Cardiopulmonary long-term effects in patients after hospitalization due to COVID-19 infection

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Background: Multiple studies have described acute effects of the Covid-19 infection on the heart, but little is known about the long-term cardiac and pulmonary effects and complications after recovery. The aim of this analysis was to deliver a comprehensive report of symptoms and possible long-term impairments after hospitalization because of Covid-19 infection as well as to try to identify predictors for Long-Covid.
Methods: This was a prospective, multicenter registry study. Patients with verified Covid-19 infection, who were treated as in-patients at our dedicated Covid hospital (Clinic Favoriten), have been included in this study. In all patients, testing was performed approximately 6 months post discharge. During the study visit the following tests and investigations were performed: detailed patient history and clinical examination, transthoracic echocardiography, electrocardiography, cardiac magnetic resonance imaging (MRI), chest computed tomography (CT) scan, lung function test and a comprehensive list of laboratory parameters including cardiac bio markers.
Results: Between July 2020 and October 2021, 150 patients were recruited. Sixty patients (40%) were female and the average age was 53.5±14.5 years. Of all patients, 92% had been admitted to our general ward and 8% had a severe course of disease, requiring admission to our intensive care unit. Six months after discharge the majority of patients still experienced symptoms and 75% fulfilled the criteria for Long-Covid. Only 24% were completely asymptomatic (figure 1).
Echocardiography detected reduced global longitudinal strain (GLS) in 11%. Cardiac MRI revealed pericardial effusion in 18%. Furthermore, cardiac MRI showed signs of former peri- or myocarditis in 4%. Pulmonary CT scans identified post-infectious residues, such as bilateral ground glass opacities and fibrosis in 22%. Exertional dyspnea was associated with either reduced forced vital capacity measured during pulmonary function tests in 11%, with reduced GLS and/or diastolic dysfunction, thus providing evidence for a cardiac and/or pulmonary cause.
Independent predictors for Long-Covid were markers of a more severe disease course like length of in-hospital stay, admission to an intensive care unit, type of ventilation as well as higher NT-proBNP and/or troponin levels.
Conclusion: Even 6 months after recovery from Covid-19 infection, the majority of previously hospitalized patients still suffer from at least one symptom, such as chronic fatigue and/or exertional dyspnea. While there was no association between fatigue and cardiopulmonary abnormalities, impaired lung function, reduced GLS and/or diastolic dysfunction were significantly more prevalent in patients presenting with exertional dyspnea. On chest CT approximately one fifth of all patients showed post infectious changes in chest CT including evidence for myo- and pericarditis as well as accumulation of pericardial effusions.