

High-resolution computed tomography in a patient with COVID-19 with non-diagnostic serial radiographs

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Case

A 63-year-old Chinese man from Wuhan, China, presented to the emergency department of Princess Margaret Hospital, Hong Kong, in January 2020 with coryzal symptoms.

He was afebrile with unremarkable respiratory examination results. He was admitted to an isolation ward for further investigation. He subsequently developed a fluctuating fever up to 38.5°C after admission and passed loose stool intermittently. His oxygen saturation levels were normal throughout hospitalisation. Supportive treatment and empirical antibiotics (amoxicillin-clavulanate) were administered.

Coronavirus disease 2019 (COVID-19) was suspected, and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection was confirmed the next day by throat swab and nasopharyngeal aspirate tests. Stool culture was negative for SARS-CoV-2 and other pathogens.

Blood test results revealed lymphopenia ($0.6 \times 10^9/L$). Total white blood cell count ($4.4 \times 10^9/L$), absolute neutrophil count ($3.4 \times 10^9/L$), monocyte count ($0.3 \times 10^9/L$), and eosinophil count ($0.0 \times 10^9/L$) were normal. Liver and renal function test results, C-reactive protein level, and serum calcium and phosphate levels were normal.

Daily portable chest radiographs over the next 5 days were unremarkable (Fig 1). Chest high-resolution computed tomography (HRCT) was performed to assess for pulmonary involvement. High-resolution computed tomography performed 6 days after admission (Fig 2) demonstrated a few patchy subpleural ground-glass opacities in both lungs. No other abnormalities were detected. Subsequent follow-up chest radiograph (Fig 3) remained clear.

The patient's fever subsided 11 days after admission. No supplemental oxygen was required. Serial nasopharyngeal aspirate sample tests turned negative 22 days after admission. The patient was discharged from the hospital 27 days after admission.

Discussion

The SARS-CoV-2 infection is diagnosed with reverse transcription polymerase chain reaction results of respiratory specimens.



FIG 1. A 63-year-old Chinese male with suspected coronavirus disease 2019 infection presented with coryzal symptoms without fever. A portable chest radiograph 6 days after admission was unremarkable despite changes on high-resolution computed tomography scans

Prior to availability of confirmatory microbiological test results, challenges exist in decision making for patients with suspected COVID-19.

We advocate that early HRCT should be considered in suspected cases to aid in clinico-radiological diagnosis of SARS-CoV-2 infection by demonstrating compatible radiological features, before microbiological confirmation has been established.

This can be especially beneficial if patients have negative preliminary virology or radiographic findings, as in the previously reported HRCT features in severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS),^{1,2} as well as recent reports on COVID-19 from China³ and Hong Kong.⁴

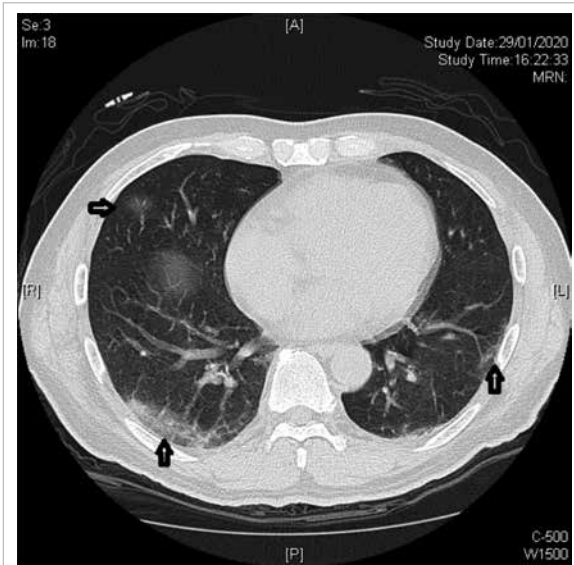


FIG 2. High-resolution computer tomography 6 days after admission showing small patchy areas of subpleural ground-glass opacities in the posterior right lower lobe, the right middle lobe, and the left lower lobe (arrows). No other abnormalities are visible. Diagnosis of severe acute respiratory syndrome coronavirus 2 infection was confirmed with nasopharyngeal aspirate and throat swab samples



FIG 3. Follow-up chest radiograph 11 days after admission remained clear

Findings on serial chest radiographs before and after HRCT remain occult without demonstrable airspace opacity, limiting its value in initial assessment, monitoring or exclusion of pulmonary involvement.

This is consistent with experience during the SARS epidemic that HRCT was useful for early radiological assessment for patients with negative chest radiographs.⁵

Our patient subsequently demonstrated a favourable outcome with recovery and did not require supplemental oxygen throughout hospitalisation.

Mirroring experiences in previous coronavirus outbreaks such as SARS and MERS, we believe that HRCT will likely play a key role in aiding diagnosis, assessing the extent of pulmonary involvement and risk in the current COVID-19 pandemic. Early HRCT can be beneficial in patients with obscure clinical presentation or negative preliminary virological or radiographic findings.

Author contributions

All authors contributed to the concept or design of the study, acquisition of data, drafting of the manuscript, and critical revision of the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Ethics approval

This study was approved by the Kowloon West Cluster Research Ethics Committee (Ref KW/EX-20-049(145-08)).

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