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Post-Acute COVID-19 Complications

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Abstract: ***Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a RNA virus that emerged in 2019 and is associated with a variety of clinical phenotypes ranging from asymptomatic to more severe disease generally referred to as coronavirus disease (COVID-19). In some cases, patients are asymptomatic but, in some cases, patients became serious during active COVID-19 period. These days many patients especially those with comorbidities are experiencing many complications after the active COVID-19 period, and this is termed as post-COVID-19. These patients experienced other abnormalities such as dyspnea, cough, oxygen dependence, fibrotic lung changes, decreased diffusion capacity, and reduced endurance. Here we present a case of patient who developed several complications of post-COVID-19 one after one. First, he was admitted for COVID-19 and then discharged but after some days readmitted due to some complications such as hypoxia, and fall at home. This patient had developed deep vein thrombosis, pulmonary embolism, lung fibrosis, multiple organ failures etc. in the course of treatment period. Such types of cases are less where many of such complications occurs one after one.***

Keywords: SARS-CoV-2, post-COVID-19. deep vein thrombosis, pulmonary embolism, lung fibrosis

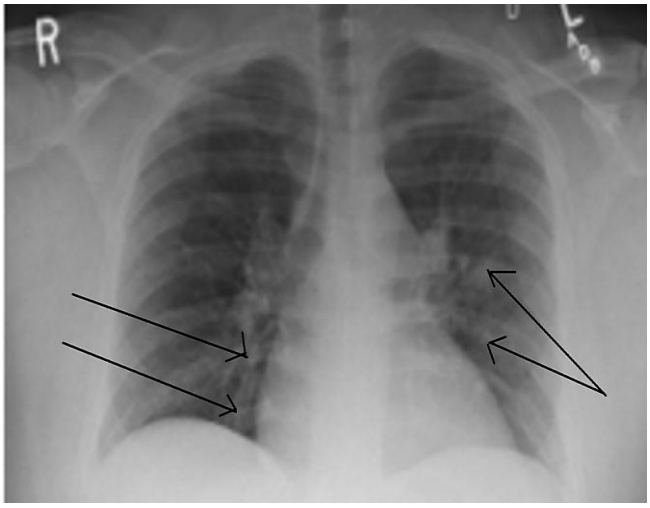
1. Introduction

Coronavirus disease 2019 (COVID-19), the highly contagious viral illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had a catastrophic effect on the world's demographics resulting in more than 6 million deaths worldwide, emerging as the most consequential global health crisis since the era of the influenza pandemic of 1918. After the first cases of this predominantly respiratory viral illness were first reported in Wuhan, Hubei Province, China, in late December 2019, SARS-CoV-2 rapidly disseminated across the world in a short span of time, compelling the World Health Organization (WHO) to declare it as a global pandemic on March 11, 2020. [1] After recovering from covid-19 infection, some of patients have developed some abnormalities which can range from mild to severe, and it was termed as post-COVID-19. Understanding of post-acute COVID-19 syndrome at this time is limited, and any organ system can be potentially affected. Hence, post-acute COVID-19 syndrome should be considered a diagnosis of exclusion. Considering this novel clinical entity manifests with various respiratory, cardiovascular, hematologic, and neuropsychiatry symptoms either alone or in combination, the following commonly occurring conditions can be considered but not limited to in the differential diagnosis of post-acute COVID-19 syndrome. Dyspnea, cough, oxygen dependence, fibrotic lung changes, decreased diffusion capacity, and reduced endurance are the common pulmonary abnormalities seen in patients with post-acute COVID-19 syndrome [2]. Even after recovering from covid some patients start complaining about shortness of breath, anxiety, sustained fever. Due to lack of awareness post-covid became a serious problem for some patients especially with comorbidities. Here in this case report, we report case of 68-year old individual who unfortunately developed some serious complication such as Deep Vein thrombosis, Pulmonary embolism, Lung fibrosis etc. following COVID-19 infection.

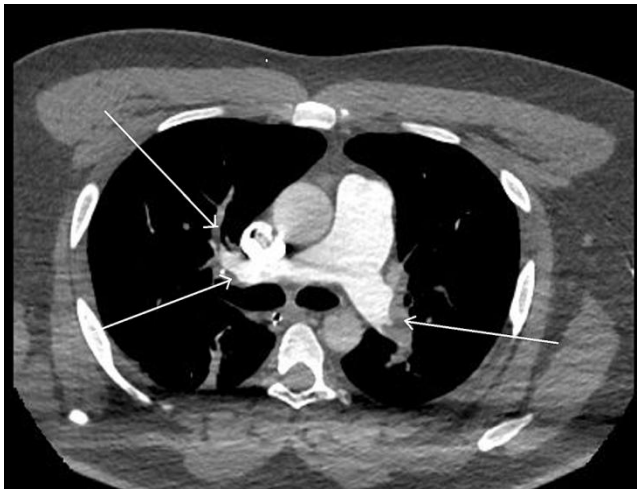
2. Case Report

We report a case of an 68-year-old male with some comorbidities such as Diabetes Mellitus and Hypertension. The patient was having mild fever and sore throat, body ache etc. & the patient was in contact with the COVID-19 infected patient. As per MOHFW guidelines (1) he was tested with throat swab reverse-transcription polymerase chain reaction (RT-PCR) and he noted to be COVID-19 positive. A high-resolution computerized tomography (HRCT) of thorax performed and it showed bilateral asymmetrical discrete patchy areas of ground-glass opacity and septal thickening along Broncho vascular bundles. His CT SEVERITY INDEX (CTSI) was 08/25 with COVID-19 Reporting and Data system (CO-RADS) of 5, D-DIMER level was 1.32 mg/L. fig (1). As the CTSI was high patient was admitted. As a part of treatment patient was administered by doses of **INJ. MEROPENEM (1Mg), INJ. Ondansetron (4Mg), INJ. ESMOPRAZOLE (40Mg), along with** Normal Saline for 3 days and then on oral medications for 3 days. After 6 days of treatment RT-PCR test & COVID-19 antigen test was conducted and it came to be negative, D-Dimer levels at 6th day of treatment was 0.46 mg/L. (refer to FIGURE-1) So on the basis of above test results as well as patient was asymptomatic, patient had been discharged.

Same patient came after 4 days of discharge with a hypoxia, fall at home and leg pain. Ultrasound of the bilateral legs was not performed due to low clinical suspicion of any clotting. D-Dimer level was tested and it came to be 1.73 mg/L which is quite high. So patient was admitted on HFNO. There was no fever, sore throat, etc. but as per MOHFW guidelines we conducted RT-PCR test and it came to be negative. CT BRAIN done suggestive of subacute infarct in occipital region. After 12 hrs. Patient started complaining about severe leg pain and developed bilateral lower limb toes black discoloration and coldness (suggestive of gangrene). Lower limb doppler performed it was suggestive of diffuse atherosclerosis changes in both lower limb veins and arteries with narrowed calf arteries and veins. Low molecular weight Heparin and Alprostadil infusion was given for 2 days. **Deep Vein Thrombosis is diagnosed.** Oximiser trial is given but patient again became tachypneic so again ventilation started on HFNO. He had increasing oxygen requirement and respiratory distress so he was taken on NIV. Chest X-Ray as well as Computed Tomography – Angiography (CT-PA) of the chest **&** the results were as follows:-



Chest X-ray Showing Bilateral Glassy opacities in lungs



Computed Tomography –Angiography (CT-PA) showing filling defects in the main, segmental branches of pulmonary arteries.

On the basis of all performed tests, we diagnosed that the patient was having **Pulmonary embolism, DEEP VEIN THROMBOSIS** and developed **Pulmonary fibrosis.** He had hypokalemia, so potassium replacement was done. He developed multiple infections. He was persistently hypoxic on NIV despite maximum ventilatory setting. Then he was taken on Invasive Mechanical Ventilation for 13 hours. His condition progressively deteriorated and he suffered bradycardia, CPR given according to ACLS protocol, but he could not be revived despite maximum efforts. And declared dead on 16th day of treatment.

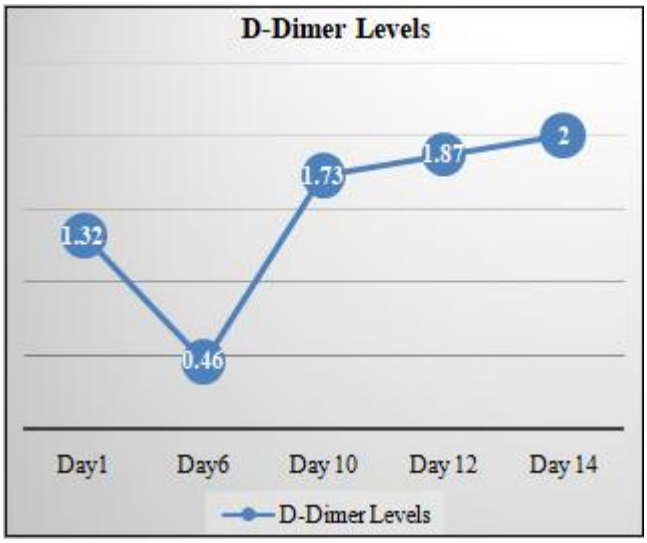
3. Discussion

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age. [3]. Some patients developed abnormalities followed by COVID-19 Infection. In our case report the patient had developed multiple abnormalities, but due to lack of clinical knowledge patient ignored the symptoms of leg pain and shortness of breath. D-dimer levels was continuously increasing, also after the readmission of the patient to the hospital. Patient developed multiple clotting in the body which leaded to Deep Vein Leg, Pulmonary embolism and developed lung fibrosis and due to blockage in the coronary artery patient had also undergone through Myocardial infarction. Some of the complications caused in post-Covid-19 are as follows:

- **Cardiovascula**r:-Deep vein thrombosis
- **Respiratory**:-Pulmonary embolism, Lung fibrosis
- **Neuropsychiatric**:-Stroke, Seizures, Depression Anxiety

Deep Vein Thrombosis (DVT)

In our patient we reported Deep Vein thrombosis, It is postulated that Covid-19 increases the blood's viscosity. Due to this clot can be formed. Oxygen supply is stopped due to blockage of blood vessels by theses clots. When this happens with leg, it can lead to mild to severe leg pain on basis of size of clot which blocks the artery, cold limbs and if untreated it will leads gangrene. These blood clots can also travel all over the body and damage distant organs.



Graph 1: D-dimer level on consecutive follow-up visits after recovery from COVID

Time interval	D-dimer level	Reference value
Initial	1.32 mg/L	0.19-0.52 mg/L
6 days later	0.46 mg/L	0.19-0.52 mg/L
10 days later	1.73 mg/L	0.19-0.52 mg/L
12 days later	1.87 mg/L	0.19-0.52 mg/L
14 days later	2.00 mg/L	0.19-0.52 mg/L

Elevated D-dimer levels are a predictor of hypercoagulation complications in COVID-19. Patients with persistently elevated D-dimer levels after recovery from COVID-19 should be screened for thromboembolic complications, even if they are asymptomatic. DVT can occur up to three months post-recovery from COVID-19 infection. There is no awareness regarding this condition and the patients ignore the early symptoms. Some come to the hospital in advanced

stages with discoloration of skin. The first 12 to 24 hours are crucial as blood circulation needs to be restored. As well as we observed three more patients with of different age group and different comorbidities and those which was came out to be **DVT** positive after the Doppler's ultrasound. The common thing between all the patients was increased D-Dimer levels.

Pulmonary Embolism (PE)
Pulmonary embolus (PE) is considered the most dangerous form of venous thromboembolism (VTE). Its rate of incidence is much higher in elderly people, and is associated with mortality. Clinical presentation of PE is variable and can be nonspecific, making the diagnosis challenging. Almost 90 % of pulmonary emboli (PE) develop from thrombi in the **Deep veins of the leg**, especially above the level of the popliteal veins. There are often associations of, recent surgery, prolonged bed rest, cancer, clotting disorder, and now days especially **COVID-19** [4] Some people are at a higher risk of blood clotting which can cause a pulmonary embolism. This includes people who are overweight, smoke, pregnant etc.

Lung Fibrosis
Elderly people with severe coronavirus symptoms or dangerous pre-existing health conditions are at the highest risk for post-COVID fibrosis (although the term "fibrosis" applies to irreversible disease, there is no consensus about the type of "fibrotic-like" sequalae in post-COVID patients [5] Fibrosis was clinically confirmed in 56% of the patients who experienced moderate COVID symptoms and in 71% of the patients with severe symptoms, 3 months after they recovered from COVID. [6] Similar results were presented by Francone: fibrotic traces visible on a CT scan were found in 40.8% (53 out of 130) early disease phase and in 53.6% (70 out of 130) at a later stage [7]. According to Vasarmidi [8]and Rai [9] the rate of COVID-induced fibrosis may exceed 30%. The severity of endothelial damage, microthrombi seen on lung autopsy is significantly more in SARS-CoV-2 infection compared to ARDS from influenza. Despite a higher chance of fibrosis in intensive care patients, fibrosis has been also documented in patients who did not need artificial lung ventilation.

4. Conclusion

- In our case report, we found increased *D-dimer* levels, not only during the active infection period but also post-recovery, and it was, in turn, linked to an increased risk of DVT. COVID-19 infection continues to cause significant mortality in elderly patients. complications due to COVID-19 are mainly reported during the active infection but can present up to several months after complete recovery from the disease. DVT in elderly populations post-COVID-19 infection can be clinically asymptomatic. However, it should be considered in the differential diagnosis if *D-dimers* are persistently elevated or has clinical symptoms. . .
- One should not take severe leg pain and any abnormal change in body casually, especially during the post-covid period.
- Health professionals should observe several health as well as pathological conditions of patients, those especially with several comorbidities such as diabetes, high blood pressure even after completely curing from Covid-19 for minimum 6 months.
- Smoking can lead to fibrosis and other several respiratory disorders, so one should avoid smoking.
- It is essential to exercise every day, and this can keep blood clots at bay. So, one should leave sedentary lifestyle to stay fit.

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