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Acute Pulmonary Embolism in SARS-CoV-2 Infection Treated With Surgical Embolectomy

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A cluster of pneumonia cases caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread rapidly throughout China, Europe, and the United States. The pneumonia might evolve to acute respiratory distress syndrome, requiring assisted mechanical ventilation. The prolonged immobilization combined with respiratory failure, sepsis, and dehydration might expose SARS-CoV-2 patients to increased risk of complication, including pulmonary embolism. We report a case of SARS-CoV-2 complicated by a massive pulmonary embolism in a patient who underwent successful surgical embolectomy. We believe that maintaining the same proactive attitude suggested by current European Society of Cardiology and European Respiratory Society guidelines might help in reducing morality and improving survival in SARS-COV-2 patients.

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In late December 2019, a cluster of pneumonia cases caused by a novel coronavirus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), occurred in Wuhan, China, and spread rapidly throughout Europe, with Italy as the third country with the most confirmed cases.1,2 Patients infected with SARS-CoV-2 usually experience fever, dry cough, fatigue, and worsening dyspnea with interstitial pneumonia that in up to 3% to 5% might, unfortunately, evolve to a severe acute respiratory distress syndrome (ARDS) requiring endotracheal intubation (ETI) and mechanical ventilation. We report a case of SARS-CoV-2 complicated by a massive pulmonary embolism in a patient who underwent successful surgical embolectomy.

We report the case of a 59-year-old white man with no evidence of cardiovascular risk factors and no medical therapy before hospitalization. The patient was admitted with a 10-day history of fever and dyspnea unresponsive to paracetamol. Physical examination revealed a tachycardic heart rate (112 beats/min), low blood pressure (90/50 mm Hg), and severe hypoxemia. Serial 12-lead electrocardiograms showed sinus tachycardia without ST segment elevation/depression or other electric pathways suggesting myocardial sufferance. A chest roentgenogram showed signs of severe interstitial pneumonia with typical ground-glass changes suggesting SARS-CoV-2 infection (Figure 1). Echocardiography was within normal limits.

Owing to the severe ARDS unresponsive to assisted noninvasive ventilation, the patient underwent ETI and was transferred to an isolation ward of the intensive care unit. Infection with the SARS-CoV-2 virus was confirmed thereafter by a real-time-polymerase chain reaction assay of a nasal swab.

After few days of mechanical ventilation, the patient experienced a sudden cardiac arrest, followed by acute hemodynamic deterioration after resuscitation. Urgent echocardiography showed a severe dysfunction of the right cardiac chambers highly suggestive for acute pulmonary embolism (PE). Owing to rapid deterioration of the patient’s hemodynamic condition, a computed tomographic scan was not performed, and he was immediately transferred to our cardiac surgery room.

Through a midline sternotomy with central aortic and bivacous cannulation, a large amount of thrombus was removed from the right atrium and from both left and right main pulmonary arteries. The complete removal of the clots resulted in a rapid improvement in pulmonary artery systolic pressure. The intervention was performed using 59 minutes of cardioplegic arrest with a mild hypothermia.

Patient was receiving hydroxychloroquine sulfate and INN-darunavir plus cobicistat as pharmacologic therapy. At 32-days of follow-up, he is in stable hemodynamic condition without any inotropic support and has been transferred from the intensive care unit to a regular ward in spontaneous ventilation. SARS-CoV-2 infection has been resolved as confirmed by 2 reverse transcriptase-polymerase chain reaction assays of nasal swabs.

Comment

We report a patient with interstitial SARS-CoV-2 pneumonia complicated by massive acute PE. The prolonged immobilization associated with respiratory failure, dehydration combined with sepsis, and the procoagulant condition of the acute infection might expose SARS-CoV-2 patients to increased risk of severe complications, including acute PE.

Moreover, the need for isolation in dedicated COVID-positive units or hospitals may limit access to examinations such as electrocardiography, echocardiography, or computed tomographic scan, and hemodynamic...
instability can be dismissed because of the widespread viral organ involvement.\textsuperscript{3,4} Even when the diagnosis is clear, there might be reluctance to apply in this subset of patients the aggressive standard approach recommended by European Society of Cardiology and European Respiratory Society guidelines.\textsuperscript{5}

Current management of significant PE is focused in reducing clot size through systemic/catheter-directed thrombolysis or removing the clot entirely with percutaneous suction or surgical embolectomy.\textsuperscript{6} The American Heart Association (AHA) and European Society of Cardiology (ESC) suggest surgical embolectomy in case of hemodynamic instability or failed/contraindications to thrombolysis, patent foramen ovale, thrombus in transit in the right-sided cardiac chambers, and also in patients who are predicted to die before realizing the benefits of thrombolytics.\textsuperscript{7}

The rapid progressive hemodynamic deterioration in our patient forced us to an urgent surgical approach aimed to achieve complete removal of the clots. A systemic thrombolysis could certainly have been easier, but we believe that in a patient in such an unstable condition, it was unlikely to offer the same effective and prompt hemodynamic improvement.

We are now facing this unexpected severe SARS-CoV-2 pandemic, but maintaining the same proactive attitude suggested by current guidelines or routine standard of care might help in reducing morality rate and improving survival also in patients infected with SARS-CoV-2.

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