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INNER SPACES

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Covid-19 Angiopathy / Vasculopathy

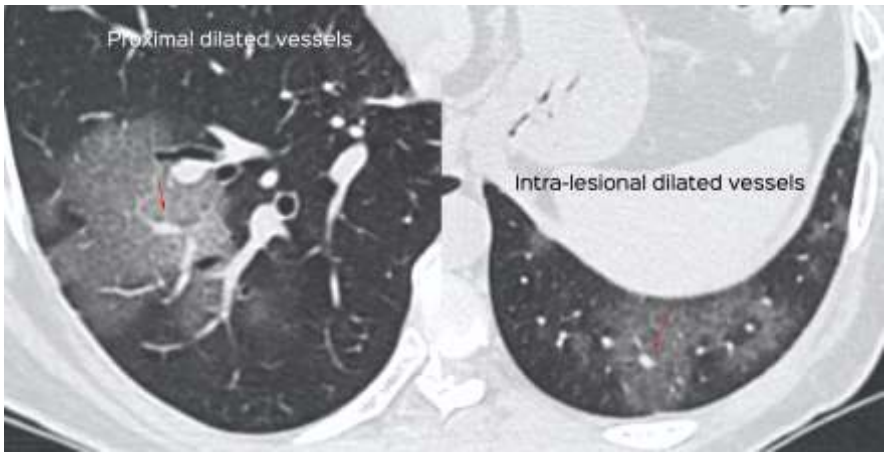

Fig. 1: Dilated vessels. Two separate images showing proximal and intra-lesional dilated vessels.

Fig. 2: Peripheral subpleural dilated vessels. MIP image shows vessels extending up to the pleural surface (red arrow). Normally vessels are only seen up to the last 2 cm of the lungs.

The SARS-COV-2 virus attacks the ACE2 receptors in the lungs and produces an endothelitis that leads to many of the lung changes described in the last newsletter.

There are many signs of angiopathy / vasculopathy on CT.

Plain Scan

1. Prominent intra-lesional or proximal vessels (Fig. 1)
2. Subpleural prominent / dilated vessels (Fig. 2)
3. Vascular tree-in-bud (Fig. 3)
4. Target sign (Fig. 4)

Contrast Scan

5. Pulmonary thrombosis (Fig. 5)
6. Perfusion defects and hyperemic halo on dual energy CT (DECT) (Fig. 6)

When these signs are seen, they confirm the presence of a vasculopathy and in turn also confirm the presence of Covid-19, since there are very few conditions that present with these signs.

The clinical implications of this angiopathy are not significant in mild cases but become very important in moderate to severe cases.

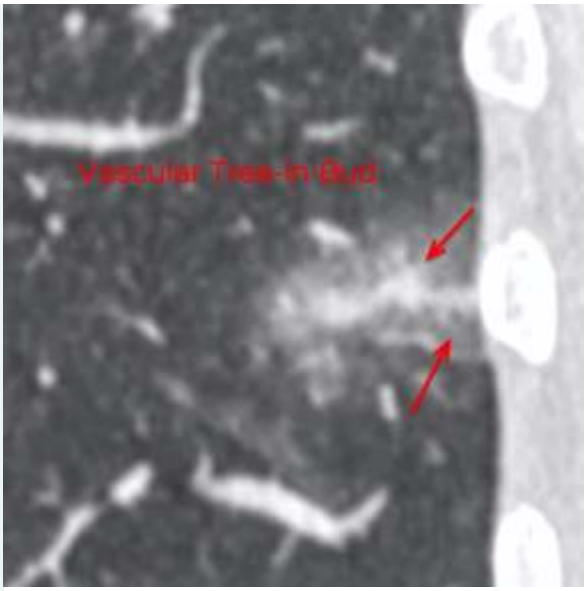

Fig. 3: Vascular tree-in-bud. This occurs due to extension of microthrombi in dilated vessel branches (arrows).

At a glance

- Angiopathy is the primary pathophysiologic process of Covid-19
- Signs on plain and contrast scans help us pick up the presence of an angiopathy and by inference improve our ability to diagnose Covid-19

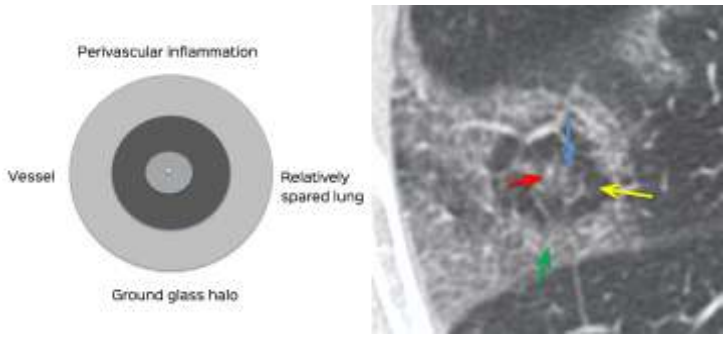

Fig. 4: Target sign. Diagrammatic representation on the left with the image on the right showing the central vessel (red arrow), perivascular edema / inflammation (blue arrow), relatively spared lung (yellow arrow) and surrounding organizing pneumonia (green arrow).

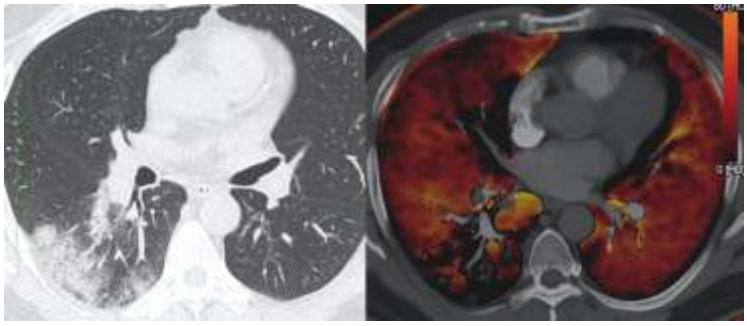

Fig. 6: Perfusion defect. The left image shows a perivascular opacity in the superior segment of the right lower lobe, while the dual energy map of the pulmonary angiogram (right image) shows a perfusion defect without pulmonary thrombosis.

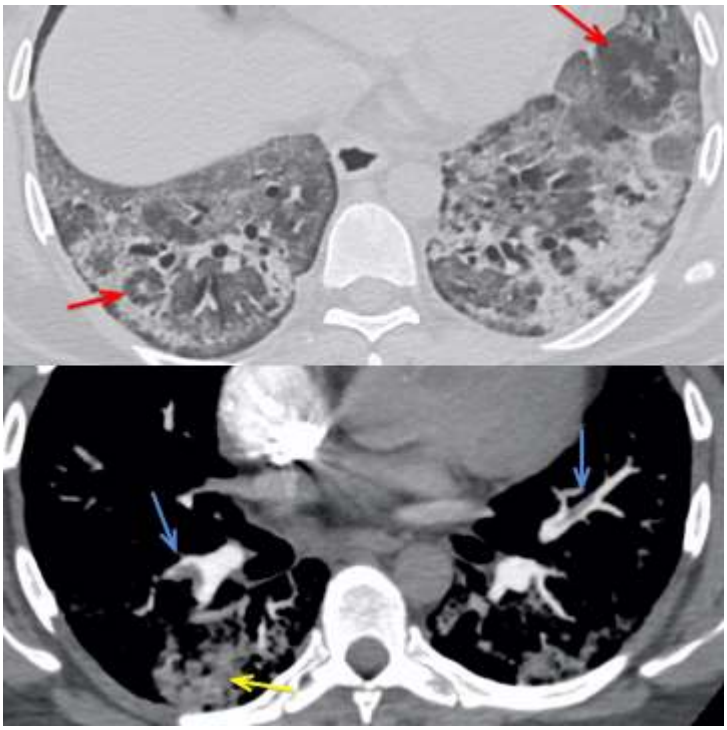

Fig. 5: Pulmonary thrombosis and infarction. The upper image shows extensive lung involvement with a target sign in the right lower lobe (red arrow) with thrombosis in the right lower lobe pulmonary artery (blue arrow, lower image) and bubble lucencies due to hemorrhagic infarction (red arrow).

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