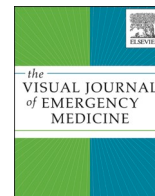




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## Visual Case Discussion

## Missed by RTK, caught by PCR, unimagined chest Radiograph

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## ARTICLE INFO

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## 1. Discussion

The sensitivity of RTK-Ag is high if the cycle threshold (CT) value is less than 30.<sup>1</sup> This correlates with infectivity of the virus. However, we are not sure the viral load trend. That is why in severe acute respiratory infection (SARI), clinical judgment and confirmation with rRT-PCR is important.

In fact, in this kind of cases the potential to be missed even by single rRT-PCR test can be up to 30%<sup>2</sup> especially when the virus replicates in lower lung rather than in nasopharynx. Supposedly all cases of (SARI) must be treated as COVID-19 case.

The clinical diagnosis of COVID-19 can be support by presenting history and chest radiograph. The earlier study indicated the sensitivity of chest radiography in diagnosing COVID-19 can be as high as 98%.<sup>3</sup>

## 2. Visual case discussion

## 2.1. Case summary

A 65-year-old gentleman with underlying diabetes and hypertension presented unwell for one-week fever, cough with whitish sputum. It was associated with myalgia. There was increasing breathing effort for the past one week until he presented to emergency department with tachypnea and lethargy.

His-vitals recorded as blood pressure of 140/71 mmHg with heart rate of 120 beats/min unsupported. The chest radiograph showed heterogenous opacities involving both lower lobes and periphery of the lungs (Fig. 1) He was put on high flow mask 15 L/m. However, he

developed worsening hypoxemic respiratory failure and required intubation. His-arterial blood gas post intubation showed pH 7.225/pCO<sub>2</sub> 45/pO<sub>2</sub> 81/HCO<sub>3</sub> 17/lac 2.6 with fraction of inspired oxygen (FiO<sub>2</sub>) of 1.0.

He was confirmed COVID-19 positive on real-time reverse transcription polymerase chain reaction (rRT-PCR) even after the initial antigen rapid test (RTK-Ag) was negative. While waiting to be transported to the isolation ward, the patient desaturated till 50%. The latest ABG results was pH 7.145/pCO<sub>2</sub> 60/pO<sub>2</sub> 60, with FiO<sub>2</sub> of 0.7. Fig. 1

## 3. Questions

## Question 1

Where is the most common distribution site of lung heterogenous opacity in COVID-19?

- A Central
- B Upper zone
- C Unilateral right
- D Bilateral lower zones and periphery
- E Middle zone

Answer: D.

Consolidation and ground glass opacities are the most common finding on chest radiograph in COVID-19. The distribution of opacities in COVID –19 pneumonia is more common in the bilateral lower zones of lung distribution (50%), peripheral of lung (41%), and followed by pleural effusion (3%).<sup>4</sup> The percentages of COVID-19 pneumonia chest

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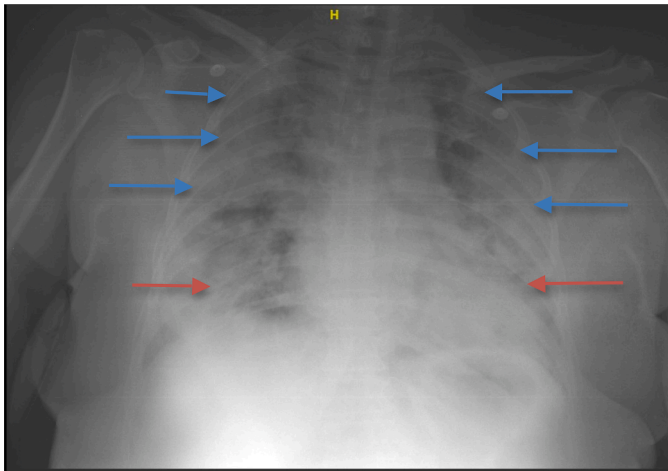
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**Fig. 1.** Heterogenous opacities involving both lower lobes (red arrow) and periphery (blue arrow) of right and left lung.

radiograph findings in comparison with non-COVID-19 pneumonia were a ground-glass opacity (91% vs 68%), peripheral distribution (80% vs 57%), vascular thickening (59% vs 22%), and fine reticular opacity (56% vs 22%) which was peak at 10–12 days from the onset of symptoms.<sup>5</sup> Central lung opacities were only 14% in comparison with peripheral opacities distribution 35%.<sup>5</sup> Meanwhile pleural effusion was only present in 4% in non-COVID-19 pneumonia in comparison with COVID-19 pneumonia 39%.<sup>5</sup>

#### Question 2

RTK is indicated for confirmatory diagnosis of COVID 19.

True/False

Answer: False

There are 3 tests commonly performed to detect severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus and body response to infection. The test is RTK-Ag, rRT-PCR and antibody test. RTK is detecting viral protein. Therefore, a person is more likely to had positive during infectious period. PCR based test detect a small viral component, therefore it can be positive for longer period despite of noninfectious period.<sup>6</sup> Meanwhile, antibody test is detecting the body immune response towards COVID-19 which were IgM and IgG antibody. Therefore, the most reliable test to confirm the diagnosis of COVID-19 is RT-PCR performed using nasopharyngeal swabs. False negative results of RTK does not exclude COVID-19 if history and chest radiograph were suggestive. False negative occurs due to inappropriate sampling collection time, techniques from nasopharyngeal swab. The test positivity was highest in bronchoalveolar lavage sample, sputum specimen, nasal and followed by pharyngeal swab.

#### Declaration of Competing Interest

No conflict of interest

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