

# Bilateral interstitial pneumonia and 2<sup>nd</sup> degree atrioventricular block as complications after COVID-19 infection

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## ABSTRACT

**Objective:** The epidemiological and clinical manifestations, pathogenesis, and complications in patients in the acute phase of coronavirus infection are described in detail. On the other hand, the term "prolonged COVID" was introduced in early 2020, representing a multisystemic disease that can occur even after a mild course of acute disease.

**Case presentation:** We present the case of a 61-year-old woman who reported severe dyspnea and was previously tested positive for coronavirus. The patient experienced worsening of the health condition again, and a chest X-ray showed changes that correspond to bilateral interstitial pneumonia, and high degree atrioventricular block (AV) was verified on an electrocardiographic record (ECG). After treatment with dual antibiotic therapy and implantation of a permanent electrostimulator (pacemaker), her condition significantly improved.

**Conclusion:** Approximately 10% of patients with COVID-19 may have symptoms persisting beyond three weeks, which presents as post-COVID syndrome. Primary healthcare professionals have a key role in the management of these patients. Research is needed to reveal the pathogenesis, clinical spectrum, and prognosis of post-COVID syndrome.

**Keywords:** coronavirus, interstitial pneumonia, atrioventricular block

## INTRODUCTION

Globally, there are over 750 million confirmed cases of COVID-19 infection caused by coronavirus, and nearly 7 million deaths (1). Acute respiratory infection varies from asymptomatic cases to respiratory disease, multiorgan failure, and fatal outcomes (2). The epidemiological and clinical manifestations, pathogenesis, and complications in patients in the acute phase of the disease are described in detail. On the other hand, the long-term consequences remain unclear (3). The concept of post-COVID was introduced in the beginning of 2020, representing a multisystem disease that can occur even after a mild course of acute disease (4).

The aim of this report is to emphasize the importance of post-COVID in patients with mild acute coronavirus infection.

## CASE

We present the case of a 61-year-old woman reporting to the emergency medical service due to severe dyspnea. She stated that she was in contact with COVID-positive individuals three weeks prior. Her main complaints at the time were loss of smell and taste and muscle pain. After testing positive at a local primary health care center, she remained in self-isolation for 14 days, with symptomatic therapy according to the protocol. After returning to her workplace, she was subfebrile up to 37.3°C for one day, developing symptoms that led to reporting to the emergency service.

The patient has two significant comorbidities, diabetes mellitus, and hypertension. She is obese (Body Mass Index – BMI 30 kg/m<sup>2</sup>) and smokes 20-40 cigarettes a day for the last 40 years. She is allergic to Penicillin and Trimethoprim-sulfamethoxazole (Bactrim®).

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During examination, the patient was dyspneic, anicteric, afebrile, agitated with blood pressure (BP) 170/100 mmHg and atrial oxygen saturation 87%. An electrocardiographic record (ECG) showed 2nd degree AV block, ventricular rate was about 35/min with no signs of acute ischemic and myocardial lesions. After initial stabilization, the patient was transported to a secondary level for further diagnostic procedures and treatment.

The chest X-ray showed changes that corresponded to bilateral interstitial pneumonia. High degree AV block was verified on the ECG record. In the laboratory findings, slightly elevated pro-inflammatory markers were registered, along with granulocytosis with lymphopenia and doubled D-dimer level. RT-PCR testing for COVID was negative. Her previous positive status was also noted, and the patient was admitted for treatment of interstitial pneumonia with dual antibiotic therapy. Due to the persistence of second-degree AV block (Mobitz II), she was referred to tertiary level for permanent electrostimulation and implantation of a pacemaker.

After admission, an examination and routine laboratory work-up, where a drop in pro-inflammatory markers was verified, an ultrasound of the heart was performed. It was found that the left ventricle had hypertrophic myocardium with normal endocavitary dimensions and increased myocardial mass of a severe degree. Segmental kinetics disorders were not detected. Global systolic function was preserved. Mild mitral stenosis was also registered.

After permanent pacemaker implantation, the patient was discharged from the hospital. Correction of the therapy, including beta-blockers, angiotensin-converting enzyme inhibitors (ACE inhibitors), antiarrhythmic, and oral hypoglycemic, was made. Transfer from low-molecular-weight heparin (LMWH) to oral anticoagulant therapy according to the scheme was done on an outpatient basis, with control of prothrombin time.

During the control check-up, the operation of the permanent electrostimulator was normal, but atrial fibrillation (AF) persisted. The patient occasionally reports fatigue during walking without dyspneic complaints.

Limitations of this case report are that the data presented were obtained from discharge lists from secondary and tertiary level institutions. We hope that it will enable family doctors to detect symptoms of prolonged COVID as early as possible and thereby improve the quality of health services.

## DISCUSSION

The cause of prolonged COVID is still not well known. It is assumed that it is related to inadequate immune-inflammatory response or that there is an association with persistent viremia due to weak or absent antibody response to current viral activity. Prolonged effects on the respiratory, cardiovascular, and musculoskeletal systems have been described before in SARS and MERS infections. COVID-19 also has a tendency towards similar pathophysiology (5).

From a clinical perspective, the incubation period and clinical phase of COVID-19 last for 2 to 3 weeks. Post-acute COVID can be described as an illness lasting longer than 3 weeks, and chronic COVID lasts longer than 12 weeks (5).

On the other hand, a consensus has yet to be established regarding adequate definitions for situations where COVID-19 symptoms persist beyond the acute phase of the disease. According to guidance from the UK National Institute for Health and Care, the term prolonged COVID includes symptomatic COVID, where symptoms last 4 to 12 weeks, while in post-COVID syndrome, symptoms persist more than 12 weeks (6).

The incidence of post-COVID sequel is estimated to be between 10% and 35%, while for hospitalized patients, it is up to 85%. The most common symptom is fatigue, reported in 17.5-72% of post-COVID cases, followed by residual dyspnea (10-40%), mental health problems (26%), chest pain (22%), and olfactory and gustatory dysfunction in 11% of cases. More than 1/3 of patients with post-COVID syndrome have pre-existing comorbidities, among which diabetes and hypertension are the most common (7), and it is also associated with old age, higher BMI, and female gender (6).

Prolonged COVID primarily affects the lungs. Cells of the upper and lower parts of the respiratory tract are richly supplied with ACE2 receptors, the primary target of the COVID virus. In addition, the infection can significantly weaken the immune system. Due to the immunosuppressive effect of the virus, a large number of patients are susceptible to new infections (5).

Globally, the extent of organ damage determines the long-term effects. Organs most often affected by prolonged COVID are the lungs, heart, brain, and blood vessels. The degree of alveolar lung damage depends on the severity of the disease. Alveolar damage is accompanied by pulmonary fibrosis resulting in long-term respiratory symptoms (8). Persistent shortness of breath and inability to perform usual activities are common symptoms of prolonged COVID, which is associated with fibrosis (9). Long-term effects on lungs and heart can be reduced according to some authors (10), but although computed tomography (CT) findings may improve with time, many patients may experience prolonged symptoms that are very difficult to resolve (11).

Various studies have shown that patients with COVID-19 infection can suffer from complications such as myocarditis and cardiomyopathies, abnormal heart rhythms, and other cardiac sequelae weeks and months after infection (12). Myocardial damage increases the risk of heart failure (13).

Cardiac rhythm disorders in the form of AV block are very rare, described only in a few case reports in COVID-positive patients (14,15). To the best of our knowledge, there is only one documented case of complete AV block as part of post-COVID. It was a 52-year-old female patient who was admitted to the emergency medical service due to syncope. A complete AV block was detected. A temporary pacemaker was implanted. The patient regained sinus rhythm during hospital monitoring, after which the pacemaker was removed (16).

Prolonged COVID is usually associated with mild neurological symptoms such as "brain fog," dizziness, headache, insomnia, and loss of smell and taste (17). On the other hand, COVID-19 can cause ischemic stroke, neuropathies, and Guillain-Barre syndrome in any age group (18). Serious neurological manifestations usually occur in

patients who have suffered from a severe form of the disease, are older, and have comorbidities (19).

COVID-19 affects large blood vessels, which can lead to acute coronary and cerebrovascular events, while damage to small blood vessels, arterioles, and capillaries in the heart can lead to myocarditis and cardiomyopathies. In addition, the immune system becomes overactive and causes disseminated inflammation and organ damage (20).

Current findings indicate that 10% of patients with COVID-19 infection may have persistent symptoms for longer than 3 weeks, which is an underestimated figure, knowing that half of COVID cases are not even formally confirmed. Monitoring systems did not routinely register long-term complications of the infection, while only deaths were reported. Prospective and systematic follow-up of patients with prolonged COVID is important to assess the incidence, clinical spectrum, and long-term prognosis (7).

According to current limited observation, most of these patients will be managed at the primary healthcare level (7), by family doctors, which further burdens the health system. There is an urgent need for improved clinical guidelines, as well as those for behavioral and mental needs related to post-COVID infection, precisely because of the rapid change in the interpersonal roles of primary care workers (7).

Finally, other patients with chronic diseases also need adequate care and treatment. Collaboration at all levels of healthcare is imperative to meet these challenges.

## CONCLUSION

It is estimated that approximately 10% of patients suffering from COVID-19 infection have symptoms for more than 3 weeks and meet the criteria for post-COVID syndrome. Primary healthcare professionals have a key role in monitoring these patients. Additional research is needed to discover the pathogenesis, clinical spectrum, and prognosis of the post-COVID syndrome.

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