The Target Sign and Its Variant in COVID-19 Pneumonia

Dr. Asna Ashari MD
Assistant professor of Emergency Medicine
IUMS

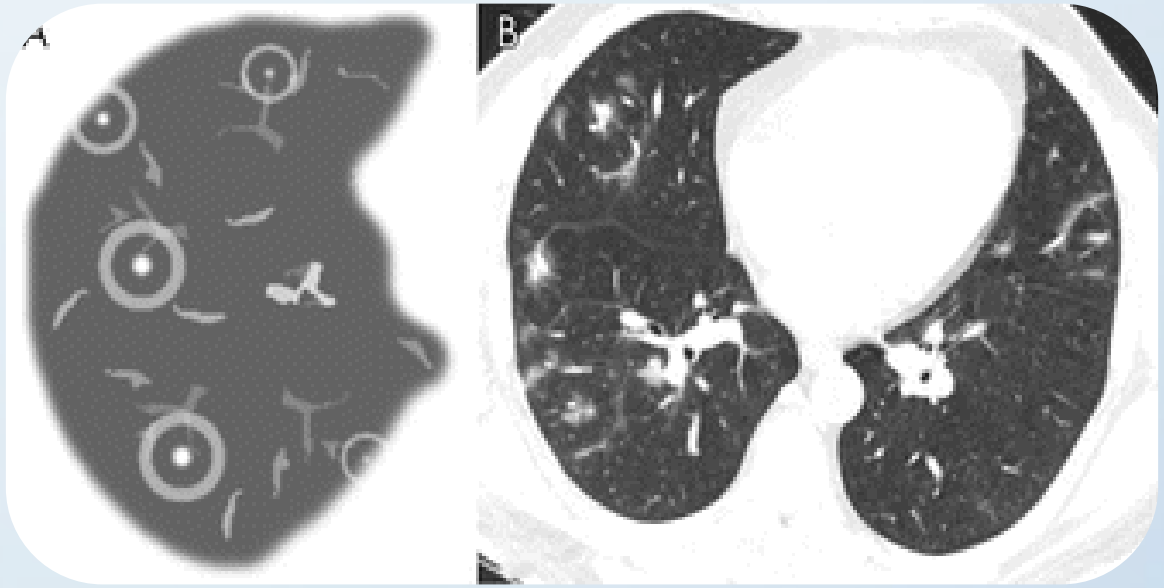
The most commonly reported CT findings in patients in the early **stages of COVID-19** are nodular/patchy, single/multiple ground-glass opacities in a peripheral/peribronchovascular distribution, as well as intralobular/interlobular septal thickening, together with a crazy-paving pattern

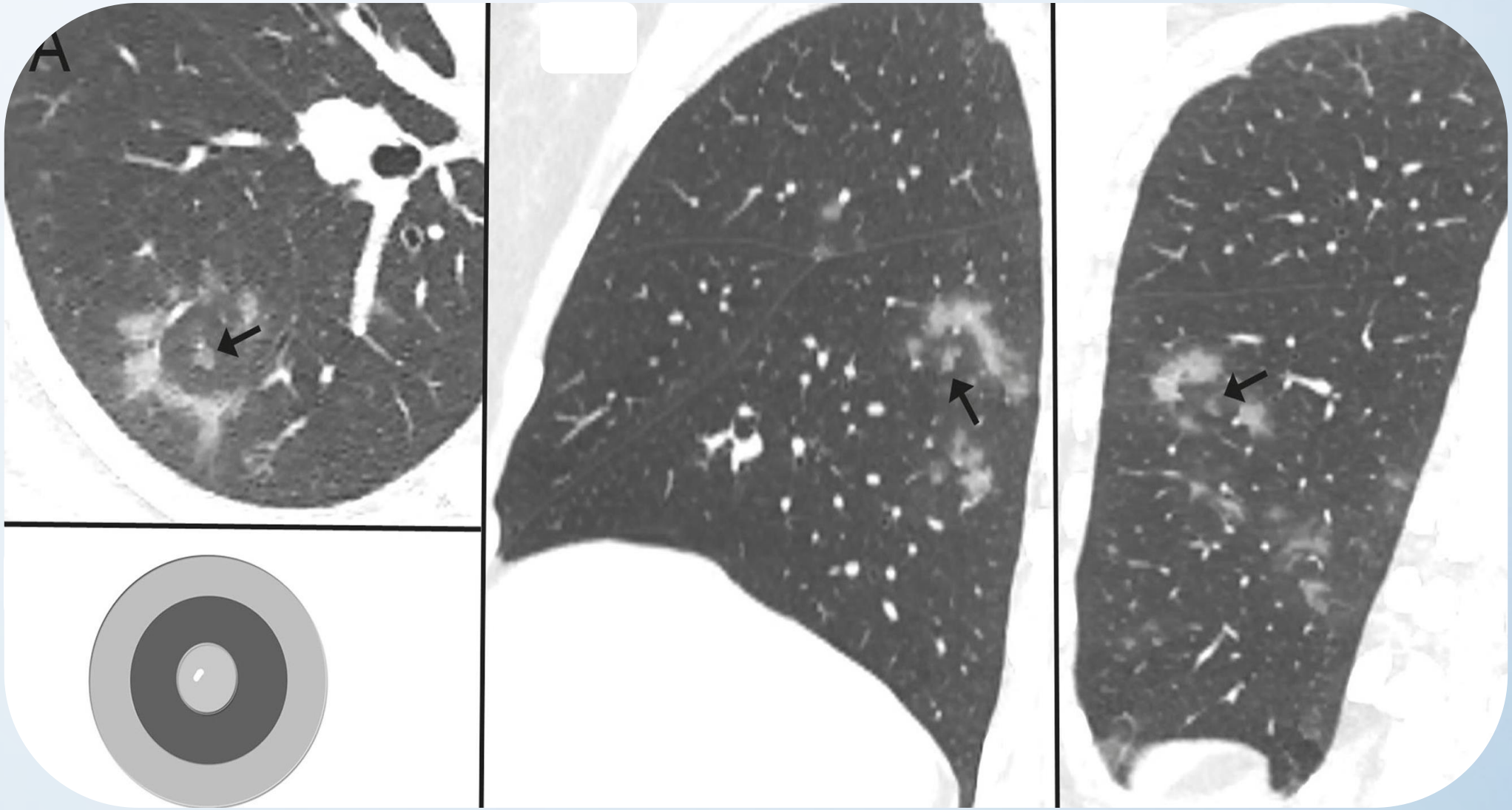
Several chest CT scan signs have been described in patients with COVID-19 pneumonia

- **Batwing sign:** Bilateral perihilar opacities
- **White lung sign:** diffuse, high-density opacities
- **Rosa roxburghii sign:** focal nodular ground-glass opacities
- **Gypsum sign:** patchy consolidations of varying density in both lungs
- **Reversed halo sign**
- **Halo sign**

Target sign

The target sign, identified at chest CT, has been recently described by Müller et al as a **nodular opacity in the center of a ring-like opacity** in patients with pneumonia caused by the severe acute respiratory syndrome coronavirus 2





Target sign

Synonyms of **Target sign** are **Bullseye sign, double halo sign**

It is different from **reversed halo sign** and **halo sign**

Reversed halo sign

Target sign

Halo sign

Halo sign and **reversed halo sign maybe seen in COVID pneumonia**

They are less specific than target sign

Pathology of Target sign

A hypothesized pathophysiology of the target sign of COVID-19 on lung CT is that it is a manifestation of **organizing pneumonia**

It seems that the **central nodule-like opacity** may correspond to a bronchiole-vascular bundle which is occluded with exudates or clot, while the **peripheral ring-shaped** airspace opacities corresponds to pulmonary tissue filled with the fluid of infective air space opacity

Based on the literatures, the target sign has not been described before in viral or bacterial respiratory infections and **could be a hallmark of COVID-19 pneumonia**, given the appropriate clinical context

The significance of target sign in COVID-19 remains unclear

It is a newly described sign of pulmonary involvement of SARS-Cov2 and few cases of this feature were published Radiologists have not yet confirmed its specificity and diagnostic value, which is due to the small number of reported cases

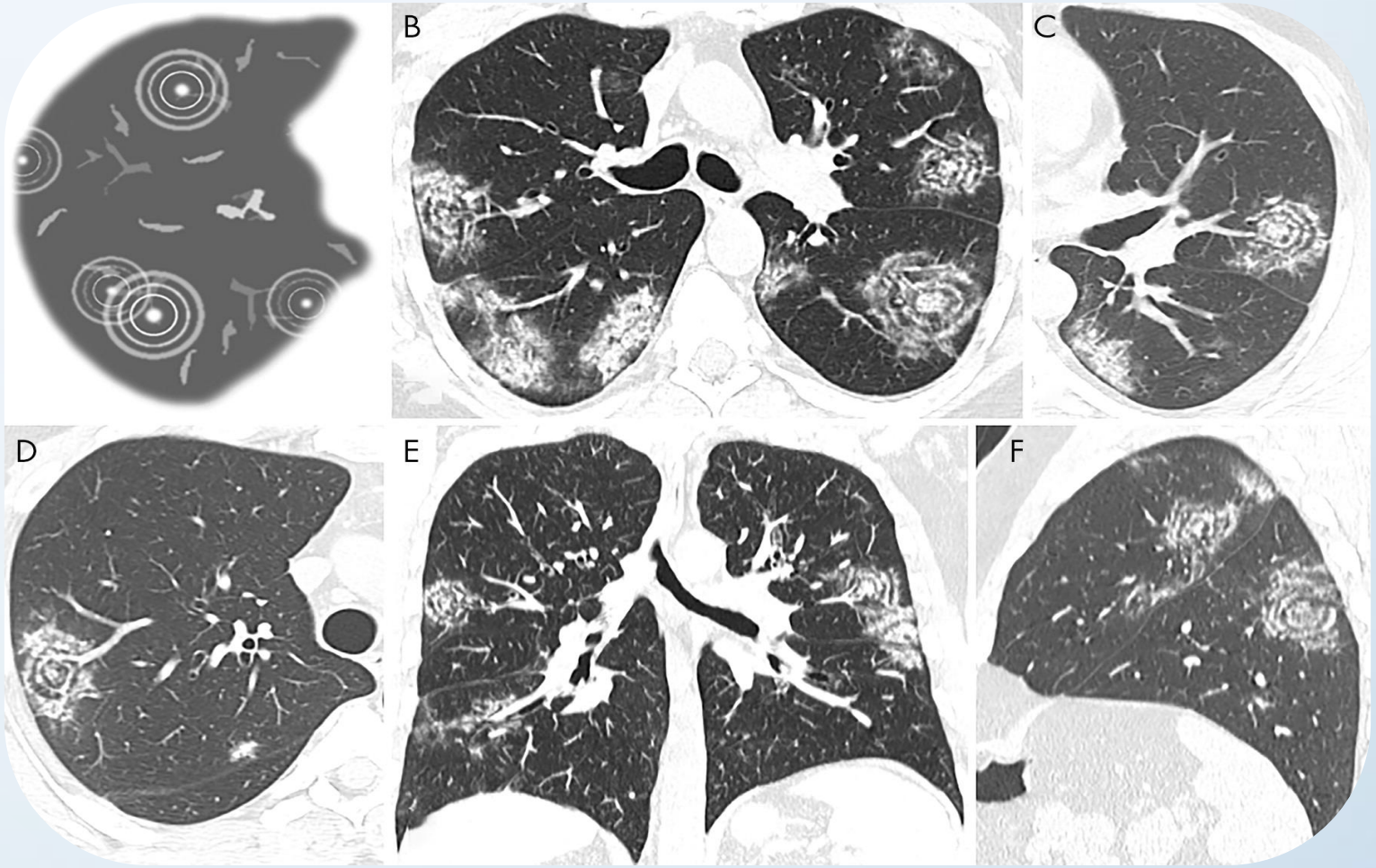
Note

Pulmonary Target sign was not linked to any specific variant of COVID-19 in literature

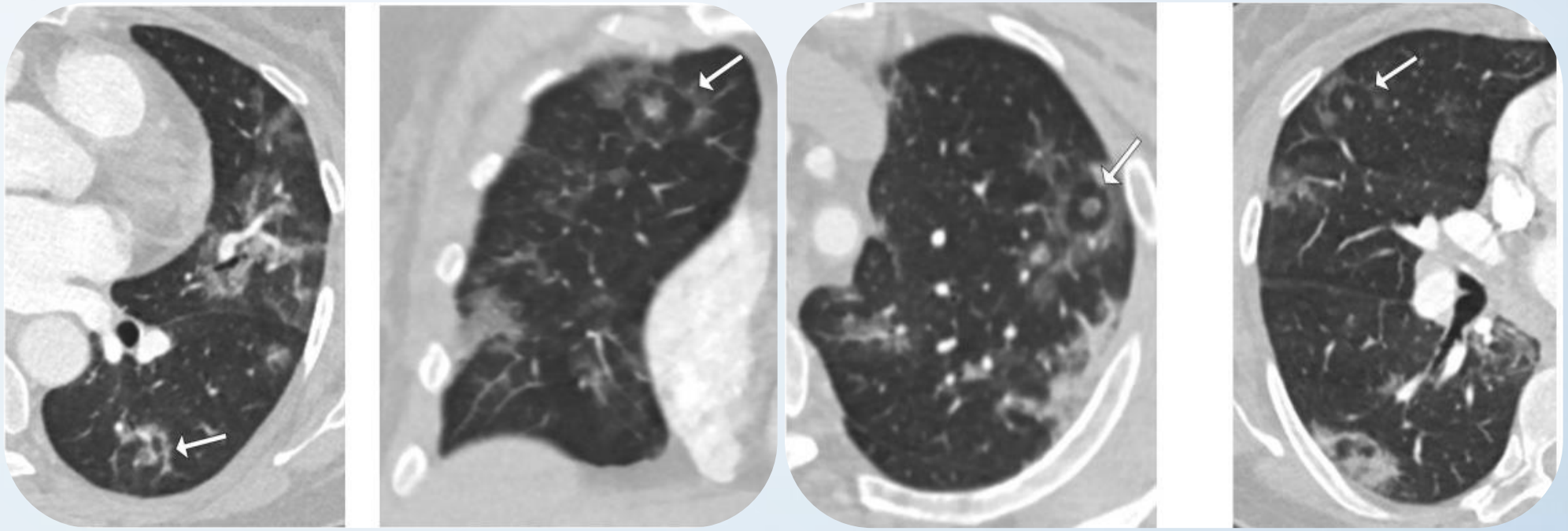
Practical points

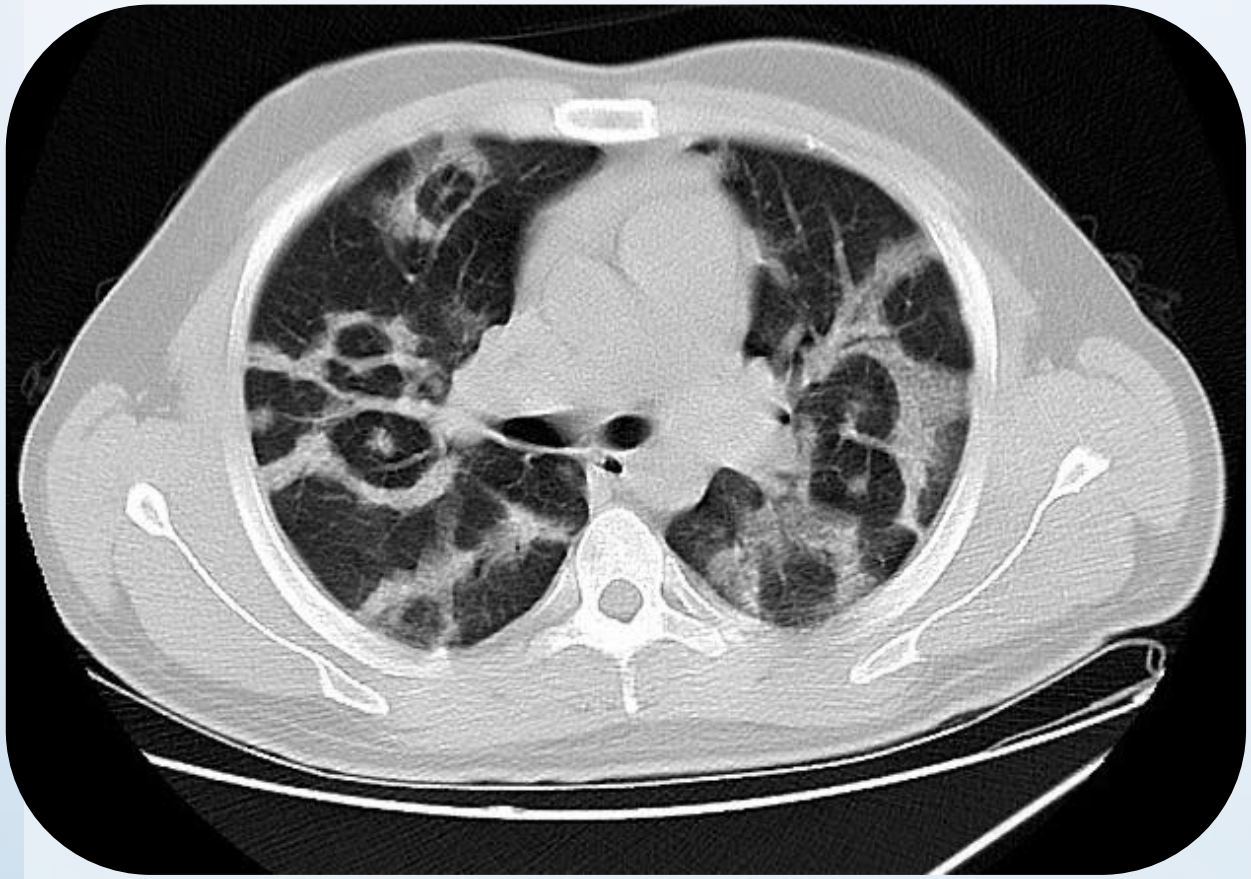
The target sign usually includes the following radiologic characteristics :

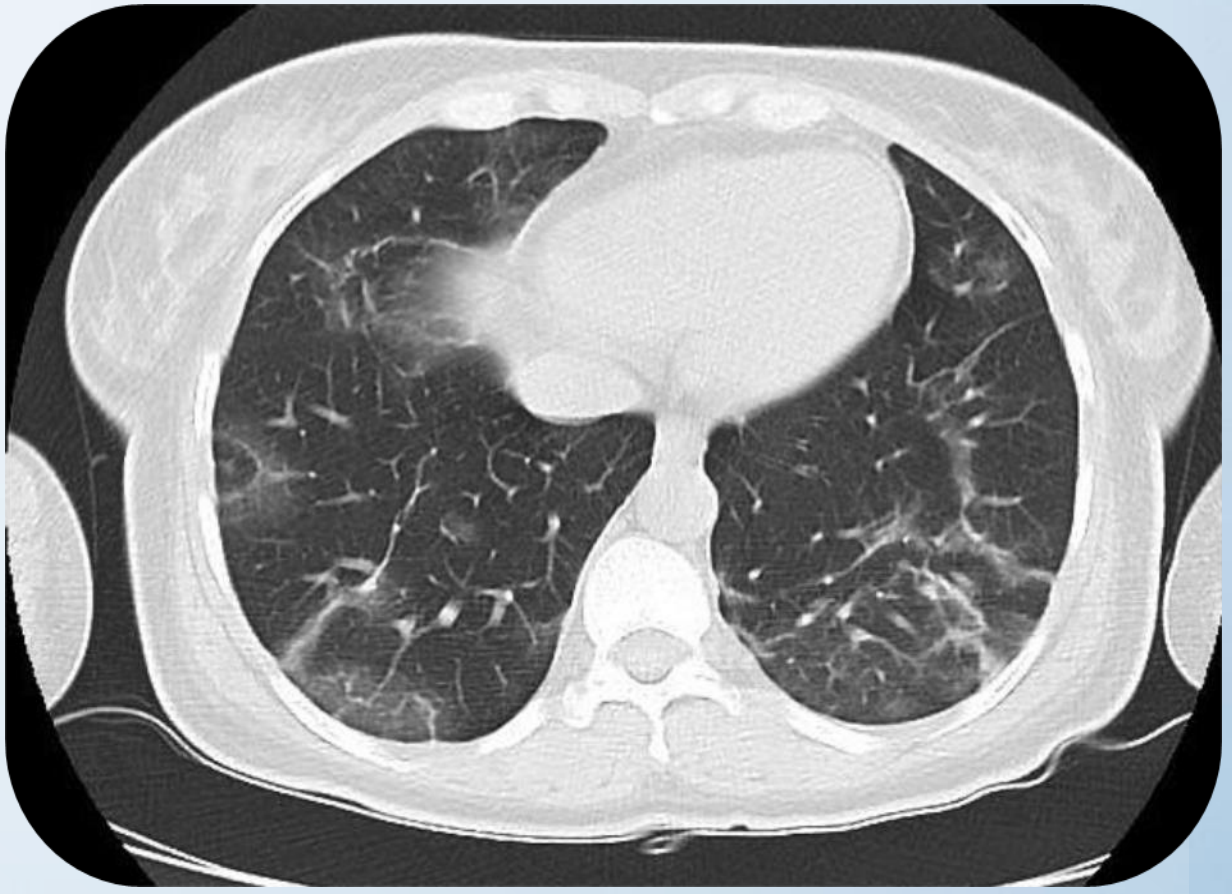
- peripheral or subpleural location
- one or more dense surrounding rings
- surrounding rings could be complete or incomplete
- multiple lesions may occur
- close-by bronchovascular bundles may be involved
- usually adjacent ground-glass opacities



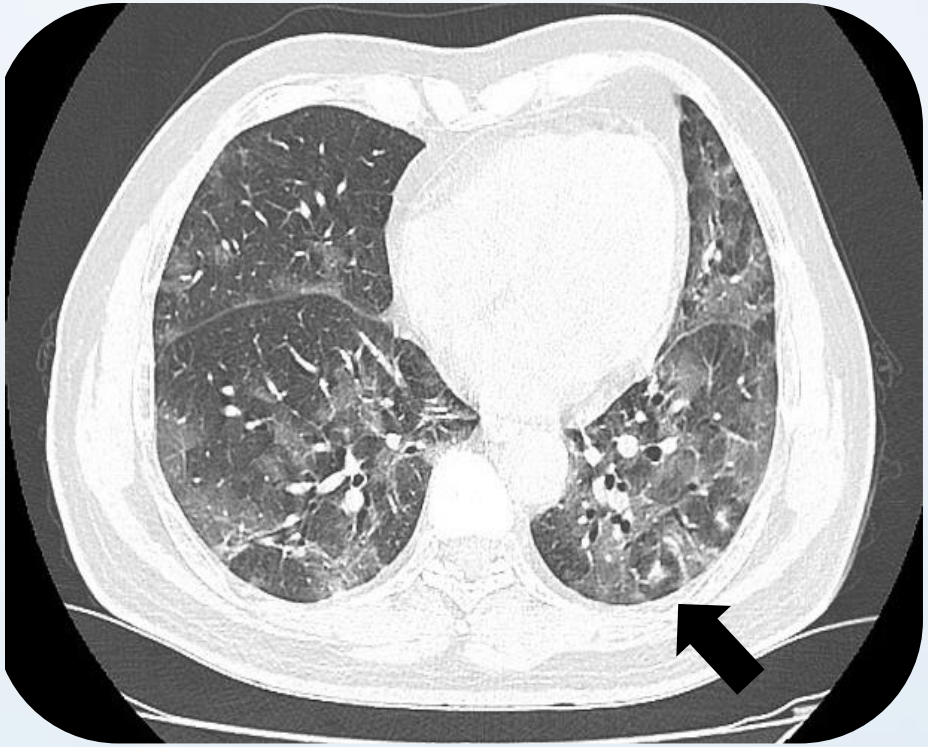
Variant of target sign characterized by multiple concentric ring-like opacities with a central nodular peribronchovascular opacity

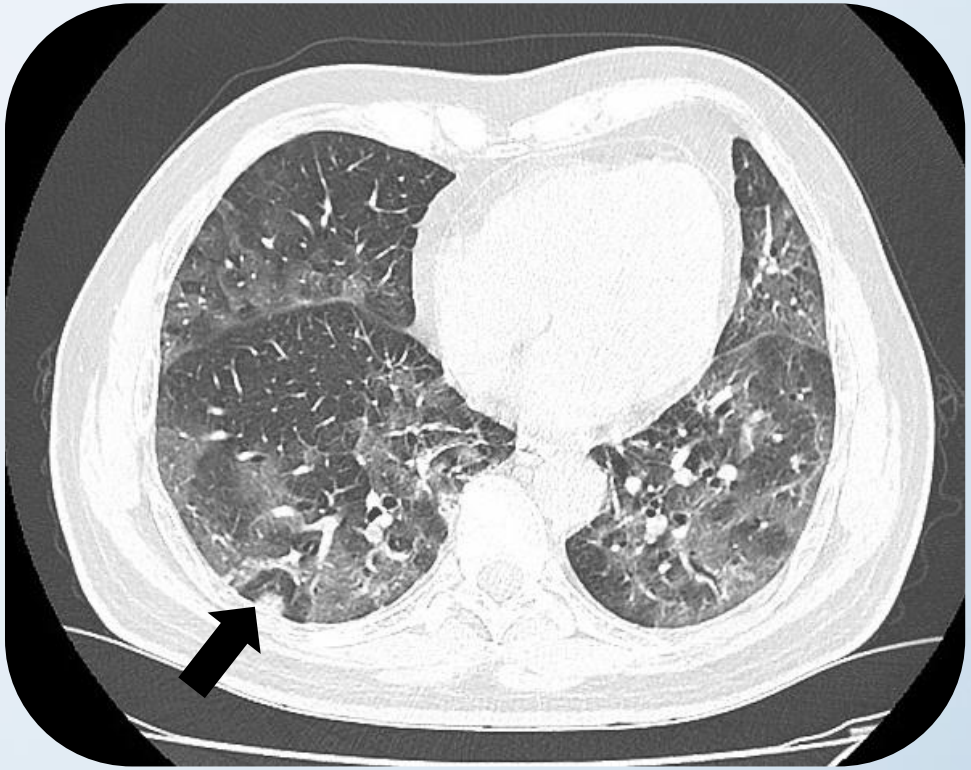






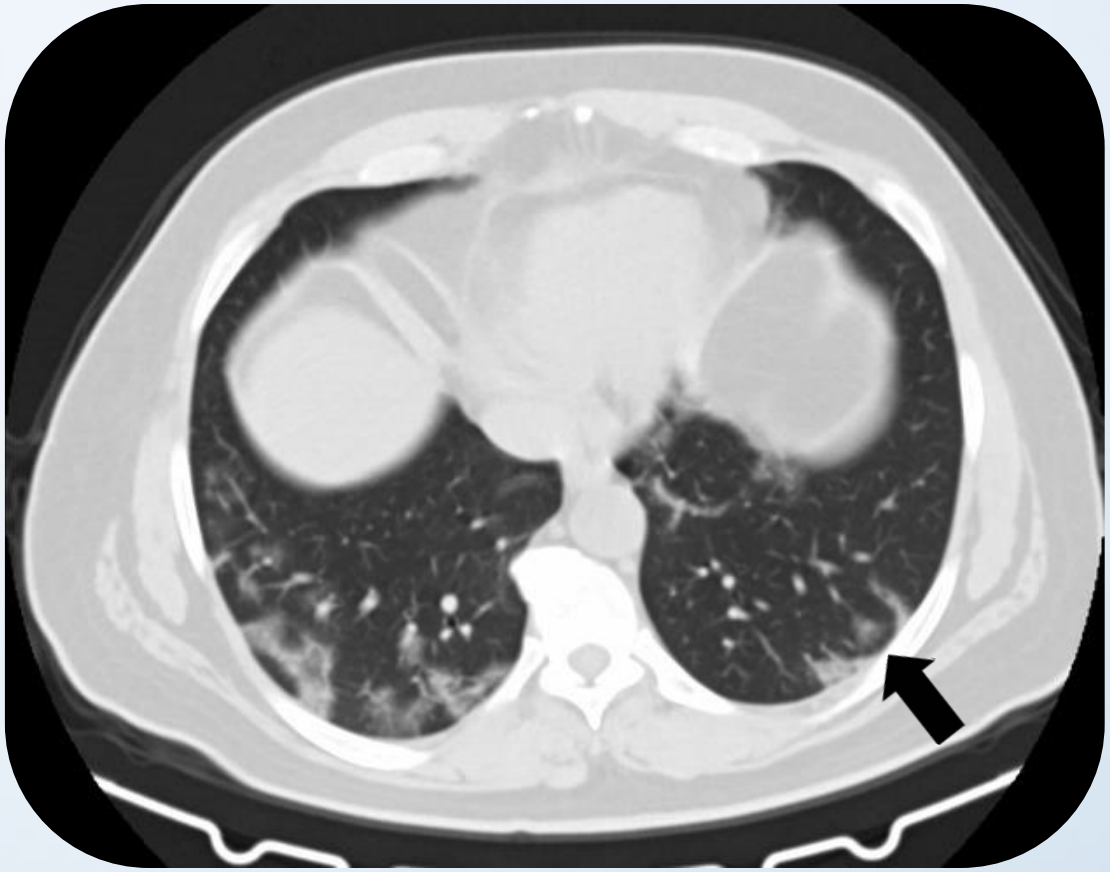
Target sign in COVID





Target sign in COVID

Target sign

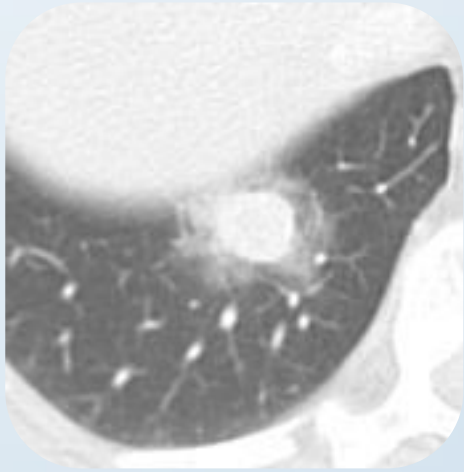


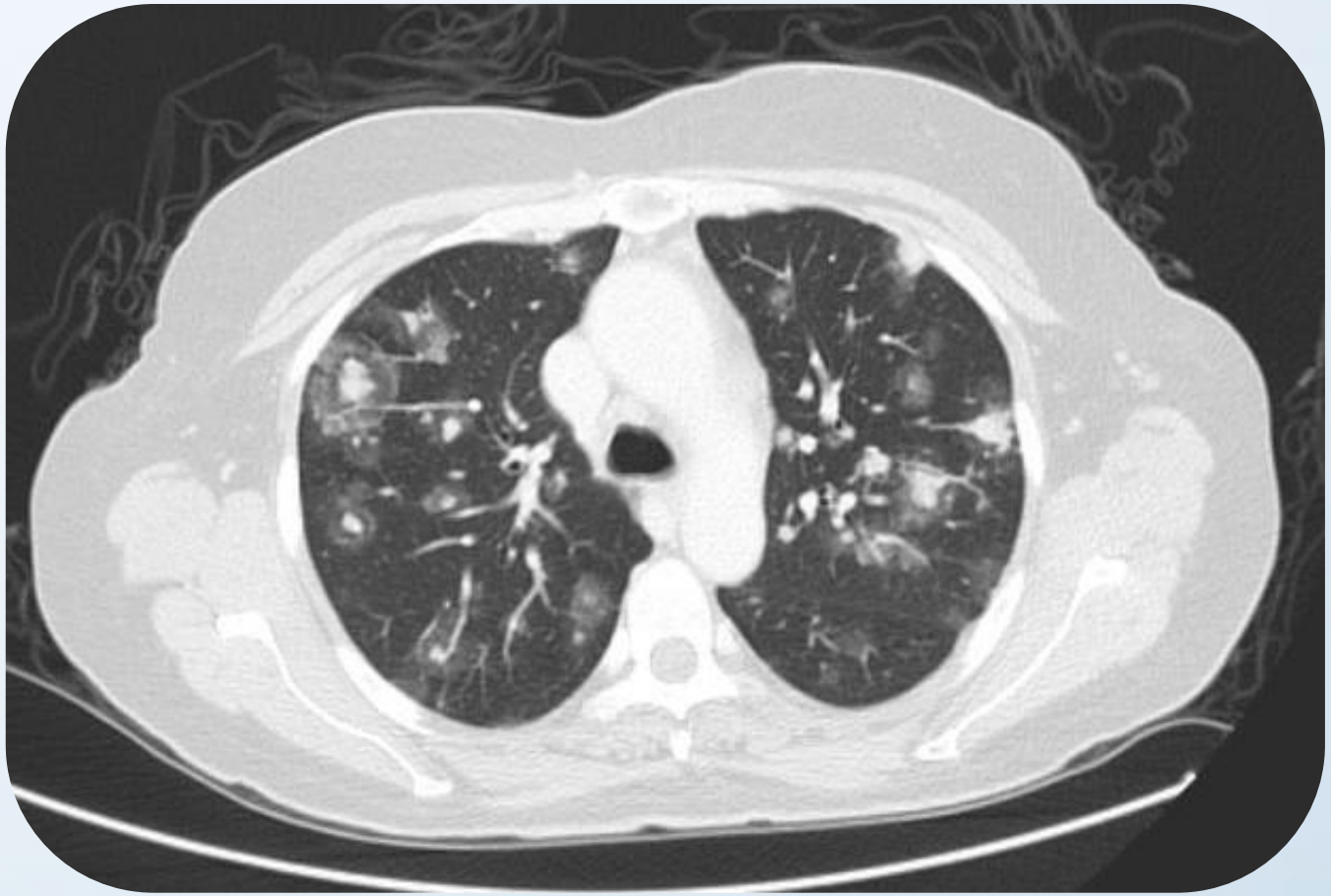
Target sign in COVID with incomplete ring

Note

The **halo sign** in chest imaging is a feature seen on lung window settings, ground glass opacity surrounding a pulmonary nodule or mass and represents hemorrhage

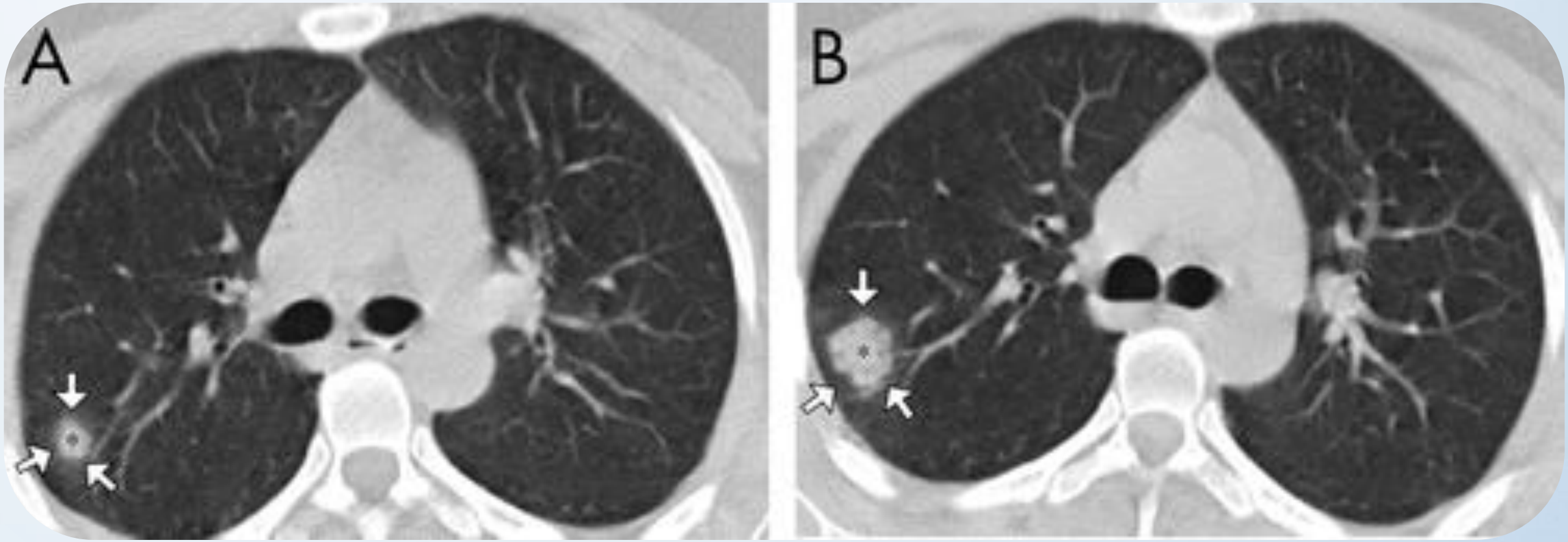
It is typically seen in angioinvasive aspergillosis





Halo sign

Hemorrhagic pulmonary metastases
from uterine angiosarcoma



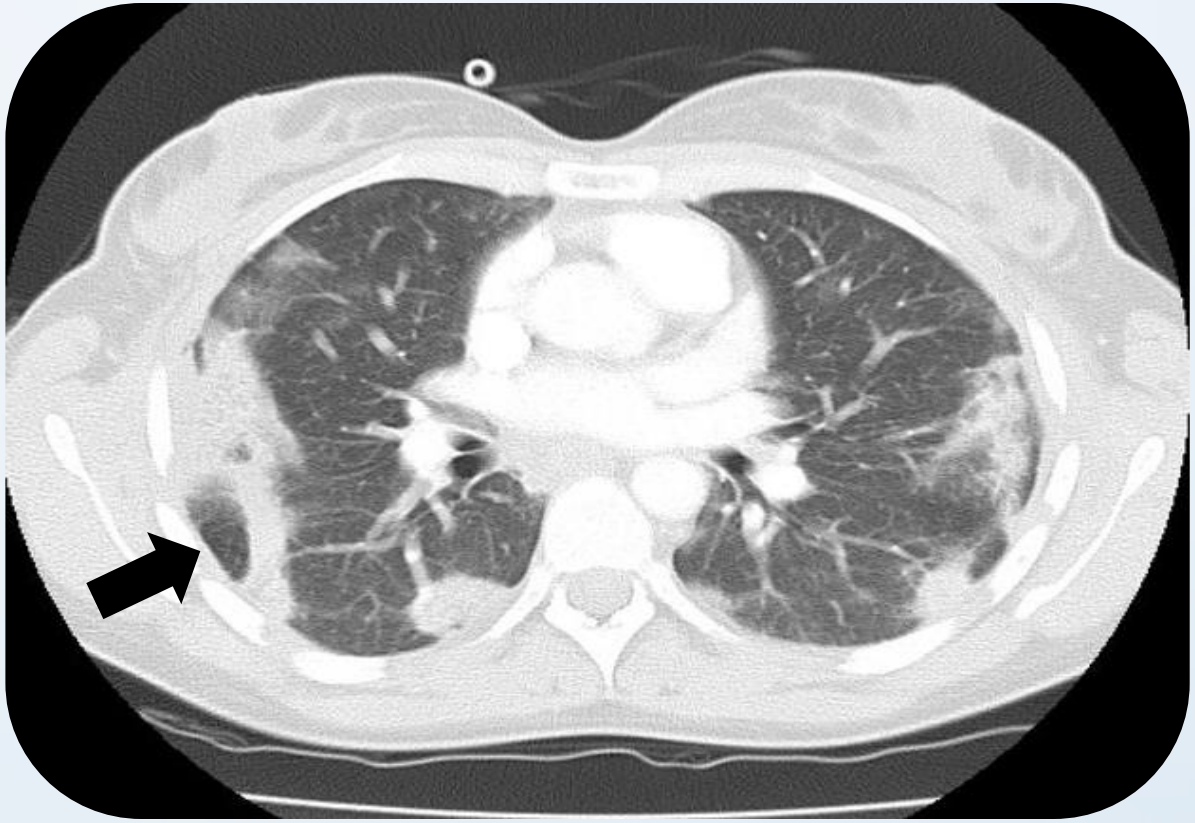
Halo sign in COVID

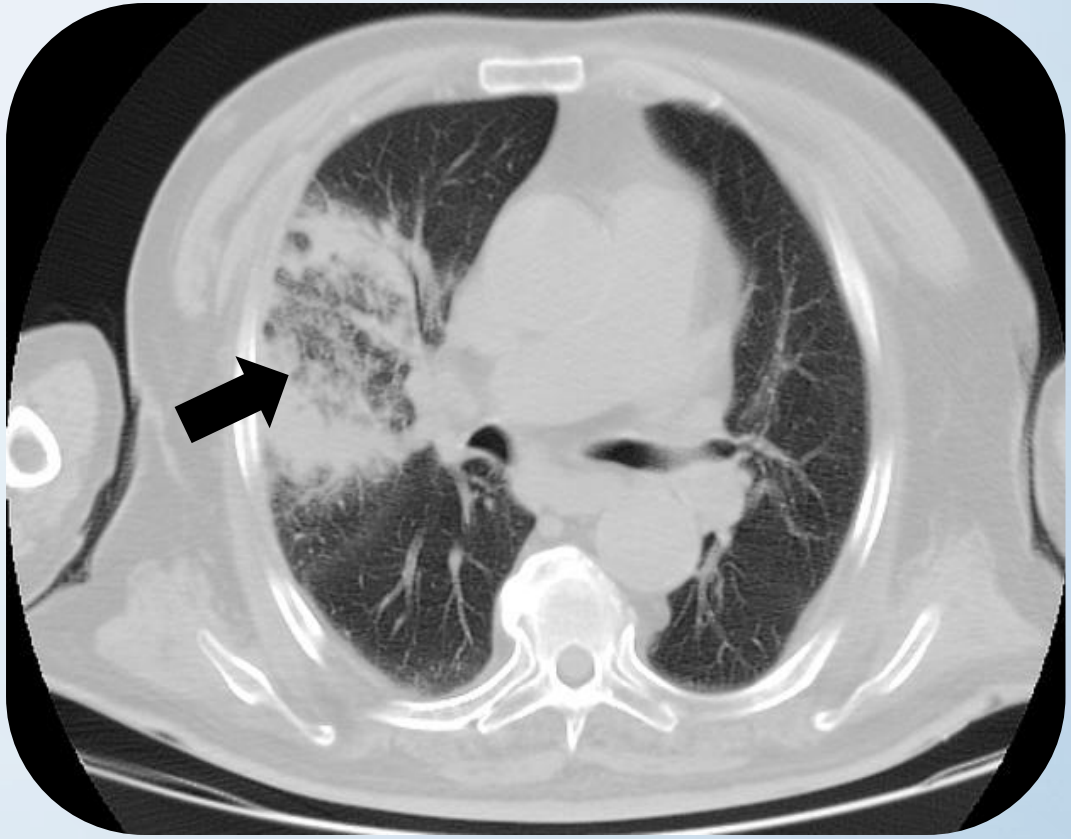
A, Image shows a solid nodule (*) surrounded by a ground-glass halo in the posterior right upper lobe segment (arrows). *B,* Image at the same level as in *A*, obtained 4 days after, shows increase in size of the solid nodule (*), with development of small peripheral air bronchograms.

Reversed halo sign

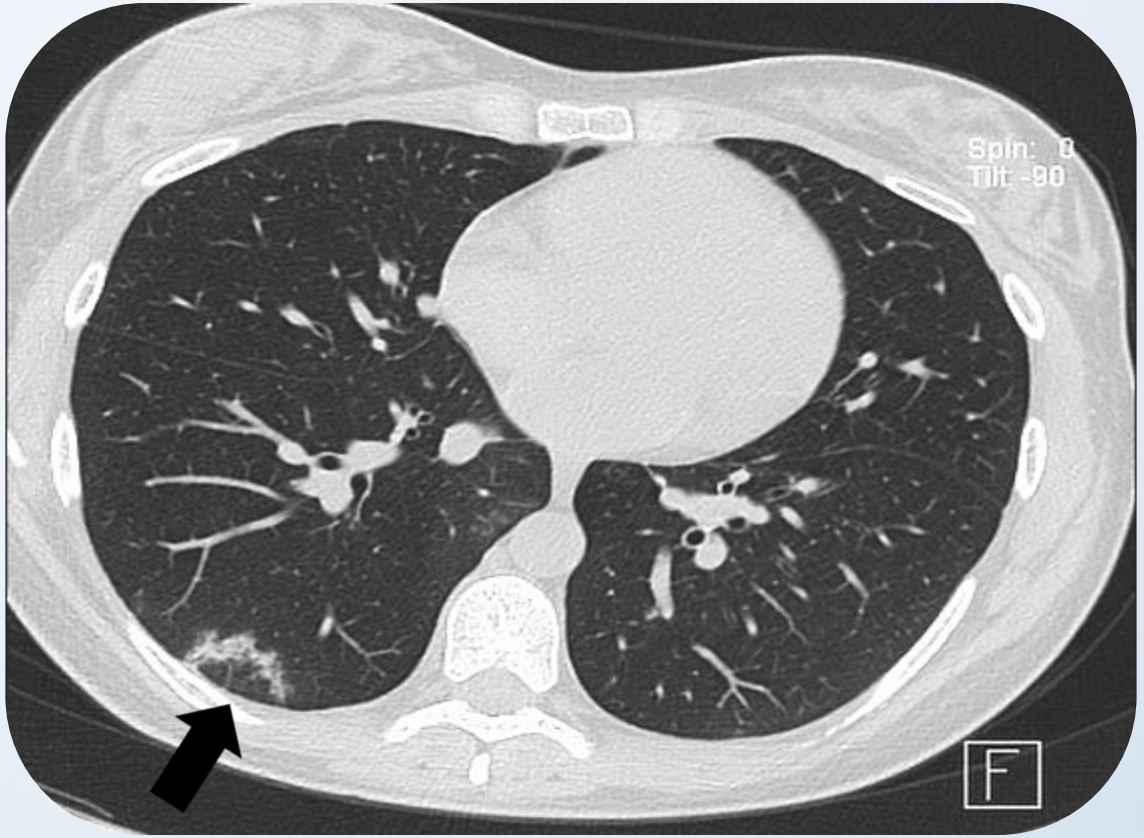
Reversed halo sign, also known as the **atoll sign**, is defined as central ground-glass opacity surrounded by denser consolidation of crescentic shape

It is associated with infectious and not infectious disease





Reversed halo sign



Reversed halo sign in COVID

Note

Alveolar edema and hemorrhage may create the **halo sign**, while the **reversed-halo sign** may be formed by the organization and resolution of alveolar exudates

Thank you for your attention