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Corona sign in the lungs in coronavirus disease 2019: Case report of a new diagnostic sign

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Abstract

The CoronaVirus Disease 2019 (COVID-19) pandemic continues raging across the world well into its second year. High Resolution Computed Tomography (HRCT) has become an extremely valuable tool in diagnosis of the disease, assessing disease severity and prognosis for patients and also as a valuable adjunct to RT-PCR. Many of the HRCT signs of COVID-19 are non-specific and overlapping with other viral pneumonias, however a few signs though uncommon, are being found to be relatively diagnostic for COVID-19. We present such a new diagnostic sign which we call as the 'Corona sign' after the disease causing it.

Keywords: Coronavirus disease 2019, high resolution computed tomography

Introduction

After initial reports of the disease from Wuhan, China in late 2019, the CoronaVirus Disease 2019 (COVID-19) pandemic continues raging across the world well into its second year. Though RT-PCR swab tests are considered the gold standard for disease diagnosis, High Resolution Computed Tomography (HRCT) has become an extremely valuable tool in diagnosis of the disease, assessing disease severity and prognosis for patients and also as a valuable adjunct to RT-PCR. Many of the HRCT signs of COVID-19 are non-specific and overlapping with other viral pneumonias such as ground glass opacities, interlobular septal thickening, consolidation, microvascular dilatation etc. However a few signs though uncommon, are being found to be relatively diagnostic for COVID-19. We present such a new diagnostic sign which we call as the 'Corona sign' after the disease causing it.

Case report

A 32-year-old woman with cough and fever who was RT-PCR positive for Coronavirus Disease 2019 (COVID-19), was referred for an HRCT of the thorax. The coronaviruses are named so because of their shape resembling a solar corona or halo on electron microscopy. In astronomy, the solar corona is a bright aura or ring of plasma which surrounds the sun. As a coincidence, our patient's HRCT showed multiple corona-shaped lesions in the lungs. We used an 'Inferno' Colour Look Up Table (CLUT) template (Osirix™ imaging software, Apple Inc., Cupertino, California, USA) (Figure 1) to highlight the similarity of the lesions to solar coronas. We also performed Three-Dimensional Volume Rendering of the CT images (Figure 2).

The lesions represent a central round focus of peri-vascular pulmonary inflammation, an intermediate zone of lucent spared lung and an outer arc-like corona of inflammation. Also described previously as 'target sign'¹ or 'combined halo and reverse halo sign'², the authors suggest the alternate name 'Corona sign' for this variant HRCT appearance, befitting the disease causing it. Though many imaging features of COVID-19 are non-specific such as ground glass opacities and interlobular septal thickening³, we believe the corona sign is characteristic of the disease as per published literature and our own anecdotal experience. Further research is needed to collaborate sensitivity and specificity of the sign with regards to COVID-19.

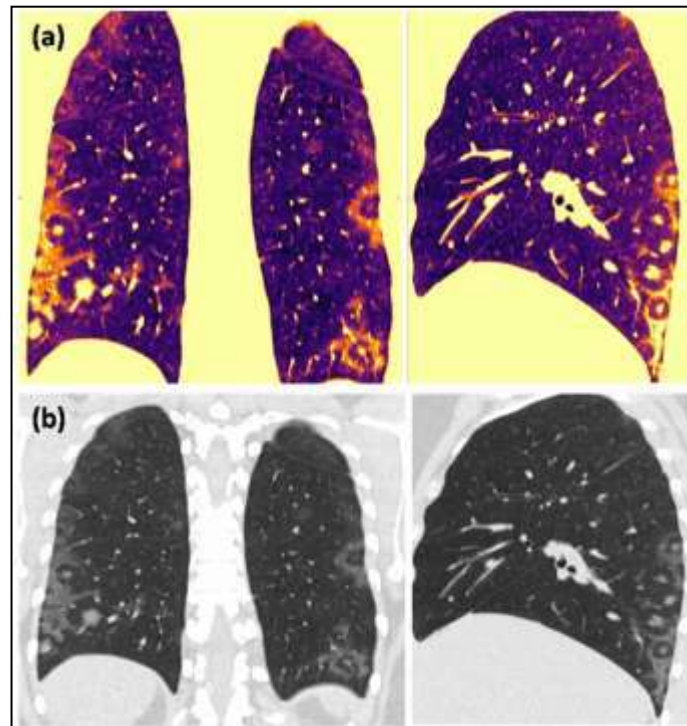


Fig 1: Coronal and Sagittal HRCT thorax images of the patient with an 'Inferno' CLUT template (a) showing multiple corona shaped lesions in both lungs in a subpleural distribution, used to highlight similarity of the lesions to bright solar coronas in a background of dark purple lungs resembling the night sky. Native HRCT images (b) show the central ground glass density focus in the lesions, an intermediate zone of spared lung and an outer rim of arc-like ground glass density forming the 'Corona sign'.



Fig 2: Three-Dimensional Volume Rendered image of HRCT of thorax of the patient with COVID-19 showing multiple corona shaped lesions in both lungs highlighting the Corona sign.

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