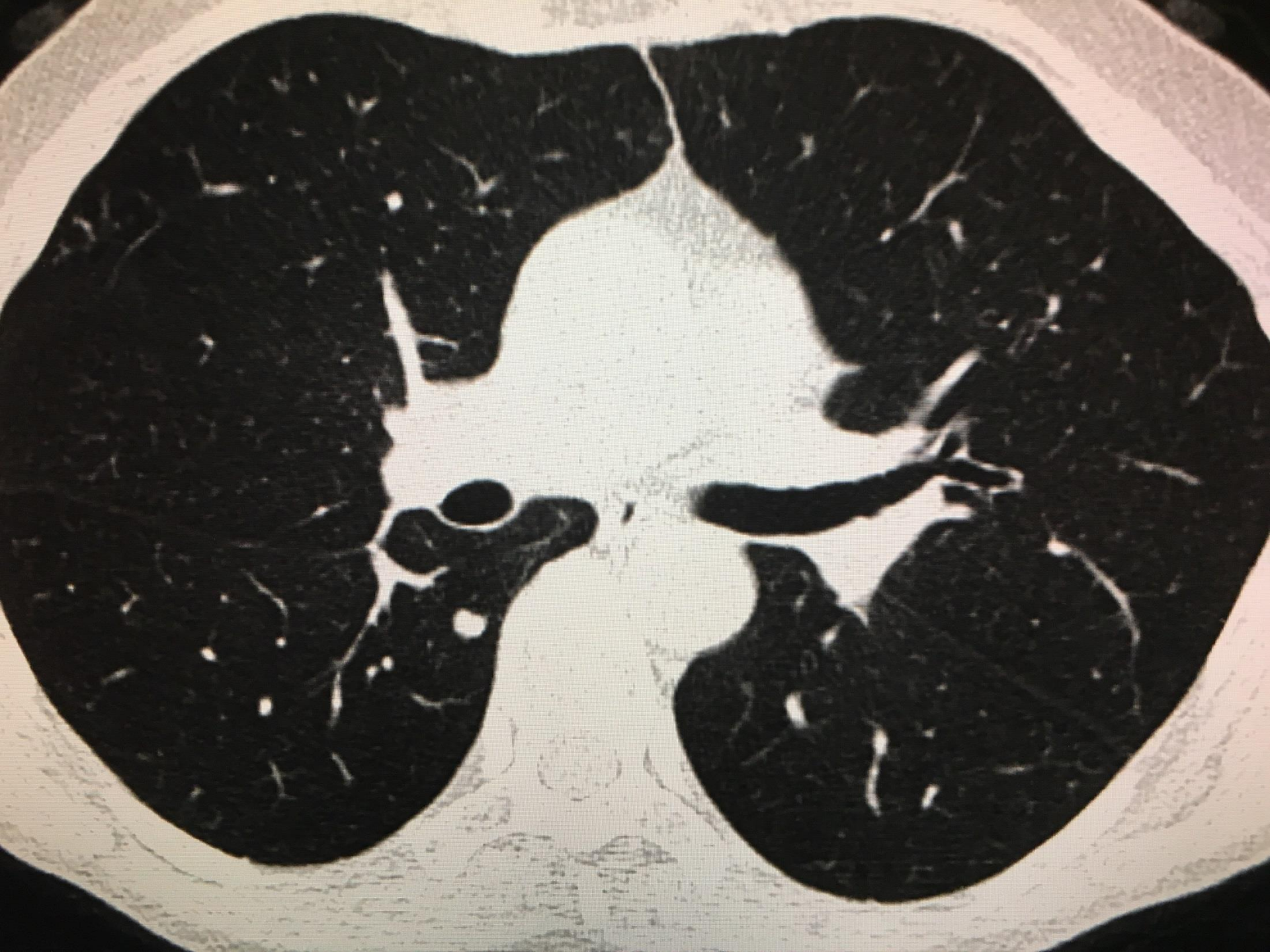
Finding	Feb 17, 2018	Apr 13, 2019
Segment/Lobe		Left Lower Lobe
Location	Slice 30 (FTH)	Slice 28 (FTH)
Status	Baseline	Stable
Type	Solid	Solid
Spiculated	No	No
Long Axis	8.4 mm	7.5 mm
Short Axis	2.8 mm	4.0 mm
Average Diameter	6 mm	6 mm
Equivalent Diameter	5.3 mm	5.7 mm
Volume	79.0 mm^3	95.2 mm^3
Mass	62.4 mg	86.0 mg
Volume Change	-	+21%
Volume Doubling Time	-	1559 d
Mass Doubling Time	-	905 d
Lung-RADS Category	2	2

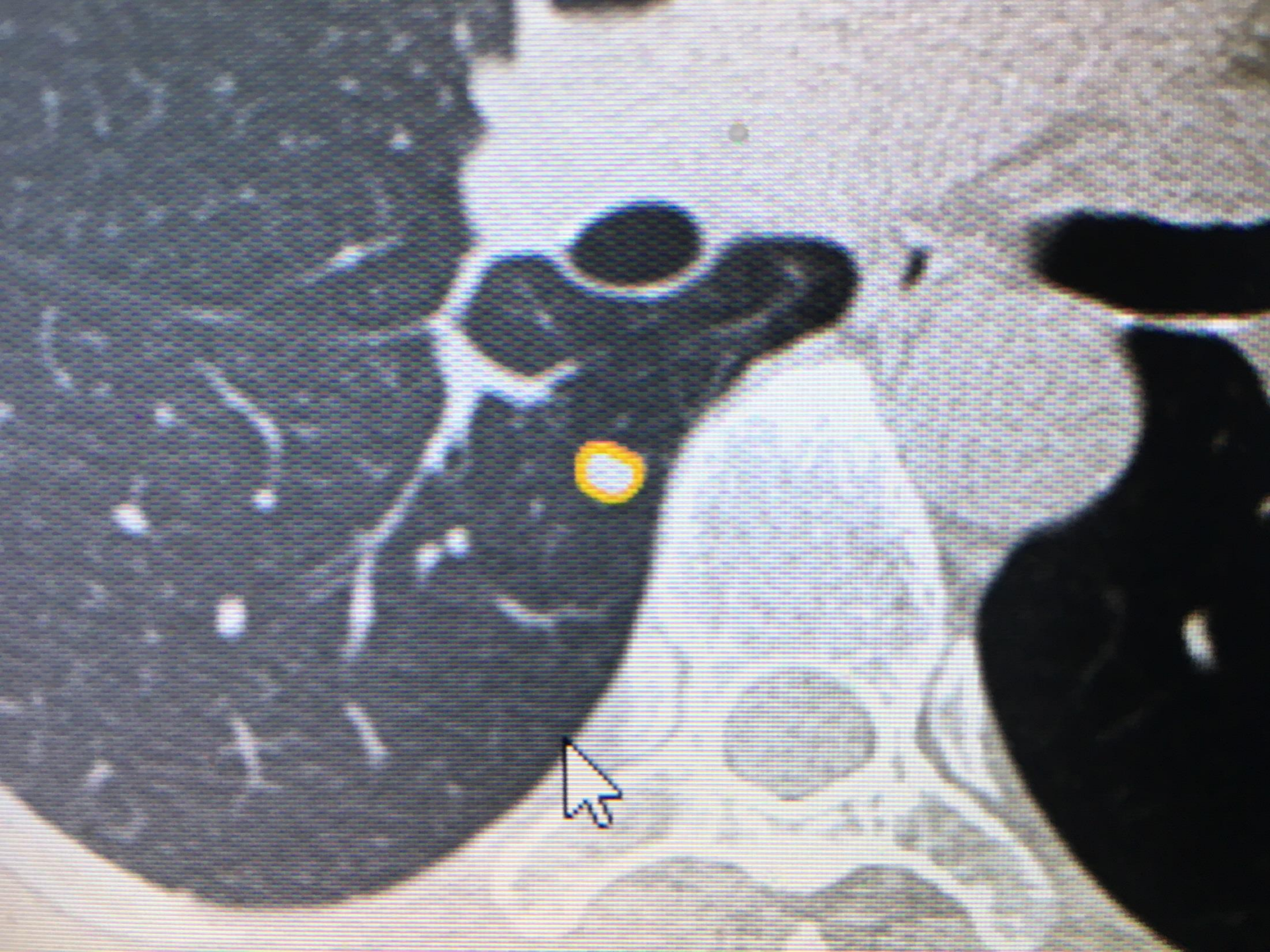
Segment/Lobe

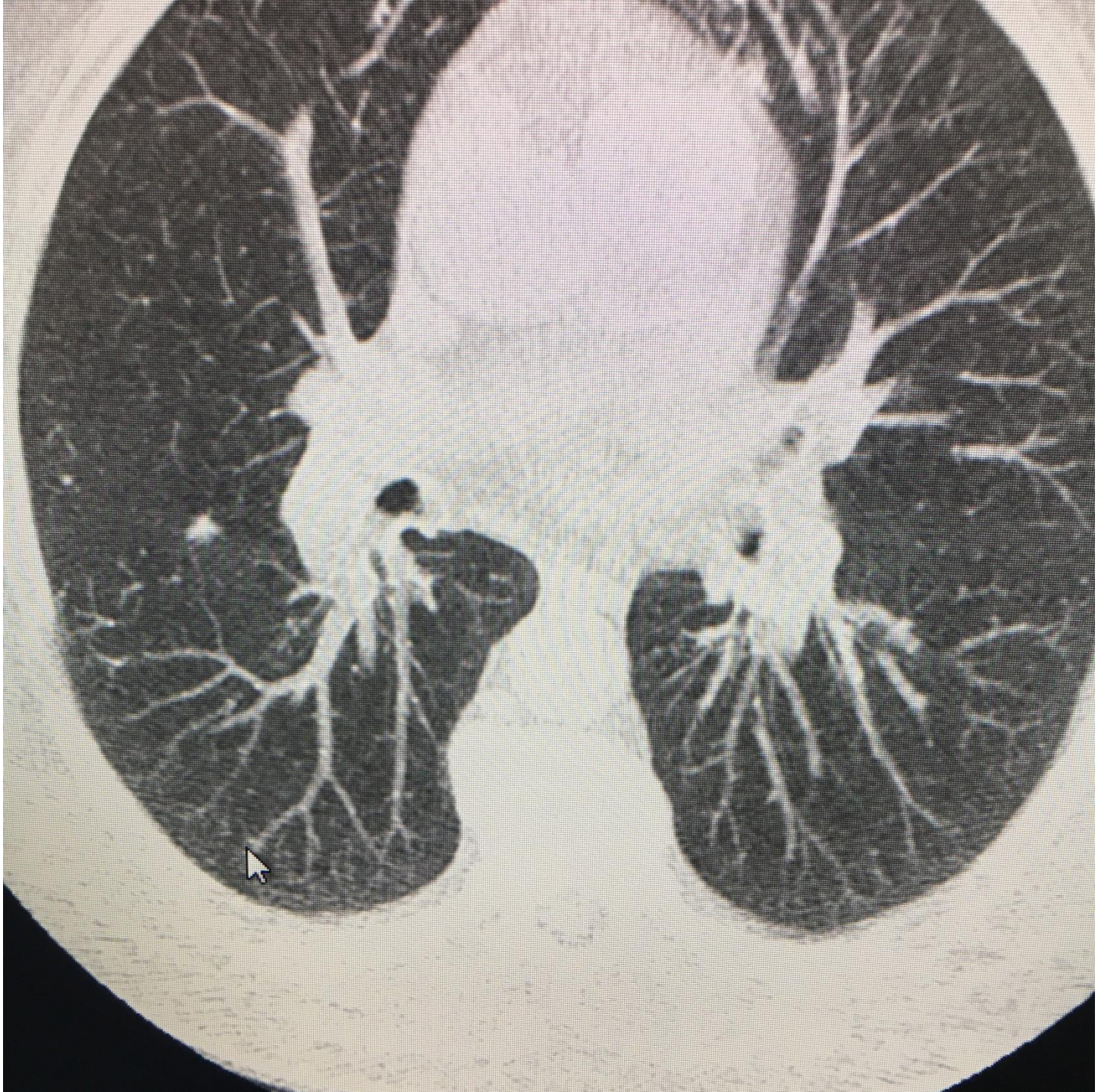
obe		Left Lower Lobe
tion	Slice 30 (FTH)	Slice 28 (FTH)
atus	Baseline	Stable
Type	Solid	Solid
lated	No	No
g Axis	8.4 mm	7.5 mm
t Axis	2.8 mm	4.0 mm
meter	6 mm	6 mm
meter	5.3 mm	5.7 mm
olume	79.0 mm³	95.2 mm³
Mass	62.4 mg	86.0 mg
Change	-	+21%
ng Time	-	1559 d
ng Time	-	


Lesion Type:
Lesion
Lobe:
Size:
Status:
Roundness:
Lung-RADS:
Spiculated
Comment:
Additional Characteristics
Emphysema
Extent:
Trivial (<5%)
Type:
Centrilobular
Distribution:
Upper lobe
Coronary Artery Calcification
LMLAD:
None
CIR:
None
RCA:
None
Airway Wall Thickening
Present:
No
Lymph Node Involvement
Present:
No
Display
Intensity Projection:
Maximum
Thickness:
10
mm
Window/Level:
Lung (1)
W:
1600
L:
-600


ID
Status
Lesion Type
Diameter [mm]
Lung-RADS
2 Stable Solid 5.7 2
Lesion Type: Solid
Lobe: Left Lower Lobe
Status: Stable
Lesion
Size:

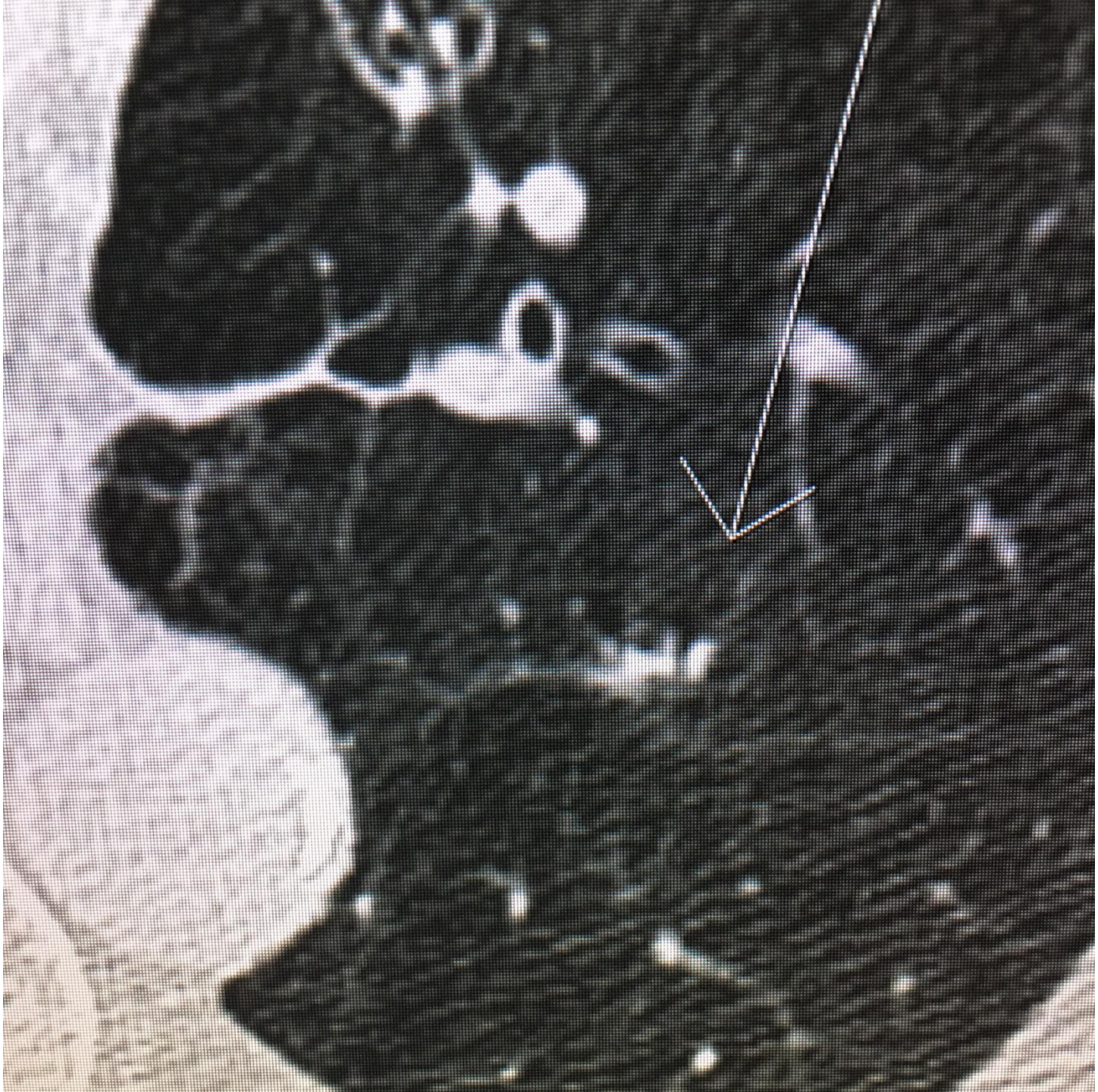


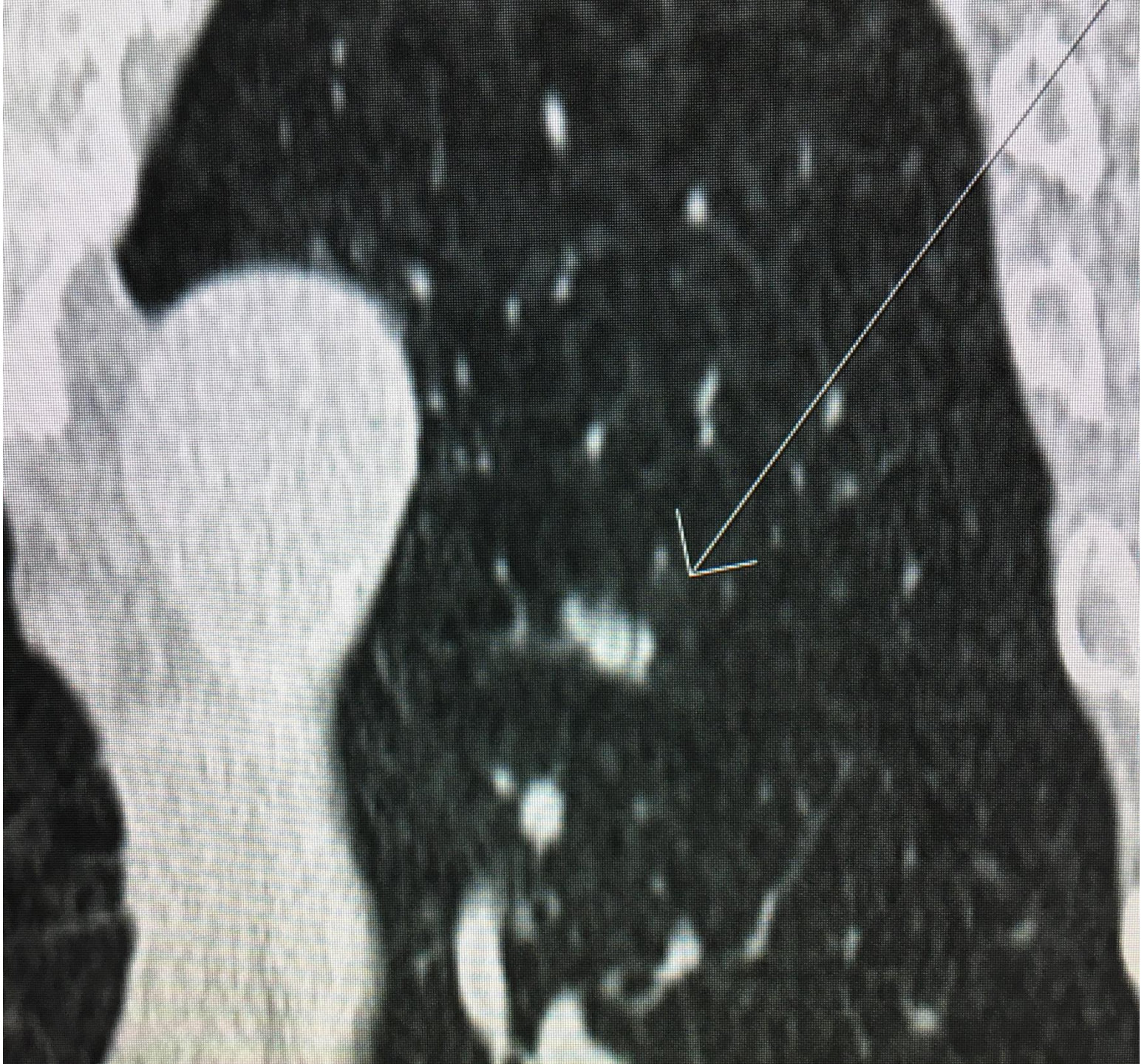


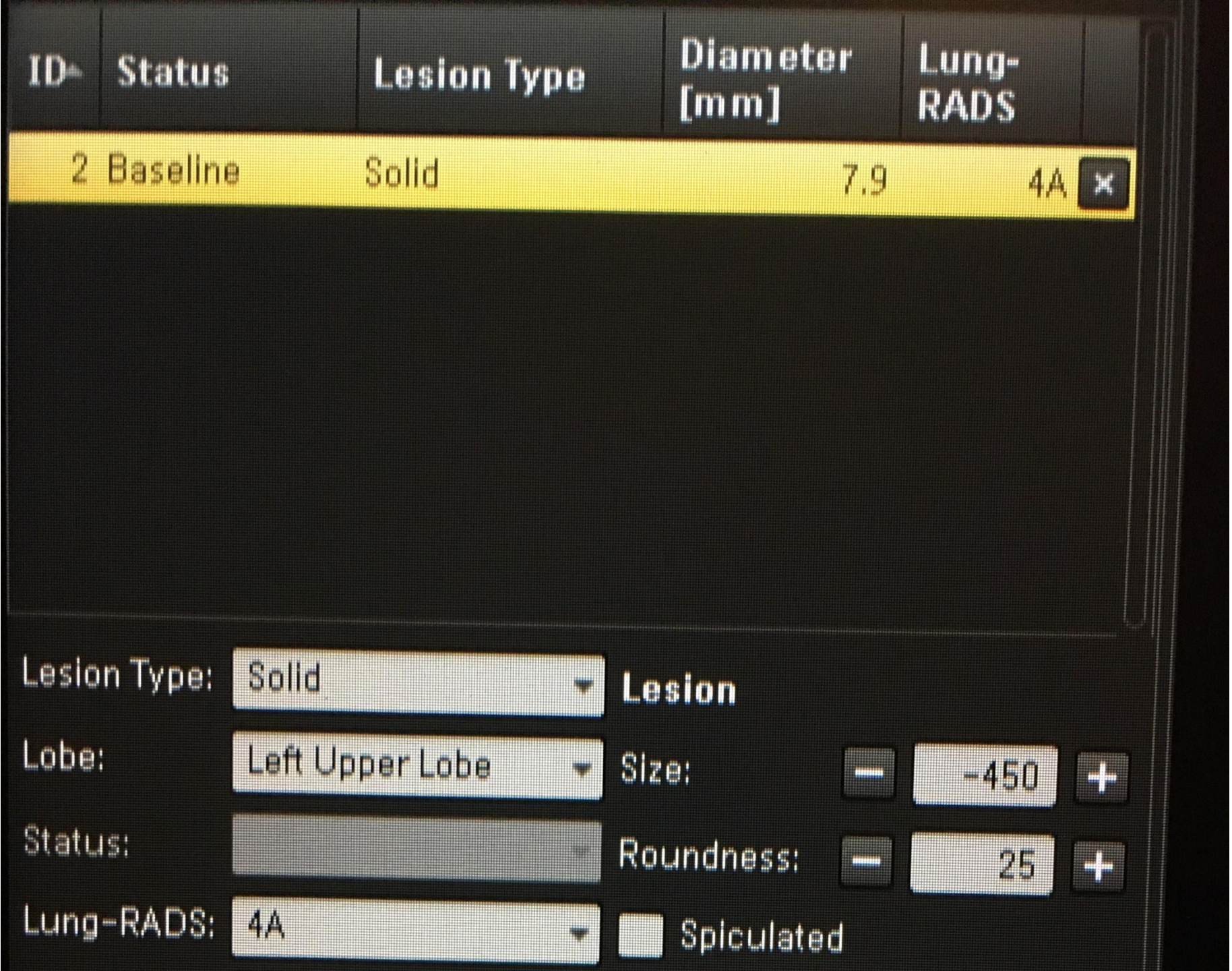


We can reformat the data

- Coronal
- Sagittal

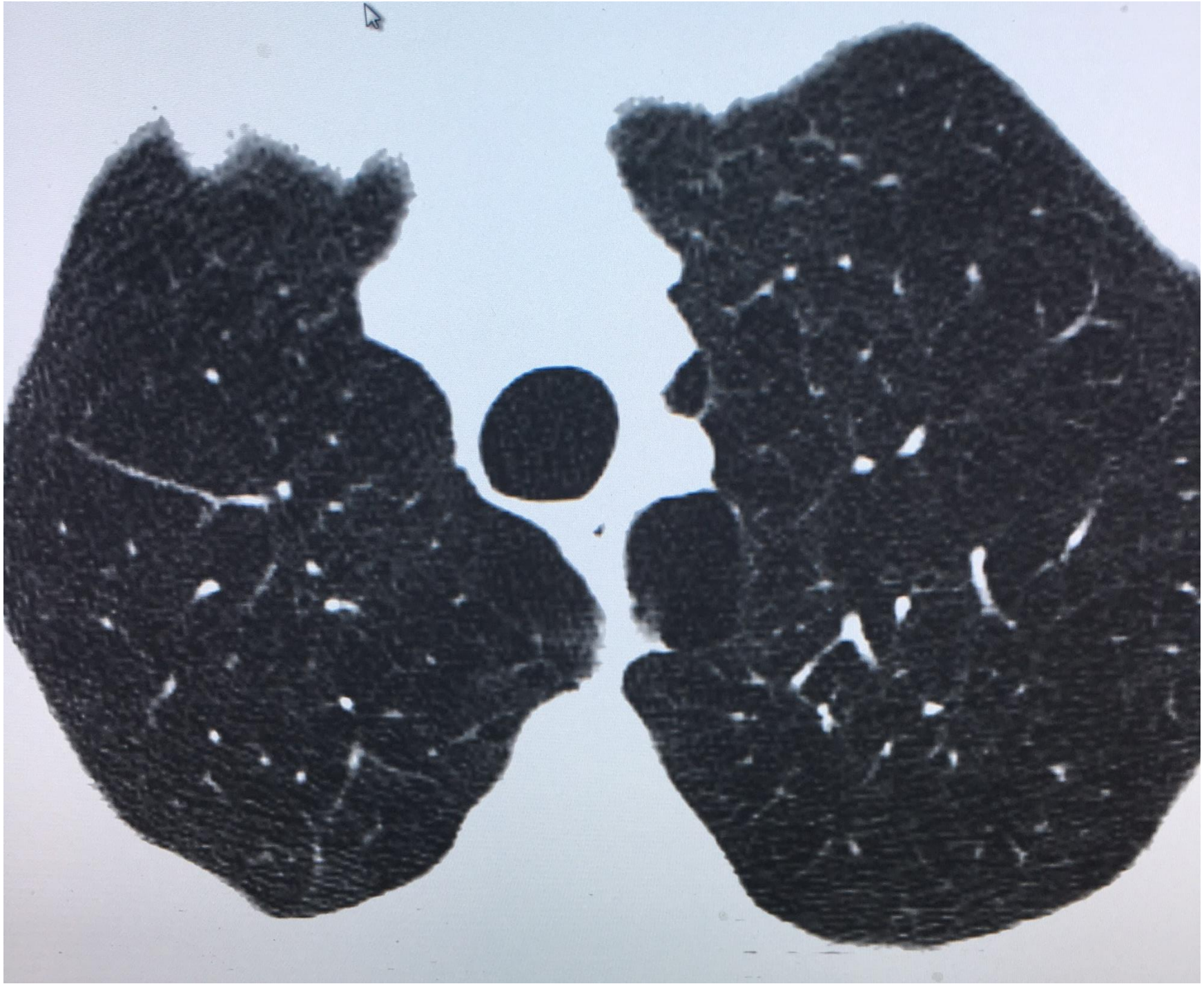


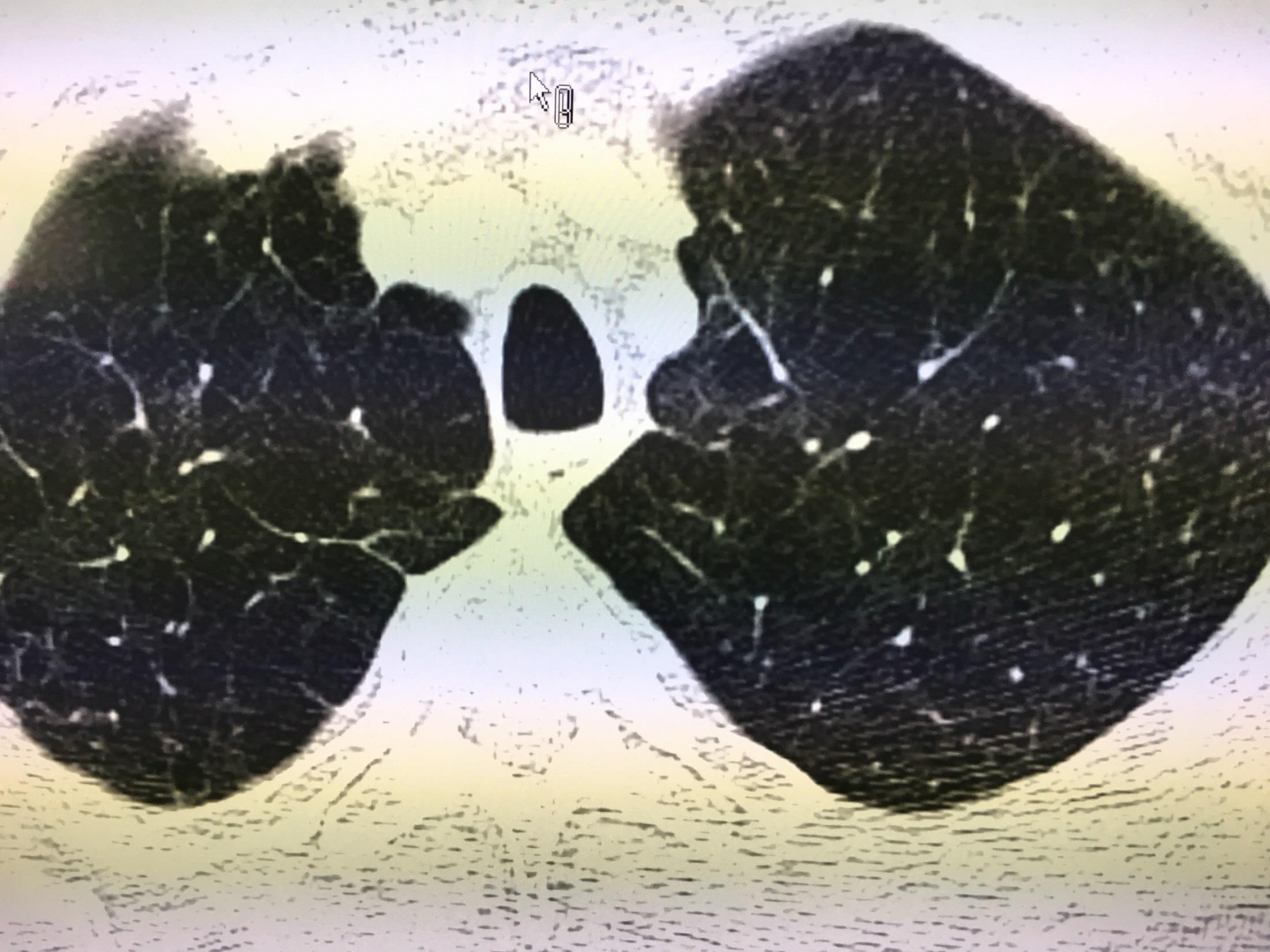


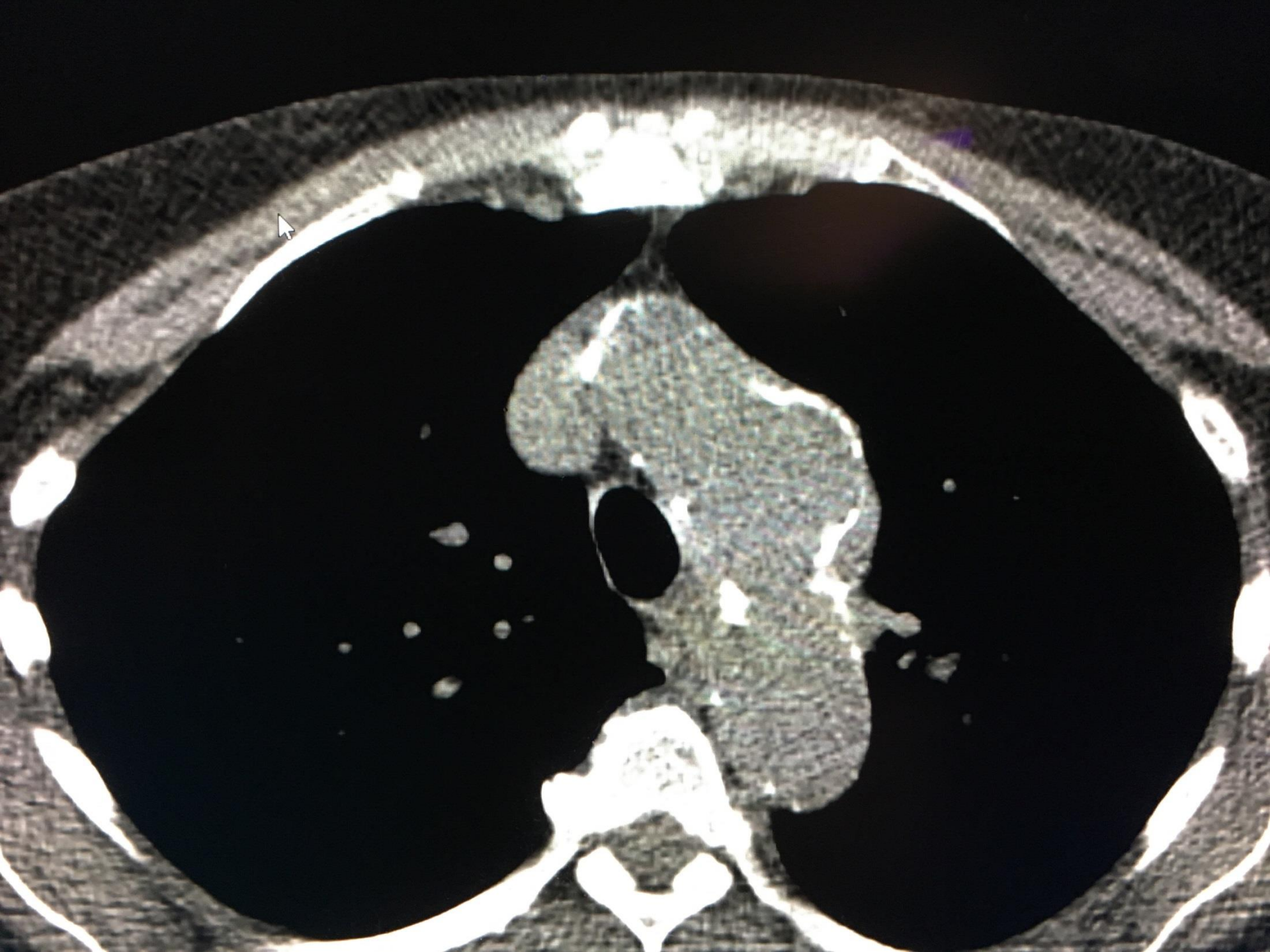

ID
Status
Lesion Type
Diameter [mm]
Lung-RADS
2 Baseline
Solid
7.9
4A
Lesion Type:
Solid
Lesion
Lobe:
Left Upper Lobe
Size:
-450
Status:
Roundness:
25
Lung-RADS:
4A
Spiculated

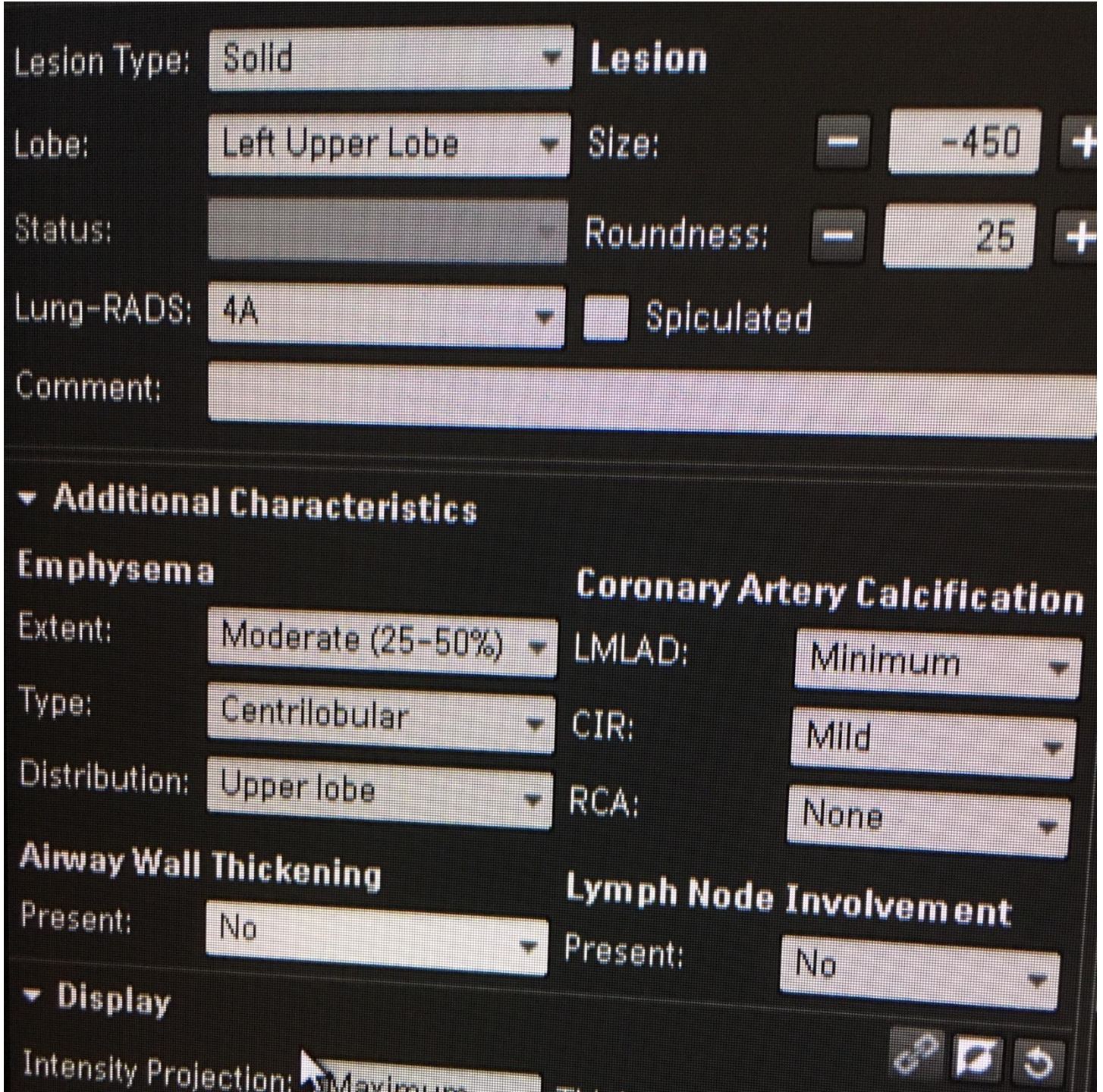
We look for other things

- Emphysema
- Airway wall thickening
- Lymphadenopathy
- Vascular abnormalities like coronary artery calcification and aneurysms








Lesion Type: Solid
Lesion
Lobe: Left Upper Lobe
Size: -450
Status:
Roundness: 25
Lung-RADS: 4A
Spiculated
Comment:
Additional Characteristics
Emphysema
Extent: Moderate (25-50%)
Type: Centrilobular
Distribution: Upper lobe
Coronary Artery Calcification
LMLAD: Minimum
CIR: Mild
RCA: None
Airway Wall Thickening
Present: No
Lymph Node Involvement
Present: No
Display
Intensity Projection:

What happens after the scan?

- Lung-RADS
- Lung Imaging Reporting and Data System
- 1, 2, 3, 4A, 4B
- 1- negative
- 2-Benign Findings
- 3- Probably Benign Findings
- 4A-Suspicious
- 4B-Suspicious

Follow Up

- Changes in Size, Morphology and Density
- Stability reassures benignity
- PET/CT, Standard Chest CT with Contrast
- Biopsy

Solid Nodules

- <6mm- LDCT in 1 year
- 6- < 8mm- LDCT in 6 months
- 8- <15mm- LDCT in 3 months or PET/CT
- > 15mm- CT Chest and/or PET CT
  - Low concern-LDCT in 3 months
  - High concern-Biopsy or surgery

Part-Solid Nodules

- < 6mm- LDCT in 1 yr
- >= 6mm w/ sp < 6mm- LDCT in 6 mo
- >= 6mm w/ sp 6-8mm- LDCT in 3 mo or PET/CT
- >= 15mm w/sp >= 8mm-Chest CT or PET/CT
  - Low concern: LDCT in 3mo
  - High concern: Biopsy or surgery

Non-solid Nodules

- New and <20mm- LDCT in 1 yr
- New and >= 20mm Bx/Sx/LDCT in 1 year

- Stable <20- LDCT in 1 yr
- Stable >= 20mm LDCT in 6 months

- Growing <20mm LDCT in 6 months
- Growing >=20mm 6 mo LDCT/Bx/Sx

Summary

- LDCT is an effective screening tool when used for the right reasons and the right population.
- Computer Aided detection assists radiologists in detection, characterization, and standardizing followup guidelines.
- LDCT is easily arranged and performed.

Questions?

Thanks very much for having me!