ROLE OF DIFFERENT IMAGING MODALITIES IN DETECTION OF VARIOUS VASCULAR COMPLICATIONS OF COVID-19

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Introduction

COVID-19 caused the most recent pandemic which had noticeable major effects on the entire world. It's caused by the seventh and the latest identified member of the corona virus group. Refined research and documentation showed that in acute infections, it takes about 14 days to get the patient intubated and about 5 days later death occurs. COVID-19 is more transmissible than other members in corona virus group, even higher than SARS and MERS together. The corona viruses are thought to have come from animals and have the ability to cause serious and even deadly illnesses in people. Unfortunately, the increased number of human-animal interactions brought by contemporary agricultural methods, new corona viruses are likely to emerge in the future.

Surprisingly, COVID-19 turned to be a systemic disease more than just respiratory. The infection may causes vascular thrombosis or even vasculitis anywhere in the body. Alterations and dysregulations of the host immunological response and endothelial cell dysfunction causes a cytokine storm which turned to be the corner stone of the disease pathophysiology.

Aim of the Work

The aim of this study was to detect and describe the different imaging features of COVID-19 vascular complications among the different body systems and organs using different imaging modalities.

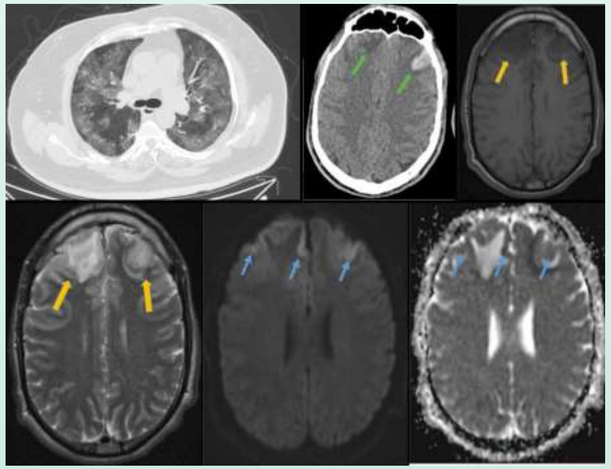
Subjects and Methods

A retrospective study on 3000 patients was done between March 2020 and December 2021 on a group of patients with positive PCR test for COVID-19. The patients with high viscosity syndrome or with previous history of vascular disease were excluded. 564 patients were studied showing COVID-19 associated vasculopathy by different imaging modalities.

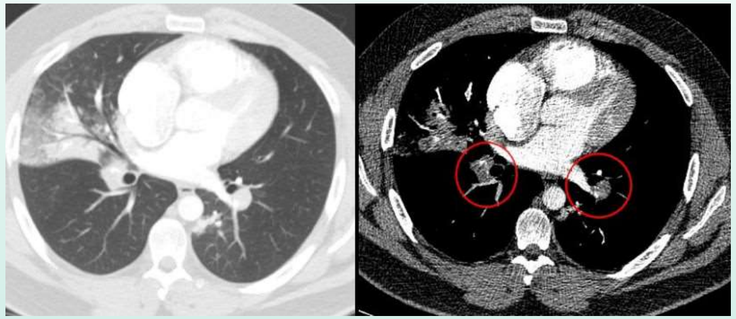
Results

Table: Percentage of vasculopathy detected by imaging in each system

	Percentage
Neurological vasculopathy	93%
Pulmonary vasculopathy	3.5%
GIT vasculopathy	2.5%
Peripheral arterial vasculopathy	1.1%
Multi-system vasculopathy	10.6%
Peripheral venous vasculopathy	1.8%



A 54 years old male patient with positive PCR for COVID-19 infection presented to the emergency unit with a sudden disturbed level of consciousness. Chest CT examination (lung window) revealed progressive bilateral sub-pleural ground-glass opacities of COVID-19 infection. Urgent non-contrast brain CT revealed bilateral high fronto-parietal cortical mixed hypo and hyper-dense areas (green arrows). Brain MRI stroke protocol was performed. The areas of mixed CT densities expressed heterogeneous hypo-intense signals in T1-WI and mixed is o/hyperintense signals in T2-WI. Positive diffusion restriction was noted with cortical bright DWI signal and low ADC (blue arrows). Hyper-acute hemorrhagic infarctions associated with progressive COVID-19 infection was the diagnosis.



A 44 years old female patient presented to the emergency department with acute chest pain and hypoxia. Urgent CT chest was performed showing mosaic attenuation of the lung lobes with patchy asymmetric areas of GGOs mounting to consolidations seen affecting the middle lobe as well as the lower lobes bilaterally. Her D-Dimer laboratory test result was significantly high. CT pulmonary angiography was urgently performed. The main pulmonary trunk is patent, yet, with extensive bilateral pulmonary artery, 2nd and 3rd order branches filling defects, more appreciated at the lower lobes segments. Pulmonary embolism associated with COVID-19 infection was the final diagnosis.

Conclusion

Multi-system vasculopathy is serious complication of COVID-19 infection and responsible for its most lethal complications. Different imaging techniques and modalities are useful for detecting and the diagnosis of cerebrovascular, pulmonary, gastrointestinal, and peripheral arterial COVID-19 vascular complications.