Case 16674

Typical and atypical CT findings in an RT-PCR confirmed COVID-19 patient
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Section: Chest imaging
Area of Interest: Thorax
Imaging Technique: Conventional radiography
Imaging Technique: CT
Case Type: Clinical Cases
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Patient: 53 years, female

Clinical History:
A 53-year-old woman was referred to our emergency department by her general practitioner (GP) because of increasing dyspnoea and suspicion of COVID-19 infection. Symptoms started five days prior with muscle ache, sore throat, cough, general malaise and fever up to 38°C. No other remarkable medical history was noted. Laboratory results showed only a mildly increased CRP (16 mg/L). There was no hypoxaemia. She was tested for COVID-19, influenza and respiratory syncytial virus.

Imaging Findings:
In the general workup of a patient with respiratory symptoms, an AP bedside chest X-ray was performed. This demonstrated a normal size of the heart without evidence of alveolar consolidation or pleural effusion. However, there was a noticeable increase in interstitial trauma at the base of the lungs. (Fig. 1)

The reverse transcriptase-polymerase chain reaction (RT-PCR) was positive for the SARS-CoV-2 nucleic acid and a non-enhanced CT scan was performed two days later to evaluate the progression and extent of the disease. CT showed bilateral multifocal ground-glass opacities with a mainly peripheral distribution, more pronounced in the left lung, and interstitial septal thickening / fibrotic bands in the base of the lungs. (Figs. 2-4) The presence of mediastinal lymphadenopathies was also noted. (Figs. 5, 6)

Discussion:

Background
Late 2019, a new virus emerged in Wuhan, China, causing multiple cases of severe pneumonia and several deaths. The virus, which got named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), had a worldwide outbreak in the weeks following and is currently declared a global health emergency by the World Health Organization. This infectious disease is known internationally as COVID-19. [1-3] The virus itself is transmitted by respiratory droplets, other methods of transmission are yet to be confirmed or discovered. [2]
Clinical perspective

The most common clinical features of the disease are fever and respiratory symptoms. The most common laboratory finding is lymphopenia. Generally, the elderly and patients with comorbidities are at risk of developing acute respiratory distress syndrome (ARDS) and the need to be admitted to an intensive care unit (ICU). [4] At the moment the mortality rate is estimated to be around 3%. [2] As the disease is easily spread and numerous people get infected, ICUs face great challenges as the number of new patients could exceed the maximum capacity.

RT-PCR is typically used to diagnose a COVID-19 infection. Sensitivity ranges from 60% up to 97% in the known literature. [5-7] Imaging could help us estimate a better probability of infection in patients with high clinical suspicion but a negative or unknown RT-PCR result, thus increasing the diagnostic value of CT. [8, 9] Imaging is also used to evaluate the severity of the disease and for follow-up.

Imaging perspective

In the very early course of the disease imaging findings may be normal. CT is more sensitive than chest radiography and shows characteristic imaging patterns. Most typical in the early stages of the disease are the bilateral ground-glass opacities that have a more peripheral and basal distribution. As the disease progresses, crazy paving and consolidation become the more dominant CT findings. Pleural effusion and mediastinal lymphadenopathy are atypical findings. [8-13]

Outcome

Our patient was clinically stable and was put into quarantine at home.

Take-home messages

The exact role of CT imaging in COVID-19 cases is not yet clear, but it shows increasing value in diagnosing COVID-19, especially when there is high clinical suspicion with an initial negative or unknown RT-PCR. Imaging also helps to estimate the severity and monitor the course of the disease.

Like the French Society of Radiology, the Belgian Society of Radiology recommends unenhanced CT as the preferred first imaging technique in evaluating proven or suspected COVID-19 infections when clinically necessary. Chest radiography should be limited and may only be considered in certain cases as an alternative for CT. Chest radiography does have a role in the follow-up imaging of patients admitted to an ICU with portable radiography units. [14, 15]

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Coronavirus disease-19 (COVID-19), Upper respiratory tract infection, Bacterial pneumonia, Influenza

Final Diagnosis: Coronavirus disease-19 (COVID-19)

References:

Description: AP bedside chest X-ray. This demonstrated a normal size of the heart without evidence of alveolar consolidation or pleural effusion. However, there was a noticeable increase in interstitial trauma at the base of the lungs. Origin: GZA Sint-Augustinus, Antwerp.
Description: Non-enhanced CT scan. Bilateral multifocal ground-glass opacities with a mainly peripheral distribution, more pronounced in the left lung. Origin: GZA Sint-Augustinus, Antwerp.
Description: Non-enhanced CT scan. Bilateral multifocal ground-glass opacities with a mainly peripheral distribution, more pronounced in the left lung. Origin: GZA Sint-Augustinus, Antwerp.
Figure 4

Description: Non-enhanced CT scan. Mediastinal lymphadenopathies. 
Origin: GZA Sint-Augustinus, Antwerp
Figure 6

Description: Non-enhanced CT scan. Mediastinal lymphadenopathies Origin: GZA Sint-Augustinus, Antwerp