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Acute Aortic Dissection Surgery in a Patient With COVID-19



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Acute aortic dissection is one of the most common life-threatening diseases that affects the aortic vessel. We present a case of acute Stanford type A aortic dissection in a patient with coronavirus disease 2019 (COVID-19) under treatment with angiotensin-converting enzyme inhibitors. A 68-year-old woman complaining of acute chest pain and dyspnea was admitted to the emergency clinic of our hospital on May 6, 2020. She had history of diabetes and hypertension. This is one of the first acute aortic surgery cases among patients with COVID-19.

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Coronavirus disease 2019 (COVID-19) has proven to be one of the worst pandemics in modern times, in mortality and morbidity, after being detected in the People's Republic of China on December 8, 2019. After the first confirmed case in Turkey was detected on March 11, 2020, the number of confirmed cases has increased so far.¹

Although there are an increasing number of reports describing the effects of the coronavirus on the cardiovascular system, we present here a case of acute dissection of the aorta in a patient with COVID-19.

A 68-year-old woman was referred to our institution with chest pain and shortness of breath. The patient's family reported a history of hypertension and diabetes. Upon admission, the physical examination showed a pulseless right femoral artery, an arterial pressure of 165/90 mm Hg, and a pulse rate of 80 beats/min. Pulmonary rales were audible at the bases of both lungs, and an aortic diastolic murmur was detected during cardiac auscultation.

Electrocardiography revealed pulmonary hypertension. Transthoracic echocardiography showed mild aortic insufficiency with an ejection fraction of 0.55. Computed tomography revealed a type A aortic dissection flap extending through the right common iliac artery and ground-glass opacities in both lungs with nodular infiltration in the right apex (Figure 1).

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At operation, we decided to establish cardiopulmonary bypass through the left femoral artery because the dissection extended to right femoral artery. Transesophageal echocardiography revealed intact aortic valves without insufficiency. A midline sternotomy was performed, and a cross-clamp was placed on the intact aorta to ensure cardiac arrest with the administration of del Nido cardioplegia solution through the coronary ostia after aortotomy, which exposed marked thickening of the aortic wall. Proximally, the aorta was completely transected at a level just above the aortic commissures and distally, just before the innominate artery. A 28-mm Dacron (DuPont, Wilmington, DE) graft (InterVascular SA, La Ciotat, France) was placed. Individual Teflon (Chemours, Wilmington, DE) pledgeted sutures were used for the distal anastomosis to affix the dissection flap to the aortic wall.

The cross-clamp was removed and air removal maneuvers were applied. Cardiopulmonary bypass (CPB) was concluded without any complication, and the femoral cannula was removed after protamine administration. The CPB time was 85 minutes, and aortic cross-clamp time was 55 minutes.

Despite repairs and protamine administration, the bleeding through distal anastomosis line did not cease. Therefore, BioGlue surgical adhesive (CryoLife International, Inc, Kennesaw, GA) was applied to the bleeding zones.

The patient had an excellent pulse in her right femoral artery after the operation. Extubation was performed 3 days postoperatively. The patient's treatment for COVID-19 continued with favipiravir and chloroquine during her hospital stay. The patient was discharged on postoperative day 14 day with antiaggregant (clopidogrel, 75 mg/d) for 3 months and β -blockers.

Comment

COVID-19 was first identified in a group of patients presenting with pneumonia symptoms in Wuhan, China, in December 2019. Since then, the number of cases in Turkey has been increasing after the first confirmed case in Turkey was detected on March 11, 2019.¹

The COVID-19 infection strongly affects not only the respiratory system but also all of the systems in the body. The prognosis of the virus is worse in the elderly and in patients with chronic diseases, such as hypertension, diabetes, obesity, chronic obstructive pulmonary disease, and asthma, and poses a higher risk for morbidity and mortality. In addition, COVID-19 infection may cause exacerbation of existing chronic conditions or acute and chronic complications of the cardiovascular system. More attention and awareness are thus needed on the acute and chronic effects of viral infection on the cardiovascular system.

Acute aortic dissection, longitudinal cleavage of vessel media by blood, is commonly associated with a high mortality complication of a chronic cardiovascular pathology, which is frequently observed in patients with chronic complicated hypertension. As presented by

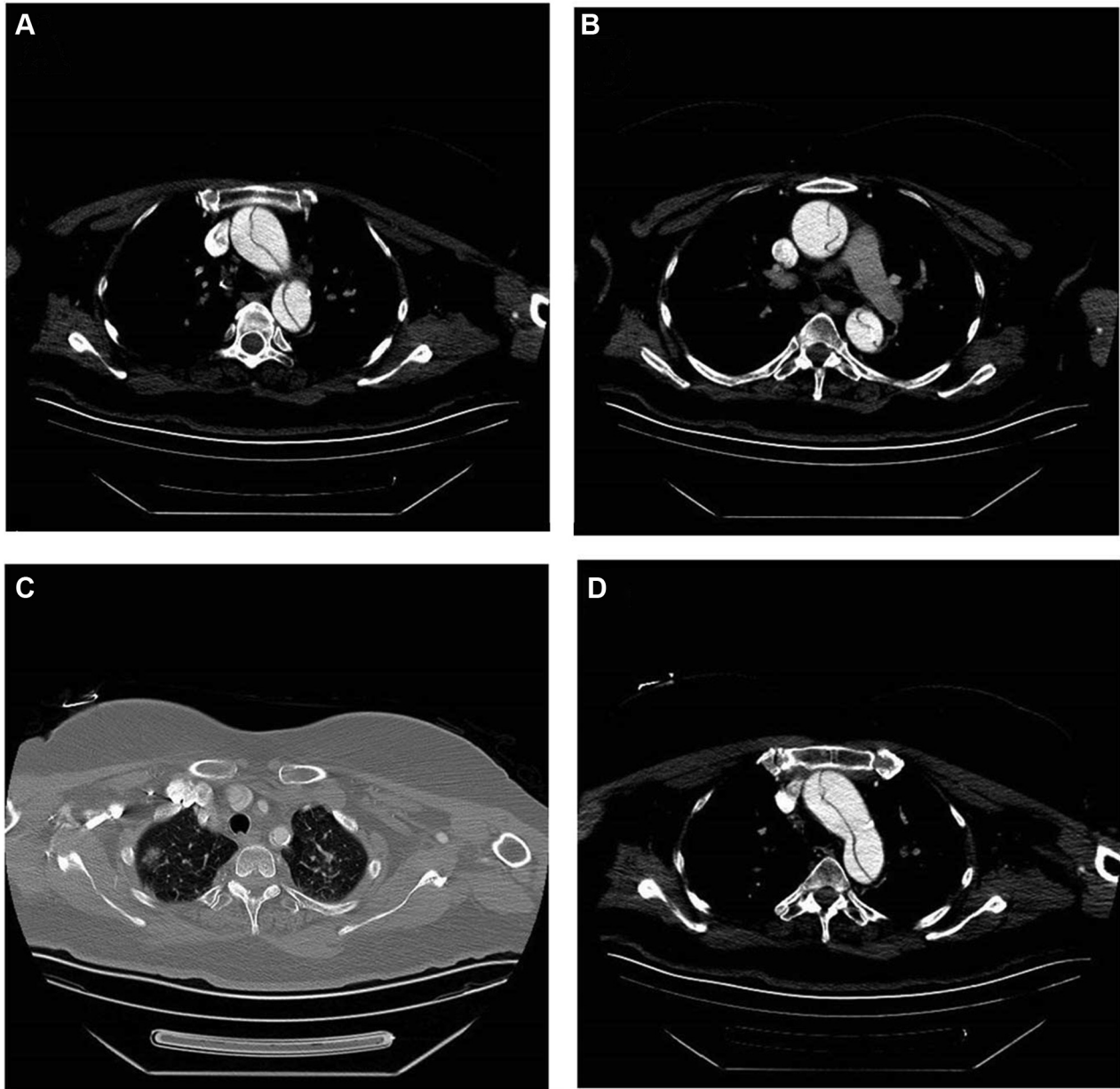


Figure 1. Computed tomographic images of the patient show (A, B, and D) the type A aortic dissection flap and (C) ground-glass opacities in both lungs, with nodular infiltration in the right apex.

Silvestri and colleagues² in their review of case reports, HIV-positive patients have a higher prevalence of aortic diseases, such as aortitis, aneurysms, and dissections, compared with patients without AIDS who have chronic cardiovascular diseases such as arterial hypertension. Reports are presented to evaluate the possibility of “similarity” of virulence as well as its therapy for HIV and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and their infections.³

During the aortotomy in our case, we evaluated the aorta, which revealed pronounced thickening of the wall, as seen in inflammatory aortopathies,⁴ compared with our experience in previous aortic dissection cases that have been published⁵ or unpublished.

Another challenge in the operation for inflammatory aortopathy remains in the suture line where bleeding might occur (as seen in our present case) in the acute phase, or formation of an aneurysm may be seen in the chronic phase. This inflammation may be due to SARS-CoV-2 viremia. Preoperative measurements of C-reactive protein and the erythrocyte sedimentation rate were high in our patient, and immunosuppressive therapy was started just after the operation.

Another important point in our case was the use of angiotensin-converting enzyme (ACE) inhibitory drugs for the treatment hypertension. SARS-CoV-2 binds to ACE2 which is also present on endothelial cells, and ACE inhibitory drugs are presented to have beneficial

effects on the COVID-19 process.⁶ Despite the hypothetical concerns on the use of renin-angiotensin-aldosterone system (RAAS) inhibitors, which alter ACE2 expression, the maintenance of hypertension treatment by RAAS inhibitors is recommended because of its beneficial effect on RAAS activation. Our present patient, however, did not show any beneficial performance despite using RAAS inhibitors for 4 years. This could have resulted because RAAS activation may not efficiently achieved without local/systemic mast cell stabilizers given that proinflammatory and profibrotic cytokines, as well as proteases such as renin, are highly released by local mast cells.^{7,8}

In addition, one of the important issues in patients with COVID-19 is the elevated risk of thrombosis, which necessitates anticoagulation therapy during hospitalization. Low-molecular-weight heparin was used for anticoagulation in our patient during her hospital stay, and clopidogrel was preferred for the prophylactic anti-aggregant agent during follow-up.

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