CT involvement score

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CT involvement score

- The severity of the lung involvement on the CT correlates with the severity of the disease.

  CSS was a strong predictor of progression to ICU admission and death

- Different method:

Visual assessment

The severity on CT can be estimated by visual assessment.
This is the easiest way to score the severity.
The CT images show a 25% involvement by visual assessment

CT involvement score

- **Lobar severity score:**

Another method is by scoring the percentages of each of the five lobes that is involved:

- 1- < 5% involvement
- 2- 5%-25% involvement
- 3- 26%-49% involvement
- 4- 50%-75% involvement
- 5- > 75% involvement.

CT involvement score

The total CT score is the sum of the individual lobar scores and can range from 5 (no involvement) to 25 (maximum involvement), when all the five lobes show more than 75% involvement.

Some say that the percentage of lung involvement can be calculated by multiplying the total score times 4.
This however is not true. Suppose that all lobes have a 10% involvement, then this would lead to an overall score of 10, which could lead to the impression that 40% of the lungs are involved.

CT involvement score

Sectional CT scoring:

- **Chest Computed Tomography Severity Score to Predict Adverse Outcomes of Patients with COVID-19** (article)
- a semi-quantitative scoring system previously used by others using a system previously described for severity of acute respiratory distress syndrome on thin section lung CT scan .
- Briefly, each lung was divided into three regions:
- (1) upper (above the level of the carina)
- (2) middle (between the carina and inferior pulmonary vein)
- (3) lower (below the level of the inferior pulmonary vein)

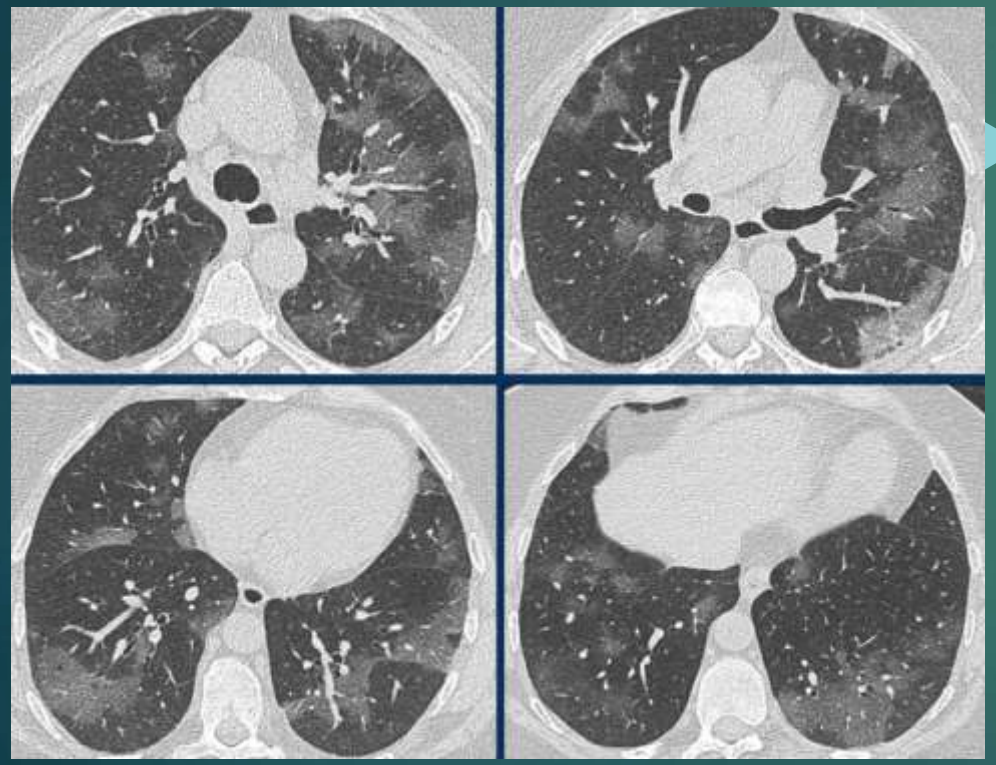
CT involvement score

- Each region of the lung was evaluated in terms of the percentage of involvement on a scale of 0 – 4
- 0- no involvement
- 1- less than 25%
- 2- 25% to less than 50%
- 3- 50% to less than 75%
- 4- 75% or greater involvement
- . Overall CT scores was the summation of scores from all 6 lung regions. Then, the total CSS calculated to be a number in the range of 0 (representative of no involvement) to 24 (indicative of diffuse interstitial involvement) and assigned for each patient.

CT-changes over time

CT-changes over time		
Early stage	0-4 days	GGO, partial crazy paving, lower number of involved lobes
Progressive stage	5-8 days	Progressive (5-8 days): Extension of GGO, increased crazy paving pattern
Peak stage	10-13 days	Consolidation
Absorption stage	≥14 days	Gradual resolution

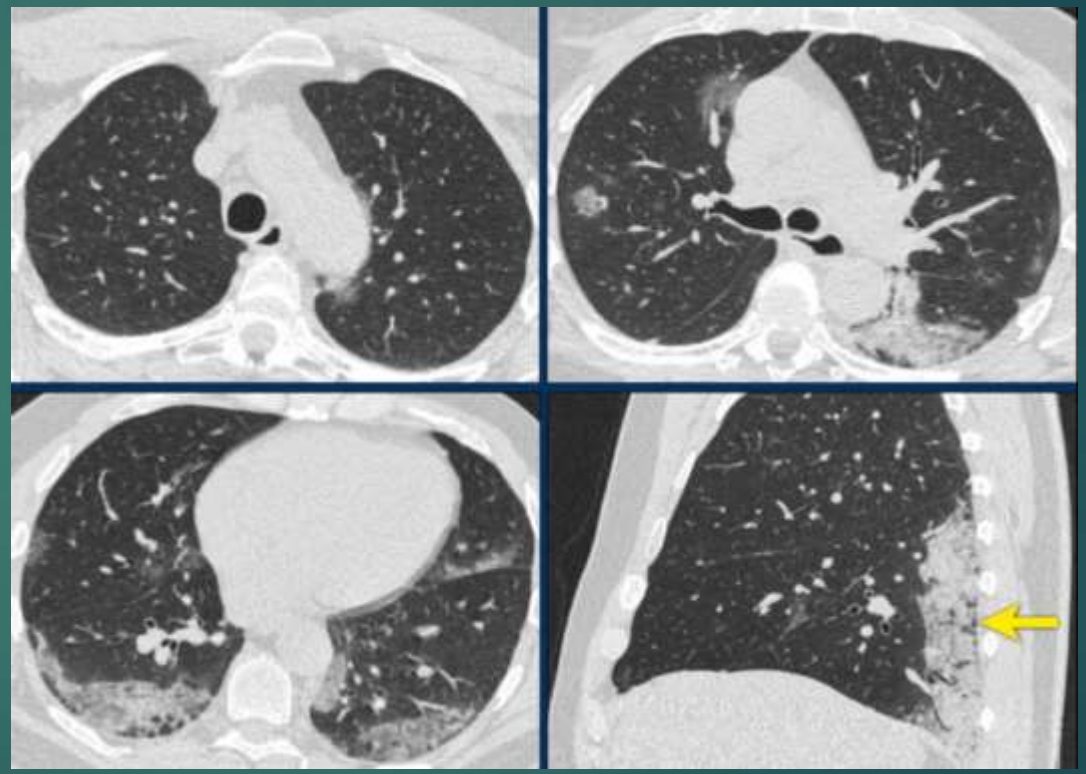
CT-changes over time



- Initial CT-findings in COVID-19 cases include bilateral, multi-lobar ground glass opacification (GGO) with a peripheral or posterior distribution, mainly in the lower lobes and less frequently in the middle lobe

CT-changes over time

Consolidation superimposed on GGO as the initial imaging presentation is found in a smaller number of cases, mainly in the elderly population



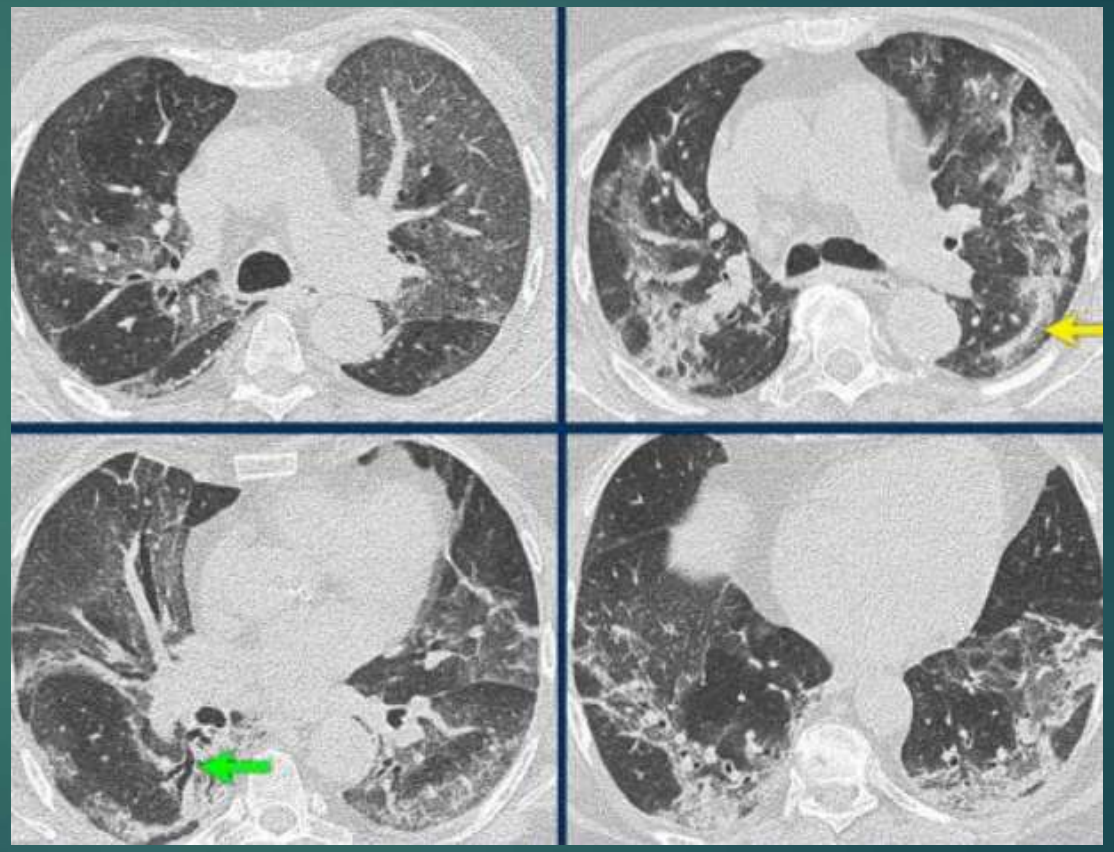
CT-changes over time

Advanced-phase disease is associated with a significantly increased frequency of:

- GGO plus a reticular pattern (crazy paving)
- Vascuolar sign
- Fibrotic streaks
- Air bronchogram
- Bronchus distortion
- Sub-pleural line or a sub-pleural transparent line
- Pleural effusion

CT-changes over time

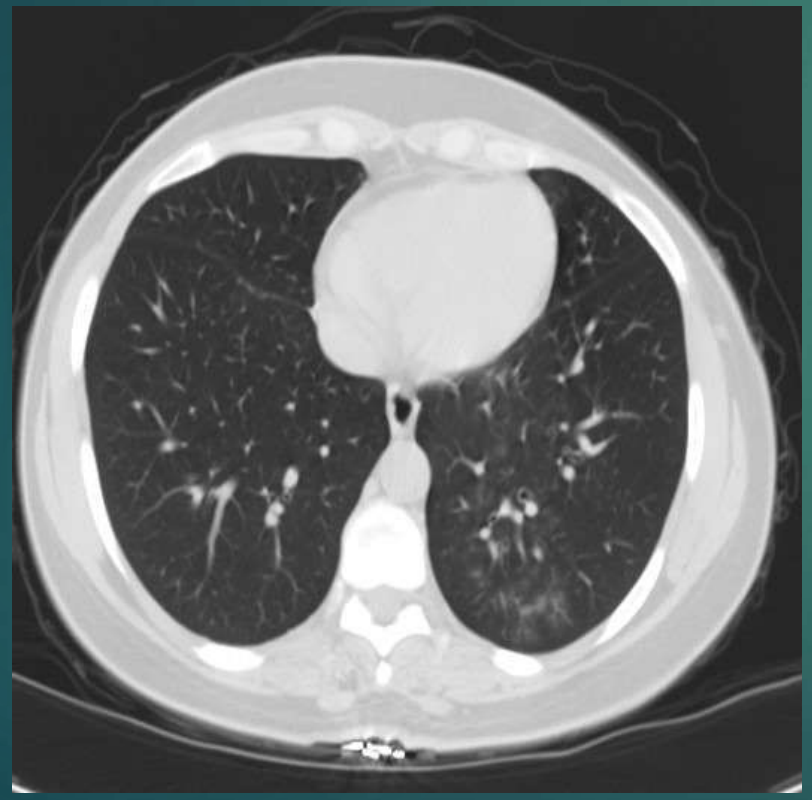
Septal thickening, bronchiectasis, pleural thickening, and sub-pleural involvement are some of the less common findings, mainly in the later stages of the disease.



Fibrous bands (yellow arrow)

Consolidation in right lower lobe with traction bronchiectasis (green arrow)

CT-changes over time



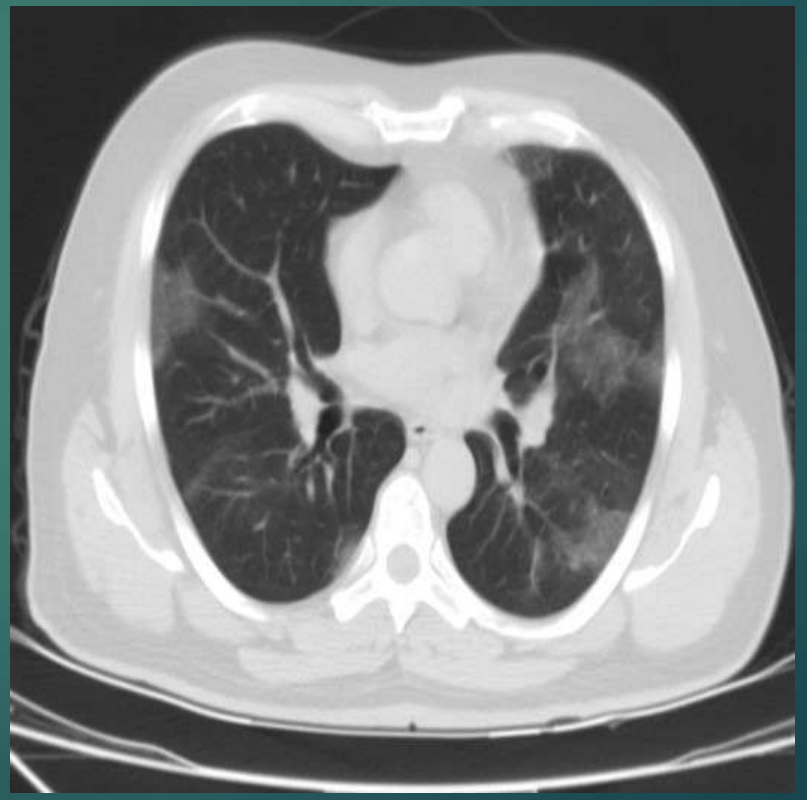
Ultra early stage

- In this stage, the patient has no clinical manifestations. Laboratory tests are negative, but the throat swab sample is positive for COVID-19

CT-changes over time

Early stage

- Chest CT scan in this stage shows dilatation and congestion of alveolar septal capillary and exudation of fluid in the alveolar cavity or agglomerated ground-glass opacities. This stage could be detected during three days after clinical manifestations

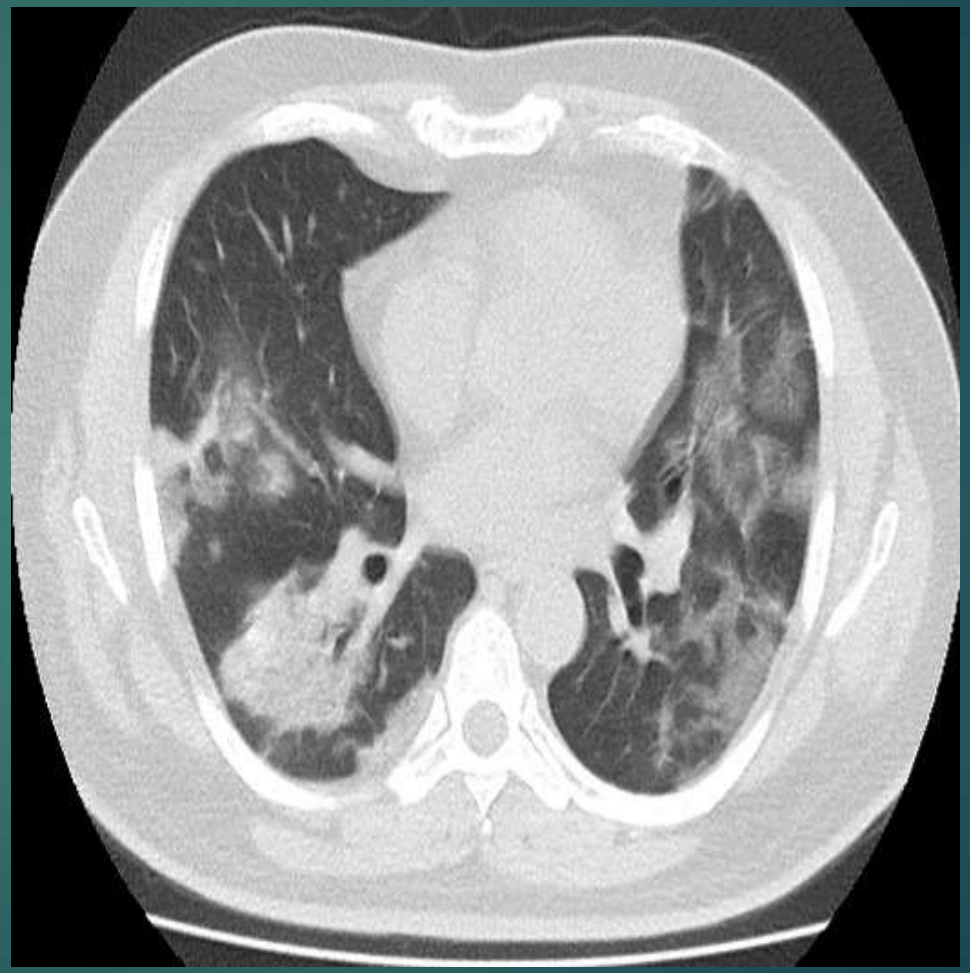


CT-changes over time

Rapid progression stage

Chest CT scan in this stage shows a large number of cell-rich exudates in the alveolar cavity, as well as vascular expansion

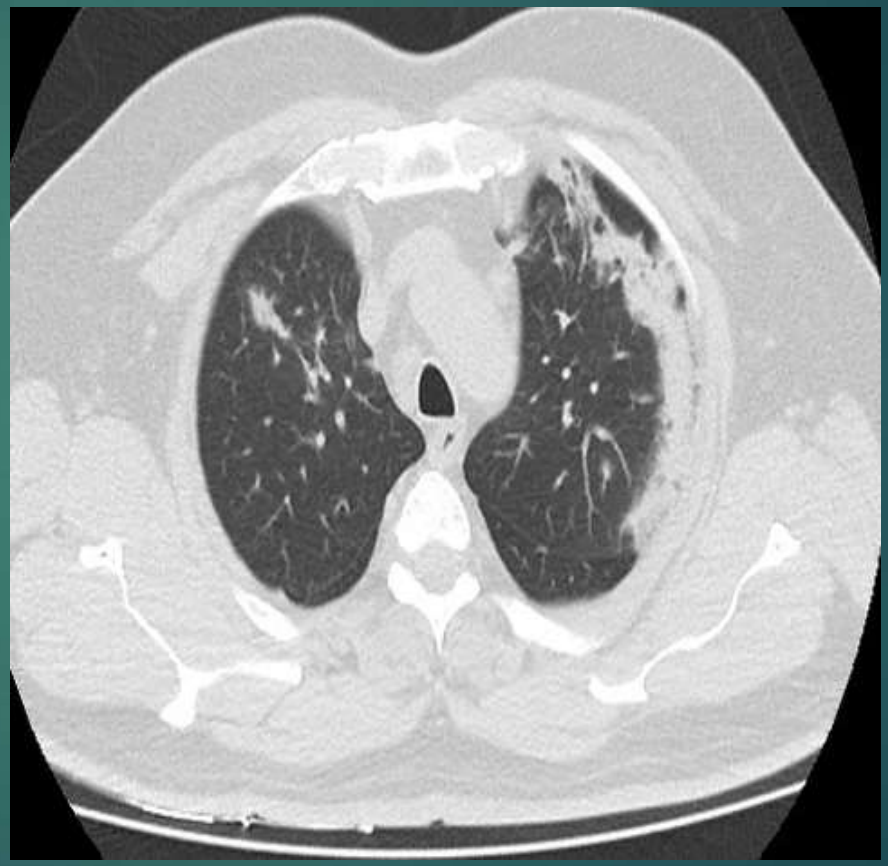
Large-scale light consolidation with air bronchogram inside is also evident. This stage could be detected during one week after clinical manifestations



CT-changes over time

Consolidation stage

Chest CT scan demonstrates fibrous exudation of the alveolar cavity as well as multiple patchy consolidations in slighter density. Capillary congestion in the alveolar wall may disappear. This stage could be detected 1-2 weeks after the beginning of clinical manifestations



CT-changes over time

Dissipation stage

Chest CT scan in this stage demonstrates patchy consolidation along with thickening and a strip-like twist of the bronchial wall and a few consolidations. This stage is detectable 2-3 weeks after the onset of clinical manifestations