

CT Scan Based COVID-19 Diagnosis. Is It Possible?

Kwiatek S¹, Manka E², Sieron A³, Krupowies M¹ and Sieron K^{4*}

¹Sergeant Grzegorz Załoga Hospital of the Ministry of the Interior and Administration in Katowice, Poland

²Students Scientific Circle at Department of Physical Medicine, Faculty of Health Sciences in Katowice, Medical University of Silesia, Poland

³Faculty of Health Sciences, Jan Długosz University in Częstochowa, Poland

⁴School of Health Sciences in Katowice, Medical University of Silesia in Katowice, Department of Physical Medicine, Chair of Physiotherapy, Poland

Volume 4 Issue 6- 2020

Received Date: 02 May 2020

Accepted Date: 19 May 2020

Published Date: 28 May 2020

Clinical Image

The COVID-19 pandemic has indicated the significance of negative results of samples taken to identify severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by a real-time reverse transcriptase PCR (RT-PCR) assay [1,2]. One of the most common Computed Tomography (CT) image finding in patients with SARS-CoV-2 pneumonia was pure ground-glass opacities with bilateral distribution of lung lesions [3]. The study present two cases with symptoms corresponding to COVID-19 with a similar image in CT, however, one of the patients had a negative test result for SARS-CoV-2.

Patient 1 Positive RT-PCR Result

A 72-year-old woman with hypertension, ischemic disease, with implanted cardio stimulator. Patient reported weakness, dyspnea, temperature elevated up to 38°C for past 3 days. Auscultatory silenced alveolar murmur, slight crackling. The laboratory tests revealed the following deviations:

C-reactive protein (CRP) 14.9 mg/l (Normal Rate (RT) <5 mg/l), d-dimer 1809.2 g/L (NR<500 g/L). An arterial-blood gas (ABG) test revealed partial pressure of carbon dioxide (pCO₂) 27.6 mmHg (NR 35-45 mmHg), partial pressure of oxygen (pO₂) 65 (NR 74-108 mmHg) and pH 7.5 (NR 7.35-7.45). Oxygen saturation 94.6% (NR 96-99%). CT scans showed pulmonary embolism within one branch of the right pulmonary artery and bilateral pure ground-glass opacities peripherally.

Patient 2 Negative RT-PCR Result

A 38-year-old patient was admitted to the emergency department due to weakness and temperature 39°C, with no underlying conditions. Patient reported contact with a person returning from Sri Lanka. In physical examination no abnormalities were noted. The laboratory tests revealed a non-characteristic troponin ratio with normal CK-MB levels, CRP 46.4 mg/l, d-dimer 1336.36 g/L and slightly elevated white blood cells 10.57 (10x3/l). Negative influenza test. Ct scans revealed peripheral pure ground-glass opacities in both lungs.

The presentation of both described patients with CT scans were compatible with COVID-19. The aforementioned cases indicate the necessity of CT scans in diagnosis of COVID-19 patients who

show clinical symptoms of infection. Many factors may affect false-negative RT-PCR. Among those we can indicate faulty swab technique. Moreover the fact that SARS-COV-2 receptor, an angiotensin converting enzyme 2, shows superficial expression on alveolar epithelium cells while it doesn't appear on nasopharynx cells, where swabs are standardly taken from may lead to false-negative results [4]. The Li et al. study, which included 610 patients, reports a high rate of false negative RT-PCR results in finally confirmed patients depending on the time of swab collection during hospitalization [1]. A negative test therefore does not exclude infection. These cases highlight the usefulness of CT in diagnosing patients suspected of SARS-CoV-2 infection whose clinical presentation and CT image corresponds to COVID-19 despite of a negative RT-PCR result.

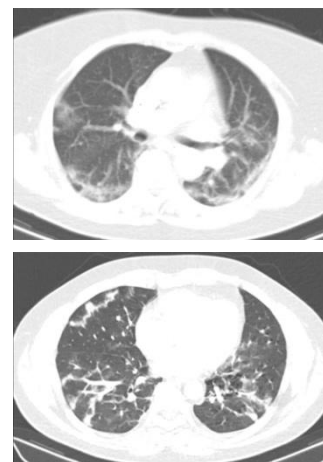


Figure 1: Chest Computed Tomography scans presenting ground-glass opacities with bilateral distribution of lung lesions. A: Patient 1 Positive RT-PCR Result; B: Patient 2 Negative RT-PCR Result.

Citation: Karolina S et al., CT Scan Based COVID-19 Diagnosis. Is It Possible?. Journal of Clinical and Medical Images. 2020; V4(6): 1-2.

*Corresponding Author (s): Karolina Sieron, School of Health Sciences in Katowice, Medical University of Silesia in Katowice, Department of Physical Medicine, Chair of Physiotherapy, Medyków 12 St., 40-751 Katowice, Institutional Telephone Number: 32 782 72 00, E-mail: ksieron@sum.edu.pl

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