

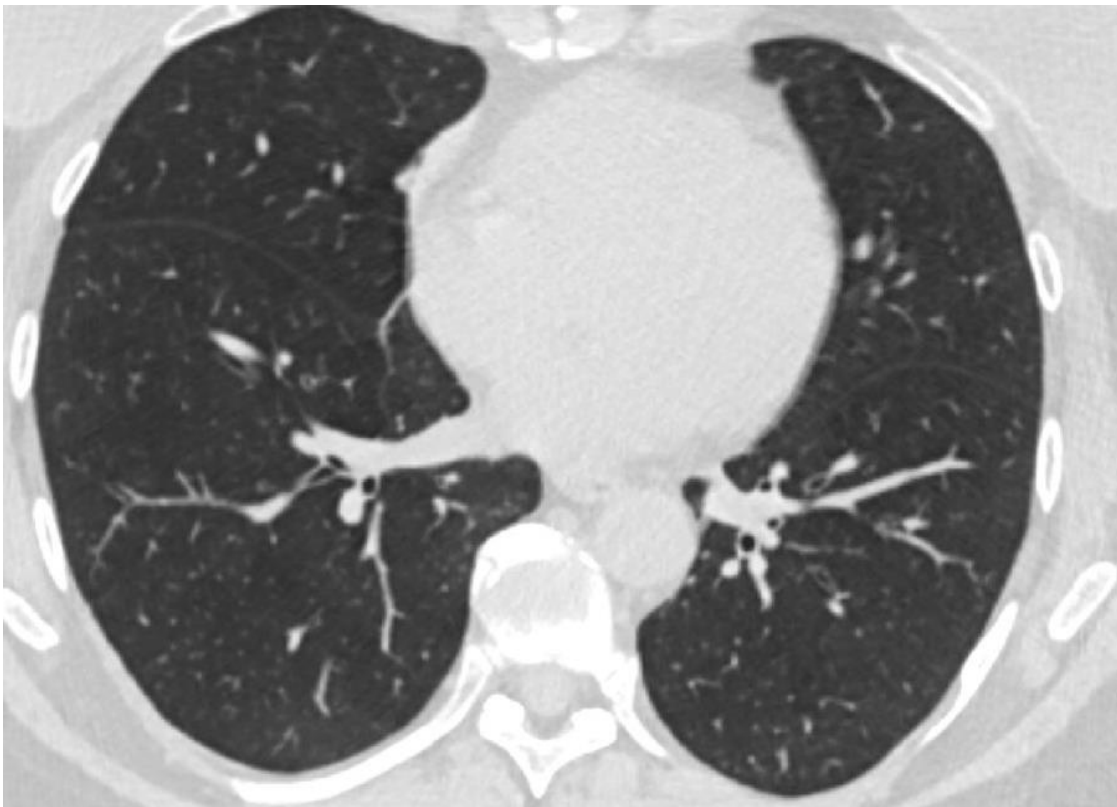
COVID-19 CORADS CLASSIFICATION
COVID WORKING GROUP OF THE DUTCH RADIOLOGICAL
SOCIETY

- CORADS-1 has a high negative predictive value in patients with complaints for four or more days.
- CORADS 5 has a very high positive predictive value given the high a priori-chance in this epidemic. The interobserver variation of CORADS 2-4 is still high and has a poor negative and predictive value.
- The interpretation of the CT findings has to be combined with the clinical symptoms and the duration of the symptoms as a CT can be negative in the first few days of a mild infection.

CO-RADS*		
Level of suspicion COVID-19 infection		
		CT findings
CO-RADS 1	No	normal or non-infectious abnormalities
CO-RADS 2	Low	abnormalities consistent with infections other than COVID-19
CO-RADS 3	Indeterminate	unclear whether COVID-19 is present
CO-RADS 4	High	abnormalities suspicious for COVID-19
CO-RADS 5	Very high	typical COVID-19
CO-RADS 6	PCR +	

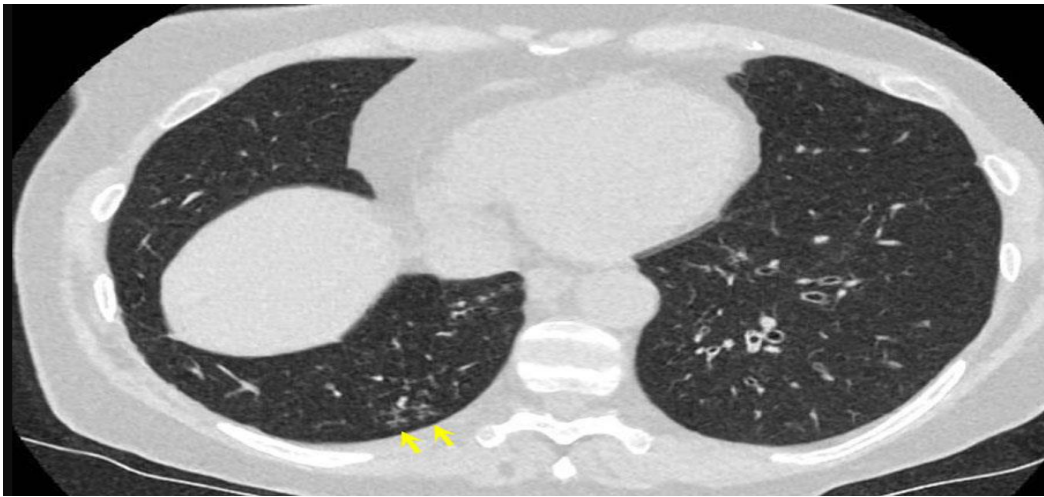
➤ **CORADS 1**

- COVID-19 is highly unlikely.
- The CT is normal or there are findings that indicate a non-infectious disease like congestive heart failure, sarcoid, histoplasmosis, malignancy, UIP or fibrotic NSIP (if unchanged to prior examination).
- An exception has to be made for the first few days of a mild infection when the CT can be normal.
- The CT-image is of a patient with complaints for five days. There are no abnormalities and the PCR was negative.

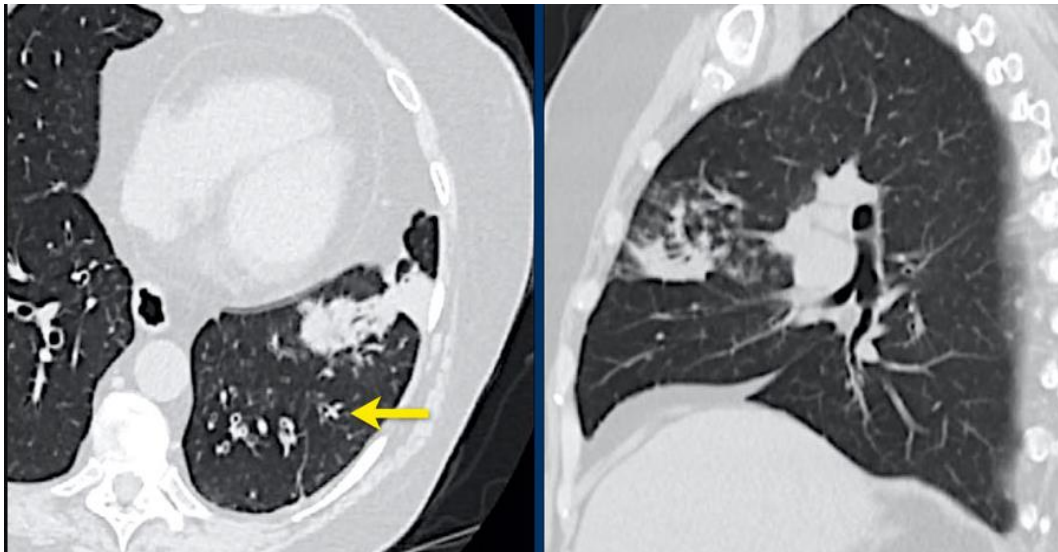


➤ **CORADS 2**

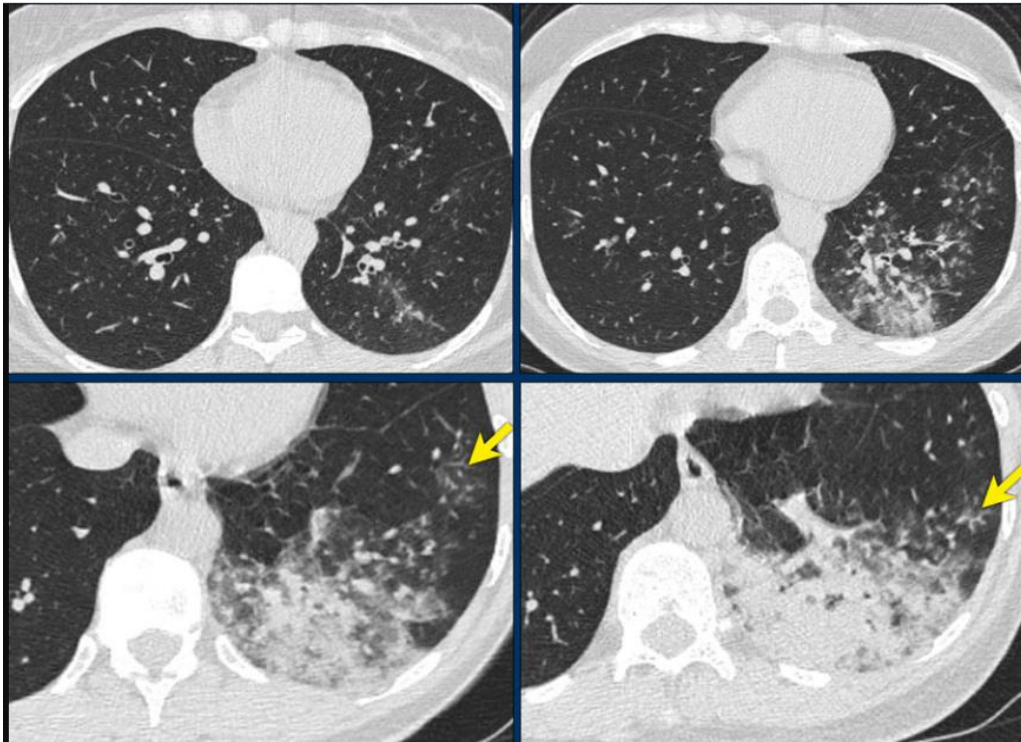
- Level of suspicion of COVID-19 infection is low. Findings consistent with other infections like typical bronchiolitis with tree-in-bud and thickened bronchus walls, tbc. No typical signs of COVID-19.
- The CT-image shows bronchiectasis, bronchial wall thickening and tree-in-bud (arrows).
- There are no ground glass opacities.



The images show bronchial wall thickening, tree-in-bud (arrow) and consolidation. There are no ground glass opacities.



40 year old woman with fever and coughing.
CT findings: lobar consolidation and tree-in-bud (arrows) consistent with a bacterial infection, i.e. CORADS 2.
COVID-19 unlikely.



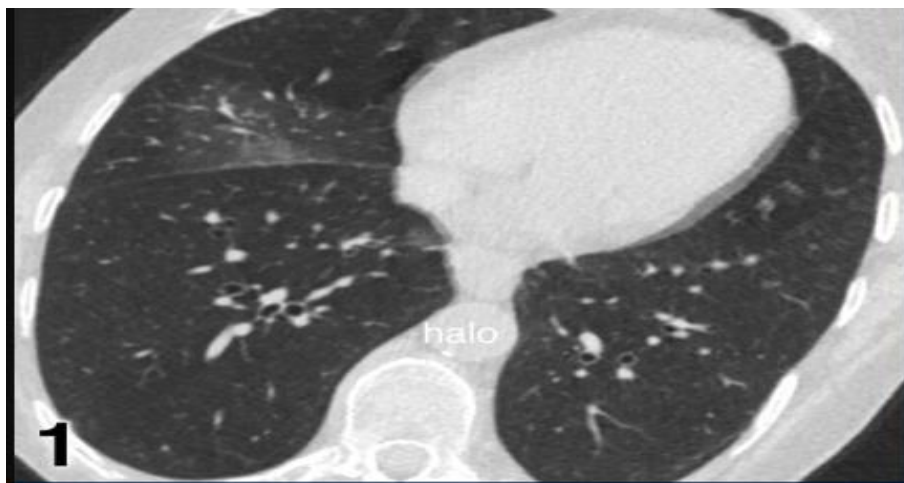
CO-RADS 2. Bacterial pneumonia with endobronchial spread (tree-in-bud)

➤ **CORADS 3**

- COVID-19 unsure or indeterminate.
- CT abnormalities indicating infection, but unsure whether COVID-19 is involved, like widespread bronchopneumonia, lobar pneumonia, septic emboli with ground glass opacities.

Case 1.

One day complaints. CT: Unifocal GGO. PCR negative.



Case 2.

CT: Unifocal GGO (circle).



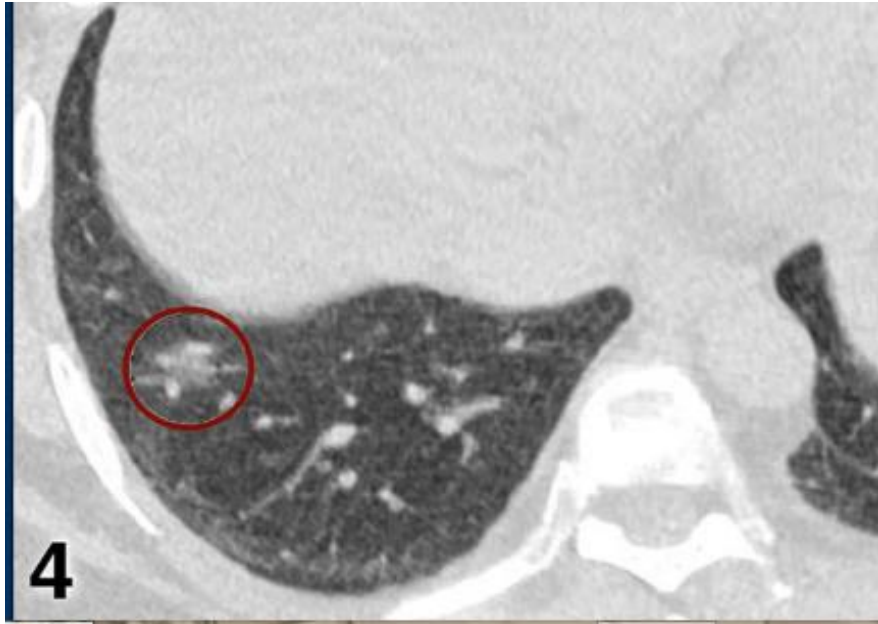
Case 3.

CT: Unifocal GGO (arrow).



Case 4.

CT: Unifocal GGO (circle).



Case 5

7 day of complaints.

CT: multifocal consolidations with surrounding GGO.

PCR negative.

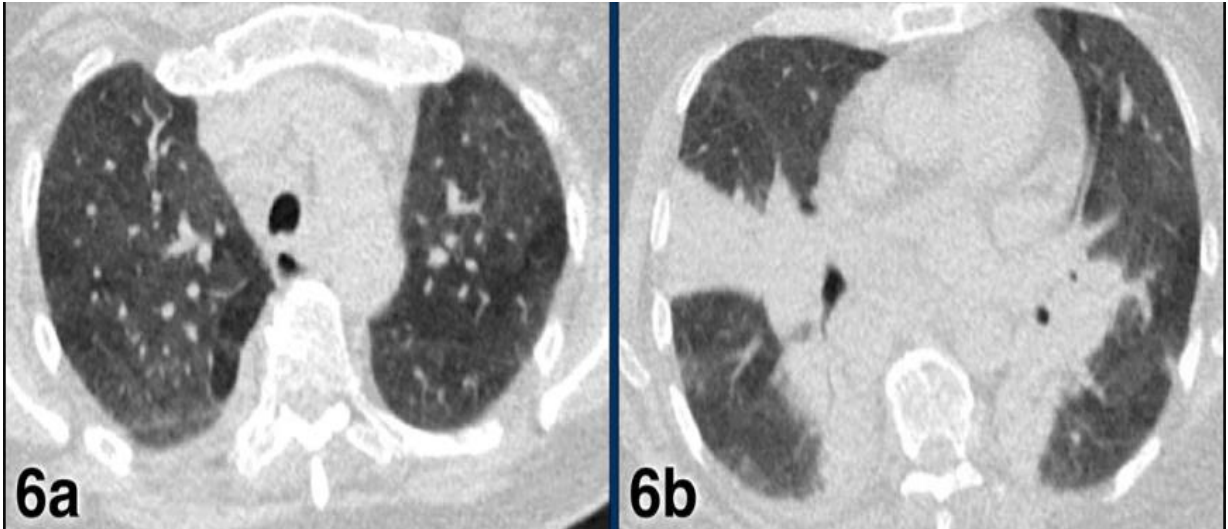


Case 6

Recent Influenza A . History of pulmonary hypertension.
Started coughing again.

CT: bilateral central consolidations with diffuse GGO.

Re-test: COVID-19 PCR: negative and Influenza A: positive.



➤ CORADS 4

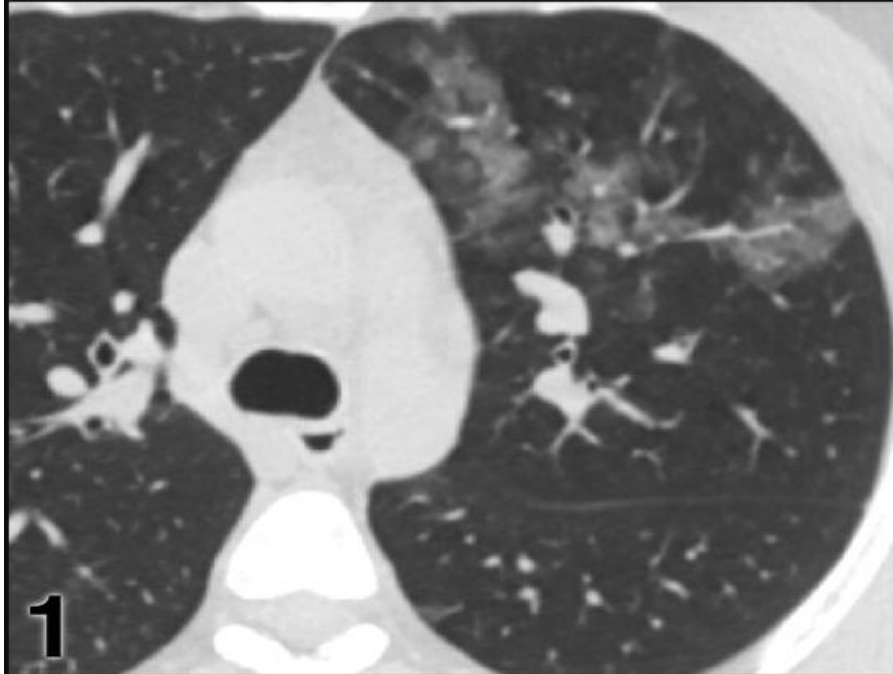
- In CO-RADS 4 the level of suspicion is high.
- Mostly these are suspicious CT findings but not extremely typical:
- Unilateral ground glass
- Multifocal consolidations without any other typical finding
- Findings suspicious of COVID-19 in underlying pulmonary disease.

Case 1

7 days of complaints

CT: unilateral areas of GGO in left upper lobe.

PCR: positive.



Case 2

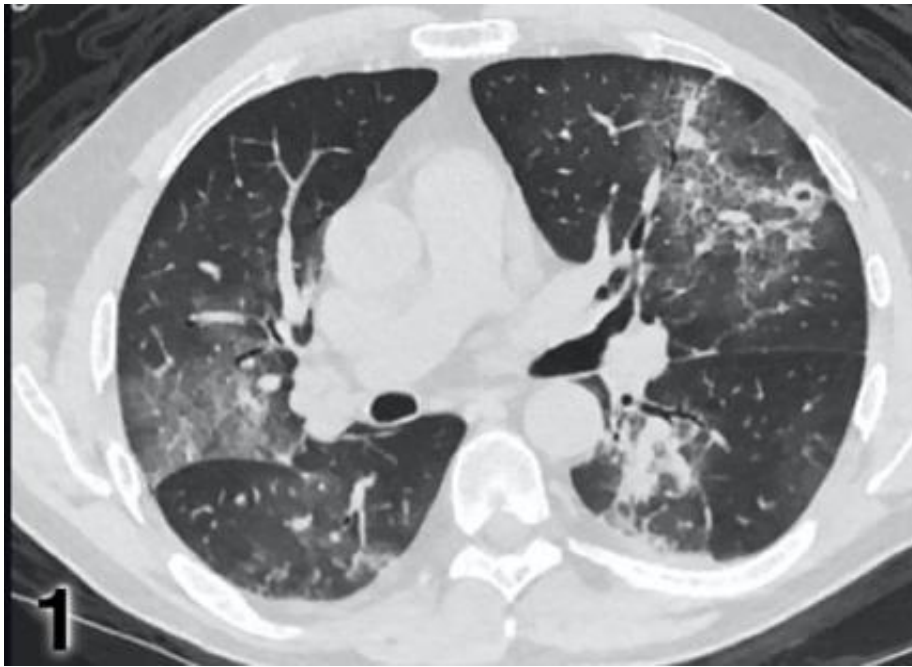
CT: bilateral GGO in a patient with emphysema.



➤ **CORADS 5**

Case 1

Multifocal GGO and consolidation

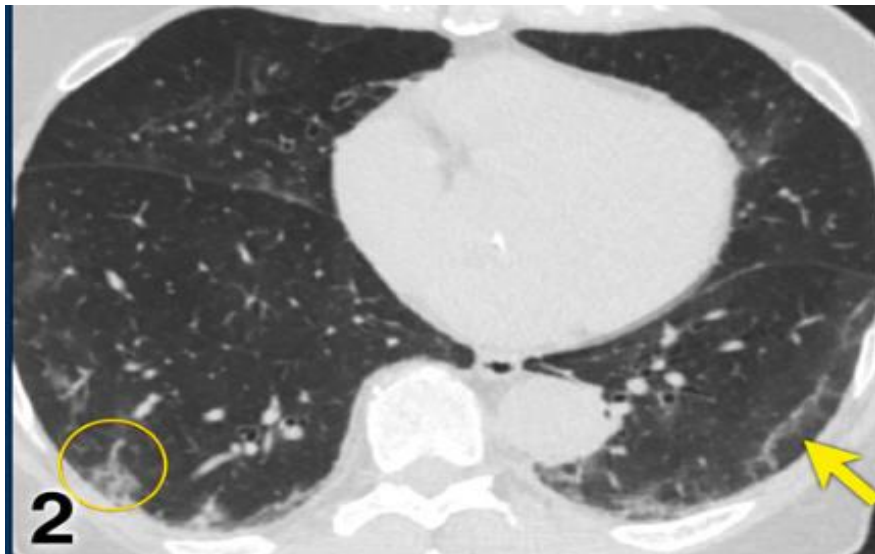


Case 2

10 days of complaints.

CT: bilateral multifocal GGO, vascular thickening (circle), subpleural bands (arrow).

PCR: positive

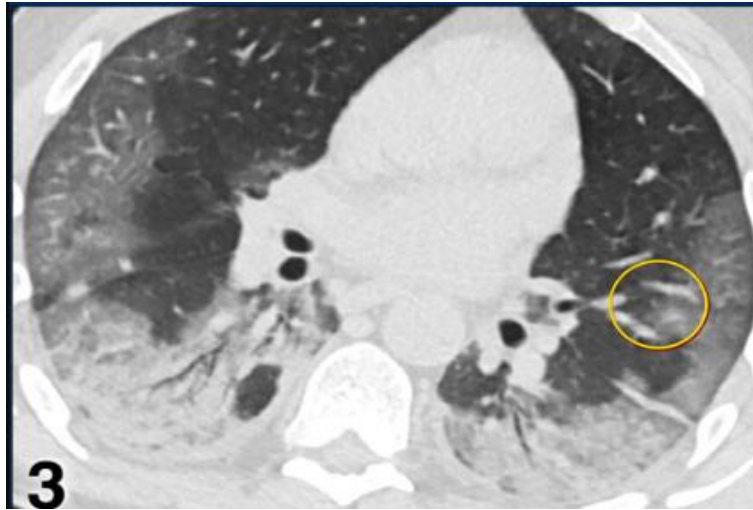


Case 3

Eleven days of complaints

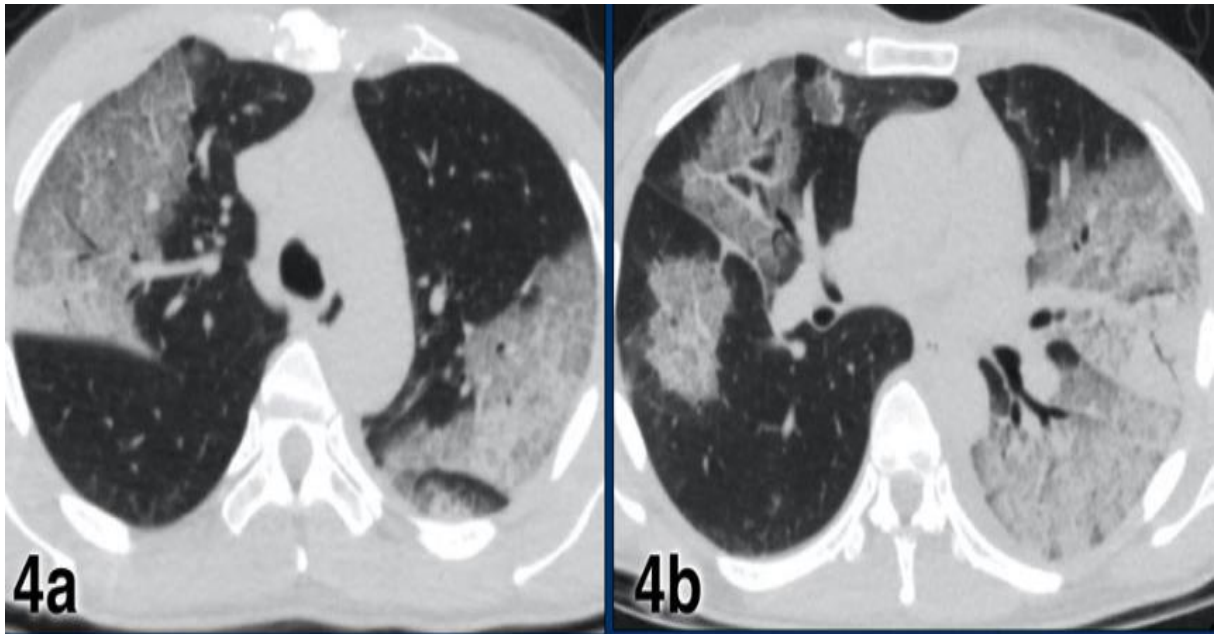
CT findings: Bilateral GGO and consolidation, basal preference, vascular thickening (circle).

PCR: positive



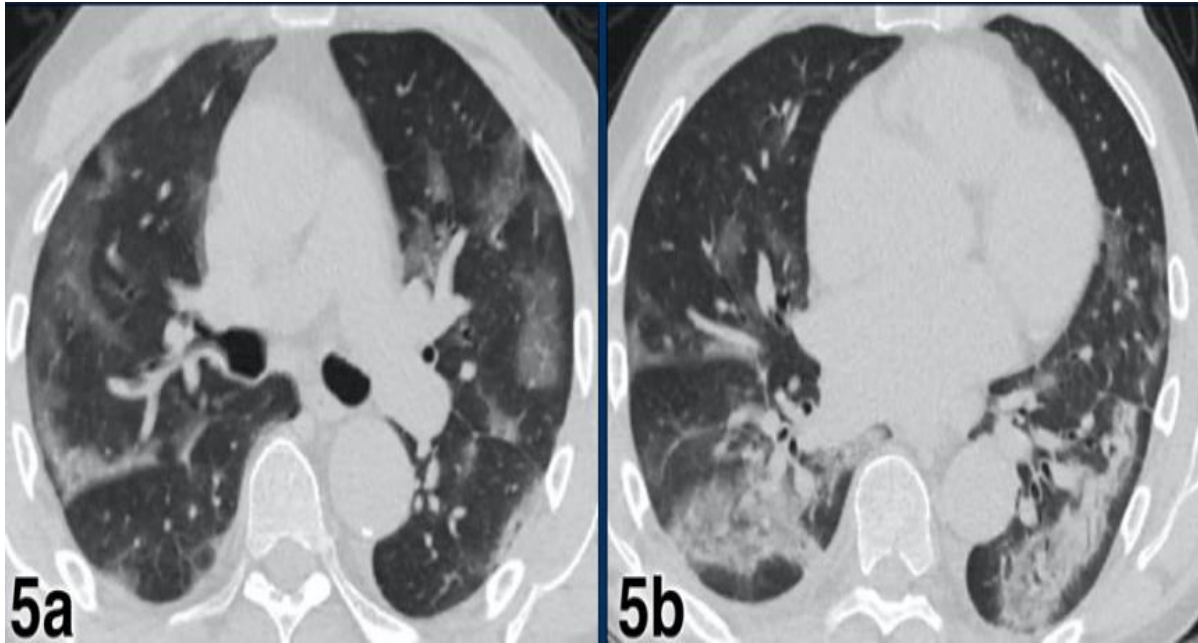
Case 4

CT findings: multifocal areas of groundglass and consolidation.



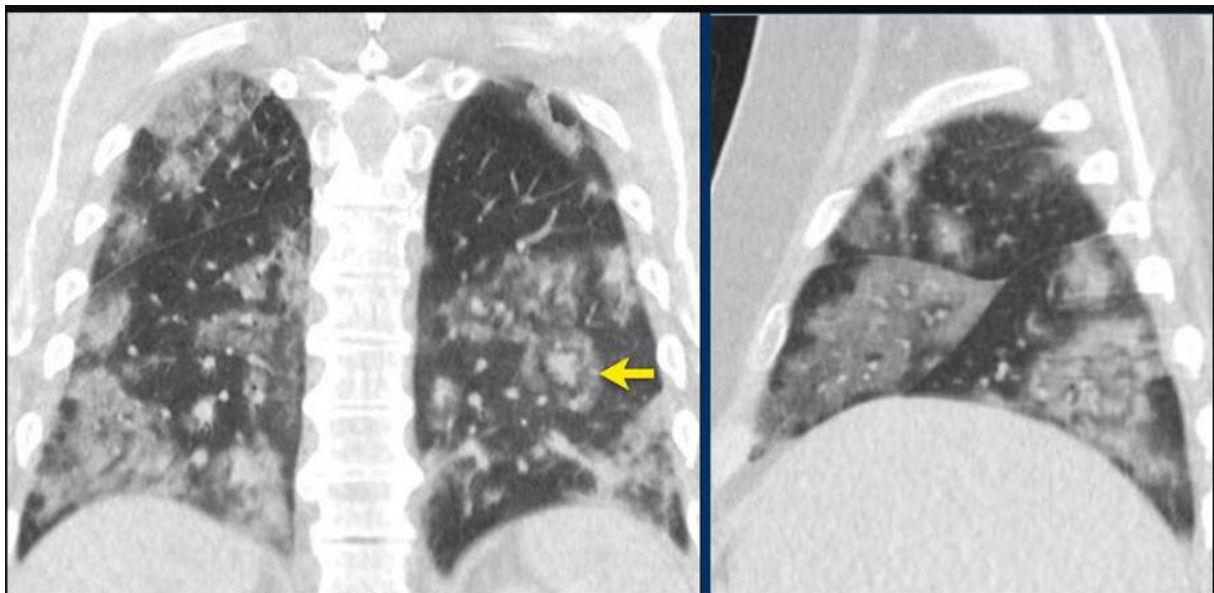
Case 5

CT findings: multifocal areas of groundglass and consolidation.



➤ **CORADS 6**

Patient with positive PCR and bilateral GGO. Notice halo sign (arrow).



In the table the typical findings of COVID-19. Mention findings that are very atypical, that are arguments against the diagnosis of COVID-19.

COVID-19	
Typical findings	Atypical findings
Multifocal groundglass opacities	Central or peribronchovascular
Peripheral and basal distribution	More apical distribution
Unsharp demarcation	Lymphadenopathy *
Vascular thickening	
Round	Very Atypical
Crazy paving	Cavitation - calcification
Ground glass and Consolidations	Tree-in-bud, bronchiolitis
(Reversed) halo	Nodular pattern
Spider web	Mass
	Pleural thickening

The duration of the complaints is important as it determines the expected stage of the disease. Discuss the findings, the chance of COVID-19 (CORADS) and the differential diagnosis. The CT-findings of COVID-19 show overlap with other diseases like:

- ❖ H1N1 influenza
- ❖ Other viral pneumonia ; adenovirus, CMV
- ❖ Organizing pneumonia
- ❖ Acute interstitial pneumonitis

CT-Report

Duration of complaints in days

CT findings GGO - consolidation - distribution
Crazy paving
(Reversed) halo - spider web sign
Vascular thickening
Pleural fluid
Enlarged lymph nodes etc

CORADS Determine level of suspicion
COVID-19

CT severity score

Additional findings co-morbidity

Conclusion CORADS
Severity