

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Medical Imaging Quiz – Case 65

A 62-year-old male presented to the emergency department with fever and cough for 4 days. Physical examination revealed blood pressure of 140/90 mmHg, pulse rate of 95/min, respiratory rate 30/min, SatO₂ 94%, temperature 38.7 °C, and pathological auscultatory sounds. Laboratory findings showed lymphopenia, elevated CRP and LDH. Chest X-ray was performed and showed bilateral, peripheral opacities (fig. 1). Polymerase chain reaction (PCR) for SARS-CoV-2 was positive.

Comment

COVID-19 is an infectious disease caused by SARS-CoV-2. The first cases were seen in Wuhan, China, in December 2019 before spreading globally, with more than 1.3 million deaths and 54 million cases now confirmed.

Definitive diagnosis of COVID-19 requires a positive real-time reverse transcriptase-polymerase chain reaction (RT-PCR) test. Current best practice advises that computed tomography (CT) chest is not used to diagnose COVID-19, but may be helpful in assessing for complications. The non-specific imaging findings are most commonly of atypical or organizing pneumonia, typically with a bilateral, peripheral, and basal predominant distribution.

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No specific treatment exists although dexamethasone, a steroid agent, has been shown to markedly improve outcomes in ventilated or oxygen-dependent patients.

R₀ is estimated 2.2 and 3.28 in a non-lockdown population. The median incubation period for COVID-19 was 5.1 days. Case fatality rate is approximately 2–3%. It is speculated that the true case fatality rate is lower than this because many mild/asymptomatic cases are not being tested, which thus skews the apparent death rate upwards.

COVID-19 typically presents with systemic and/or respiratory manifestations. Some also experience mild gastrointestinal or cardiovascular symptoms, although these are less common. A significant minority of individuals infected with SARS-CoV-2 remain

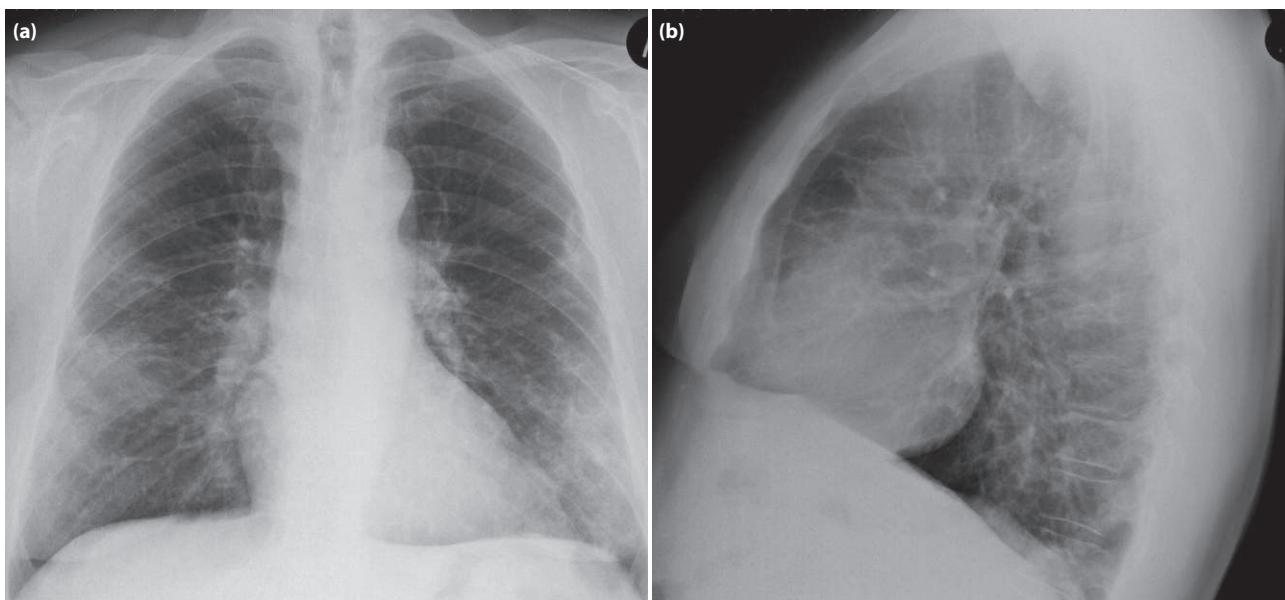


Figure 1. Chest X-ray face (a) and profile (b) revealed bilateral, peripheral opacities with lower zone distribution.

asymptomatic throughout the course of their illness acting as carriers.

The full spectrum of clinical manifestations of COVID-19 is broad with non-specific signs and symptoms. More common symptoms are fever (85–90%), cough (65–70%), anosmia (40–50%), fatigue (35–40%), sputum production (30–35%), shortness of breath (15–20%), myalgia/arthralgia (10–15%), headaches (10–36%), sore throat (10–15%), chills (10–12%), pleuritic pain, diarrhoea (3–34%). Cutaneous lesions may also be seen, similar to many other viral infections.

The definitive test for SARS-CoV-2 is the RT-PCR test. It is believed to be highly specific, but with sensitivity reported as low as 60–70%, and as high as 95–97%. Meta-analysis has reported the pooled sensitivity of RT-PCR to be 89%. Thus, false negatives are a real clinical problem, and several negative tests might be required in a single case to be confident about excluding the disease.

The threshold for the imaging of patients with potential/confirmed COVID-19 demonstrates a degree of variation globally due to local resources, the published guidelines of individual learned bodies and socio-cultural approaches to imaging. The use of CT as a primary screening tool is discouraged, not least because these studies tended to suffer from selection bias.

According to a Fleischner Society consensus statement published on 7 April 2020: (a) Imaging is not indicated in patients with suspected COVID-19 and mild clinical features unless they are at risk for disease progression; (b) imaging is indicated in a patient with COVID-19 and worsening respiratory status; and (c) in a resource-constrained environment, imaging is indicated for medical triage of patients with suspected COVID-19 who present with moderate-severe clinical features and a high pretest probability of disease.

Moreover performing CT routinely for large cohorts of patients carries additional risks: Depletion of finite resources, increased risk of viral transmission, additional ionizing radiation exposures.

The primary findings of COVID-19 on chest radiograph and CT are those of atypical pneumonia or organizing pneumonia.

However, imaging has limited sensitivity for COVID-19, as up to 18% demonstrate normal chest radiographs or CT when mild or early in the disease course, but this decreases to 3% in severe disease. Bilateral and/or multilobar involvement is common.

Although plain radiograph is less sensitive than chest CT, chest radiography is typically the first-line imaging modality used for patients with suspected COVID-19. For ease of decontamination, use of portable radiography units is preferred.

Chest radiographs may be normal in early/mild disease. In those COVID-19 cases requiring hospitalization, 69% had an abnormal

chest radiograph at the initial time of admission, and 80% had radiographic abnormalities sometime during hospitalization. Findings are most extensive about 10–12 days after symptom onset.

The most frequent findings are airspace opacities, whether described as consolidation or less commonly, ground-glass opacification-opacity. The distribution is most often bilateral, peripheral with lower zone predominance. In contrast to parenchymal abnormalities, pleural effusion is rare (3%).

The British Society of Thoracic Imaging (BSTI) have published a reporting proforma for the plain chest radiographic appearances of potential COVID-19 cases: (a) Classic/probable COVID-19 (lower lobe and peripheral predominant multiple opacities that are bilateral); (b) indeterminate for COVID-19 (does not fit classic or non-COVID-19 descriptors); (c) non-COVID-19 (pneumothorax/lobar pneumonia/pleural effusion(s)/pulmonary edema/other); and (d) normal (COVID-19 not excluded).

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