A Tale of Undiagnosed Coronavirus Disease 2019 and Continued Disabling Exertional Dyspnea in a Previously Healthy and Active Patient

The worldwide medical community has been challenged by the difficult task of identifying patients infected with coronavirus disease 2019 (COVID-19), with many remaining asymptomatic or too mildly symptomatic to seek care yet who are still infectious. Another focus is keeping alive severely ill patients who often have respiratory failure, acute respiratory distress syndrome–like complications, and thromboembolic complications. Also realized, but somewhat later, are the many cardiac complications encountered in patients with COVID-19, including effects on electrical conduction, pericardial effusions, and myocarditis. Point-of-care ultrasound has been repeatedly described as playing a key role in the diagnosis, monitoring, and treatment of all of these patients, sometimes revealing unexpected and previously undocumented findings early in the spread of the virus.

Recently, attention has turned to long-term sequelae, being identified with increasing frequency in COVID-19 survivors. Long-term damage to the lungs appears to be one of the most common manifestations, and ultrasound shows slow and only partial resolution in some patients. Several authors have reported lingering effects from cardiac and pulmonary impacts of COVID-19. Most of this work has understandably focused on formerly critically ill patients, yet there may be others who are being overlooked, as highlighted below.

A 52-year-old male patient with no medical history presented with shortness of breath for 5 months. He was a resident of a resource-limited portion of the Caribbean area, where he was a farmer, and was highly physically fit, largely because of daily strenuous physical labor. The patient worked on a large fruit farm he managed himself, harvesting fruit and then pushing large wheelbarrow loads of it up tall hillsides on a regular basis. Typical days were 10 to 12 hours of hard manual labor, which he tolerated easily. His physical examination supported the reported level of fitness, even after 5 months of a sedentary lifestyle. All vital signs were within normal limits, including room air saturation of 97%. The patient’s visit was his second in 10 days for the same condition: debilitating exertional dyspnea. The prior visit revealed negative workup results for pneumonia, pneumothorax, and congestive heart failure. A chest radiograph was read as poorly defined lung opacities, and a nasal swab result for COVID-19 was negative (Figure 1). That was his fourth negative COVID test result within 3 months. The patient had 3 prior visits to emergency departments over 3 months and follow-up with a primary care physician.

Although not elicited earlier, a lengthy discussion revealed an additional key history. In late April and early May 2020, the patient was working on his farm, and approximately 6 cases of COVID-19 were identified among neighbors, none immediately adjacent to his home. Coincidentally, at the end of the first week of May, the patient suddenly noticed he was having increasing difficulty breathing when picking fruit and pushing the wheelbarrow uphill. This worsened over several days to the point at which he could not do his work and had to hire workers. He never had fever or noted signs of illness that would have prompted him to seek medical help. When he arrived for an extended visit to the United States a month later, he was mildly better but continued to be severely limited by exertional dyspnea, including feeling breathless after walking 10 ft.

The patient had again received a chest radiograph, which was read similarly, and a positive D-dimer result prompted a computed tomographic (CT) angiogram, which revealed no pulmonary embolism but basilar lung changes (Figure 2). A fifth COVID-19 test was ordered, and the result was negative. During this visit, however, a lung ultrasound examination was performed. It revealed the classic appearance of thickened and irregular lung pleura with comet tail artifacts, which were often clustered and coalescing (Video 1). These areas were patchy and identified predominantly in the lower half of lung fields, anteriorly and laterally, but higher posteriorly, again perfectly fitting published descriptions of COVID-19 lung ultrasound findings throughout the world. A point-of-care ultrasound examination of the heart and abdomen revealed normal systolic left ventricular function, no evidence of valvular regurgitation, no pericardial effusion, and no evidence of right heart strain (Video 2). The inferior vena cava was not plethoric and varied with respiration by more than 25%. The absence of right heart strain and pericardial effusion were consistent with CT angiographic findings. No evidence of a fluid overload, pulmonary edema, pleural effusion, or another
explanation for the patient’s dyspnea was identified, other than abnormal areas of the lungs, consistent with COVID-19 infection. The patient went on to follow-up with pulmonary medicine and had a positive COVID-19 serum antibody test result, confirming likely COVID-19 infection previously. Historically, these results were most consistent with his history of rapid onset of severe dyspnea 5 months previously. He started undergoing daily pulmonary rehabilitation and was lost to follow up.

Prior publications have demonstrated longer-term lung injury in patients with COVID-19, but much of that work has focused on critically ill patients who have recovered.9 Such patients are much more likely to be identified for longer-term follow-up and to undergo rehabilitation to improve pulmonary function and stamina. Logically, it would be obvious to suspect that a critically ill patient might have long-term lung damage, but this may be unexpected for anyone with a mild infection not requiring hospitalization or even a physician visit. However, there are many patients around the world who never sought medical help, had no access to accurate testing, or simply did not present in time to generate a positive COVID-19 test result. The case presented here is unlikely to be unique and could represent an at-risk population of unknown size, which if never identified may have severely diminished pulmonary function, as this patient did, not for 5 months, but much longer. Since mass screening using chest CT is ill advised, lung ultrasound may represent a relatively inexpensive imaging modality, one without ionizing radiation, to screen for possible post–COVID-19 lung injury and identify individuals who may need rehabilitation and longer-term follow-up, even if they never had a diagnosis of active COVID-19 infection.

One study showed that COVID-19 intensive care unit survivors frequently had an impaired-effort pulmonary reserve at 4 months after hospital discharge, with 48.8% having difficulty breathing and fatigue and being unable to complete a 6-minute walk test.10 Apart from the high mortality risk of acute severe COVID-19, long-term sequelae in survivors such as interstitial lung disease and pulmonary hypertension may develop, necessitating long-term follow-up and pulmonary rehabilitation. Providers should be open minded to using lung ultrasound in patients with similar symptoms during the COVID-19 era, even when patients only had negative COVID test results and chest radiographic or CT results are nonspecific.

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**Figure 1.** Patient’s chest radiograph 5 months after start of exertional dyspnea.

**Figure 2.** Chest CT angiogram depicting areas of abnormal lung parenchyma.

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