COVID or not COVID, key role of CT in diagnosis and evolution : Case report.

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Abstract: Since December 2019, the world had experienced the emergence of an epidemic novel coronavirus disease named COVID-19 leading to a Public Health Emergency of International Concern (PHEIC). The non-enhanced chest computed tomography (CT) is an important imaging modality for the diagnosis and the management of patients with coronavirus disease 2019 (COVID-19). We present two cases of two young adults, the first one with a recent history of travel coming back from an endemic country who presented dry cough, myalgia, weakness and chest tightness all evolving in a context of low grade fever, the chest CT at admission was suggestive of COVID with positive biological confirmation by the real-time polymerase chain reaction (RT-PCR) test. The second patient had one week history of rhinopharyngitis associated to a dry cough, headache, myalgia, curvature, all evolving in a context of unencrypted fever who was admitted in the emergency department for acute dyspnea, the chest CT was also suggestive of COVID while the RT-PCR test on admission was negative. During their hospitalization, both patients received a series of RT-PCR tests and multiple pulmonary CT scans (3 times) providing reliable data of the dynamic radiological pattern. Both patients were treated initially with hydroxychloroquine in combination with Azithromycin and was interrupted in the second case. A few days later, the second patient showed a significant radiological improvement with different chronological evolution of lung abnormalities.

We present this case to compare the sensitivity of chest CT and viral nucleic acid test at initial presentation and to highlight the important role played by the chest CT and the chronological evolution of the imaging to orient and straighten the diagnosis.

Keywords: Imaging, CT, epidemic, COVID 19, RT-PCR.

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I. Introduction

Coronaviruses are non-segmented, enveloped, positive-sense, single-strand ribonucleic acid viruses, belonging to the Coronaviridae family [1]. In December 2019, an outbreak of unexplained pneumonia in Wuhan [2] was caused by a new coronavirus infection named COVID-19 with an accelerated increase in cases and deaths. Novel COVID-19 may causes diseases ranging from a common cold to severe respiratory disease and death. Imaging is critical in assessing severity and disease progression in COVID-19 infection. The non-enhanced chest CT may be considered for early diagnosis of this newly emerging life threatening infection, even if viral nucleic acid detection using (RT-PCR) remains the standard of reference [3]. The predominant CT findings include ground-glass opacification, consolidation, bilateral involvement, and peripheral and diffuse distribution.

First Case Presentation:

The patient was a 33-year-old man, non-smoker, with a recent history of travel coming back from an endemic country and 10 days history of dry cough, myalgia, weakness and chest tightness all evolving in a context of fever. The patient called the emergency number for COVID suspicion. The patient was examined by a special team and the examination revealed a low grade fever (Temperature : 37.9 °C), respiration rate (20 cpm); pulse (94 bpm); blood pressure (120/60 mmHg), blood oxygen saturation (92%). The remaining examination
was inconspicuous. An initial non enhanced chest computed tomography with multi-planar reconstruction was performed and showed bilateral, central and peripheral, diffuse ground glass opacities interesting the inferior and superior lobes associated to inter- and intralobular septal thickening (crazy-paving pattern). The extent of lung abnormalities was estimated between 20% and 50%. The first RT-PCR was positive. The patient was treated with hydroxychloroquine in combination with Azithromycin for 10 days. During hospitalization, the second and third RT-PCR tests were still positive while the fourth one was negative. The patient presented a gradual clinical improvement. The control CT at day 10 onset hospitalization revealed a regression of lung abnormalities (Figure 1-Figure 3).

Figure 1 : Axial non-enhanced lung sequences chest computed tomography at presentation in (A1,A2,A3,A4) and control CT respectively at 10 days onset hospitalization in (B1,B2,B3,B4), all images have the same window level and window width : (A1,A2,A3, A4) Bilateral diffuse ground glass opacities interesting the inferior and superior lobes associated to inter- and intralobular septal thickening (crazy-paving pattern). . (B1,B2,B3, B4) : regression of lung abnormalities.

Figure 2 : Coronal non-enhanced lung sequences chest computed tomography at presentation in (A1,A2,A3) and control CT respectively at 10 days onset hospitalization in (B1,B2,B3), all images have the same window level and window width : (A1,A2,A3) Bilateral diffuse ground glass opacities interesting the inferior and superior lobes associated to inter- and intralobular septal thickening (crazy-paving pattern). . (B1,B2,B3) : regression of lung abnormalities.
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Second Case Presentation:

The patient was a 40-year-old woman, non-smoker, with one week history of rhinopharyngitis associated to a dry cough, headache, myalgia, curvature, all evolving in a context of unencrypted fever. The patient didn’t have any recent travel history and had no close contact with an infected individual. She was admitted in the emergency department for acute dyspnea. She presented a low grade fever (Temperature: 37.8 °C), respiration rate (18 cpm); pulse (96 bpm); blood pressure (110/70 mmHg), blood oxygen saturation (90%). The remaining examination was inconspicuous. Anon enhanced chest computed tomography with multi-planar reconstruction was performed and showed bilateral, central and peripheral, diffuse ground glass opacities interesting the inferior lobes, the right superior and the middle lobes, and small bilateral consolidation areas. The extent of lung abnormalities was estimated between 25% and 50%. The patient was treated initially with hydroxychloroquine in combination with Azithromycin. The first real-time polymerase chain reaction (RT-PCR) was negative. The treatment was interrupted and the patient was underclose monitoring. Three days later, we noticed on the control CT a regression of lung abnormalities and the second RT-PCR test was still negative. She presented a significant clinical improvement including a decrease in dyspnea. Six days onset presentation, the control CT showed almost a complete disappearance of the above mentioned abnormalities (Figure 4 – Figure 7) and the third RT-PCR test was still negative.
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Figure 4: Coronal non-enhanced lung sequences chest computed tomography at presentation in (A1,A2,A3) and control CT respectively after 4 days in (B1,B2,B3) and after 10 days in (C1,C2,C3), all images have the same window level and window width: (A1,A2,A3) Bilateral diffuse ground glass opacities interesting the inferior lobes and the superior right lobe associated to a small consolidation areas. (B1,B2,B3 & C1,C2,C3): progressive disappearance of lung abnormalities.
Figure 5: Sagittal non-enhanced lung sequences chest computed tomography at presentation in (A1,A2,A3) and control CT respectively after 4 days in (B1,B2,B3) and after 10 days in (C1,C2,C3), all images have the same window level and window width: (A1,A2,A3) Bilateral diffuse ground glass opacities interesting the inferior lobes and the superior right lobe associated to a small consolidation areas. (B1,B2,B3 & C1,C2,C3): progressive disappearance of lung abnormalities.
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II. Discussion:

Thoracic imaging based on chest radiography and computed tomography (CT) are key tools for pulmonary disease diagnosis and management, however performing radiological examinations including CT for a large number of patients suspected or confirmed to have COVID-19 is challenging during an outbreak because of the multiple constraints of adherence to infection control protocols to minimize the risk of transmission and also to protect healthcare personnel[4].

To this intent, the Fleischner society has worked on a multinational consensus to guide and optimize the use of imaging in patient management during the COVID-19 pandemic and has developed different scenarios based on the severity features consistent with COVID-19, pre-test probability and resource constraints[5].

Among the scenarios proposed is that of patients with moderate to severe characteristics compatible with COVID-19 infection, any pre-test probability of COVID-19 infection, and no significant critical resource...
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References:


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