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Acute Type A Aortic Dissection Complicated by COVID-19 Infection

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A patient underwent surgery for acute type A aortic dissection. Testing for SARS-CoV-2 was positive. The postoperative course was complicated by a mixed viral and bacterial pneumonia with bilateral infiltration, treated with antibiotics and hydroxychloroquine, without any need for reintubation. The patient recovered and finally could be discharged. This report shows the feasibility for surgical treatment of acute aortic disease in patients with COVID-19.

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The rise of the COVID-19 pandemic created an unseen impact on the organization of health care that also influenced surgical treatment of cardiac pathology.[1] In this report, we describe the clinical course of a patient with a type A aortic dissection who tested positive for COVID-19 infection with subsequent pulmonary complications after repair. In addition, *Hemophilus influenzae* was isolated in the sputum culture, causing a mixed viral and bacterial infection.

A 64-year-old man was admitted with acute onset chest pain and ischemia of the right leg. There was no history of recent illness; he was hypertensive but hemodynamically stable and self-ventilating. Computed tomography scan (Figure 1) revealed intimal dissection from the sinotubular junction reaching to the iliac arteries (Stanford type A/DeBakey type 1), for which he was referred to our institution for urgent surgical treatment. There were no pulmonary abnormalities to be noted clinically or on this scan. Through a median sternotomy, the involved aortic segment (ascending aorta and aortic arch) was replaced using a 28-mm branched polyethylene terephthalate tubed graft (Gelweave; Vascutek Terumo, Inchinnan, UK), with the use of cardiopulmonary bypass, core body temperature deep cooling to 22°C, and selective cerebral antegrade perfusion. Echocardiography at the end of the procedure revealed good biventricular function with a trace of aortic valve regurgitation. The patient was transferred to the cardiac intensive care unit and extubated 8 hours later, initially without respiratory complaints.

Based on our institution's protocol to identify and isolate admitted patients, SARS-CoV-2 screening by polymerase chain reaction[2] on nasopharyngeal swab taken on the first postoperative day was positive, with the patient's subsequent transfer to the COVID-19 intensive care unit. He had no fever and C-reactive protein was only mildly elevated (45.7 mg/L; Figure 2). Other serologic features of an active SARS-CoV-2 infection were present: lowered lymphocytes (420/μL), absence of eosinophils (0/μL), but still-normal ferritin (201 μg/L). Three days later the patient was transferred to a monitored COVID-19 ward. Saturation was 97% on 4L oxygen, with limited respiratory complaints, which was not considered abnormal in the postoperative setting. On the sixth postoperative day, he had low-grade fever with respiratory complaints consisting of dyspnea and dry cough. Pulse oximetry demonstrated decreased saturations of 90%. Imaging with both bedside chest roentgenogram and chest ultrasonogram showed pleural fluid. Biochemistry revealed a steep rise in C-reactive protein to 214 mg/L and slight elevation of ferritin to 308μg/L. The fluid was drained and was classified as exudate according to Light's criteria,[3] based on an elevated lactate dehydrogenase pleural concentration (260 U/L).

Based on the national guidelines at that time, a combination of hydroxychloroquine (Plaquenil) and amoxicillin/clavulanic acid was started empirically. Subsequently, a computed tomography scan was performed and revealed bilateral pleural fluid and several ground glass opacification lesions with alveolar infiltration (Figure 3). On day 10, C-reactive protein peaked at 271 mg/L, with concomitantly increasing ferritin from 500 μg/L to 610 μg/L on day 12. Sputum culture revealed *H influenzae*. Further physiotherapy and oxygen through nasal cannula were administered together with a 5-day course of hydroxychloroquine and a 7-day course of amoxicillin/clavulanic acid. The patient's status improved. The C-reactive protein, ferritin, and lymphocyte count were normalizing, and there was no longer need for supplemental oxygen at the time of discharge, 14 days after the operation. The patient is at home in self-isolation, and follow-up in the COVID-19

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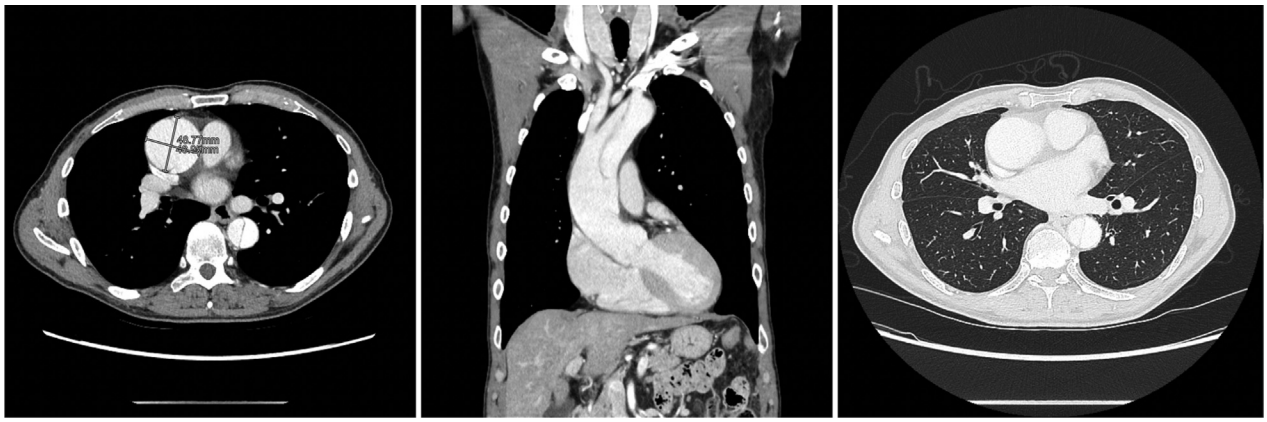

Figure 1. Computed tomography on admission. (Left) Transverse plane: ascending aortic dilation and intimal tear in the descending aorta. (Middle) Coronal plane: intimal tear in the ascending aorta and arch. (Right) Transverse plane: clear pulmonary parenchyma.

outpatient clinic revealed good clinical evolution without respiratory complaints and a further trend toward normalization of biochemistry.

Comment

The emerging pandemic caused by SARS-CoV-2 can further complicate life-threatening diseases. However, this case illustrates the surgical feasibility of acute aortic dissection treatment in patients with proven COVID-19 disease. Their postoperative course is unpredictable, however, and is influenced by respiratory complications due to a possible combination of viral and bacterial infection. In this case, antibiotics and hydroxychloroquine treatment was initiated based on the national guidelines at that time, despite insufficient evidence-based data to support the latter. Reports of COVID-19 infection in cardiac surgery patients are rare. He and colleagues[4]

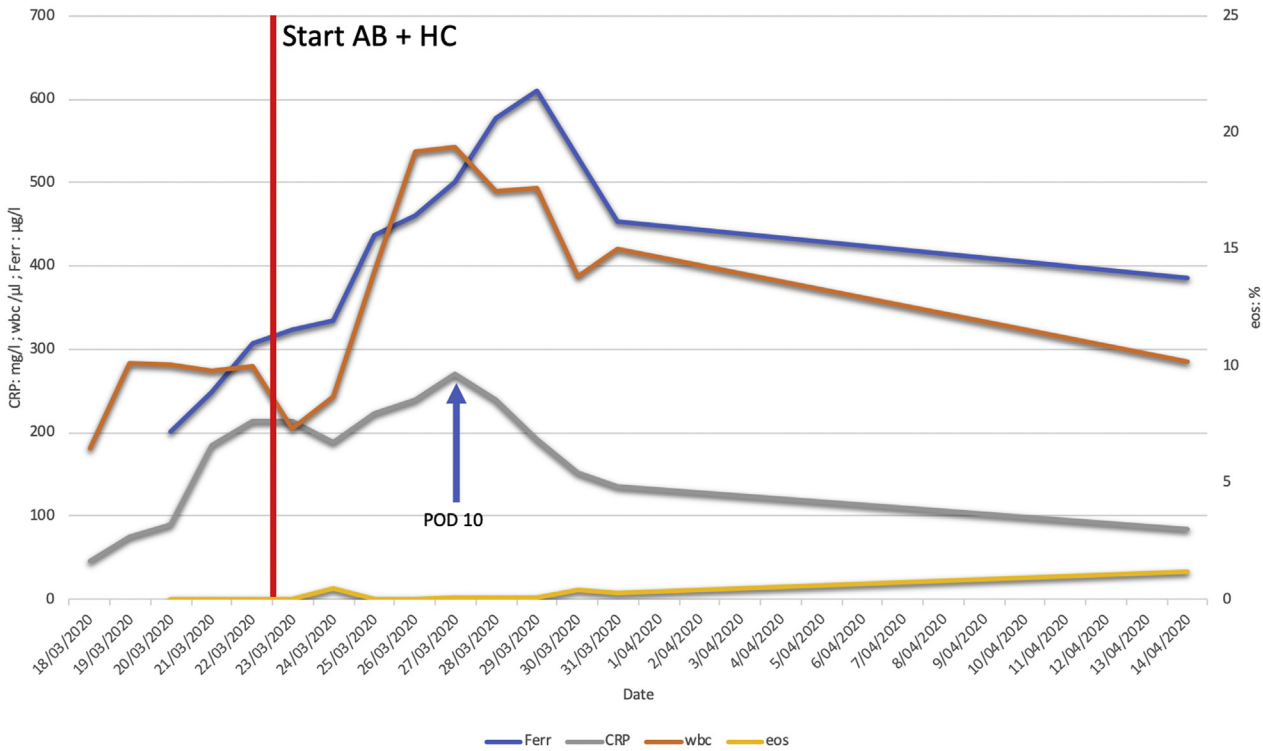

Figure 2. Evolution of C-reactive protein (CRP [gray line]), white blood cell count (WBC [orange line]), ferritin (Ferr [blue line]), and eosinophils (eos [yellow line]). (AB, antibiotics; HC, hydroxychloroquine; POD, postoperative day.)

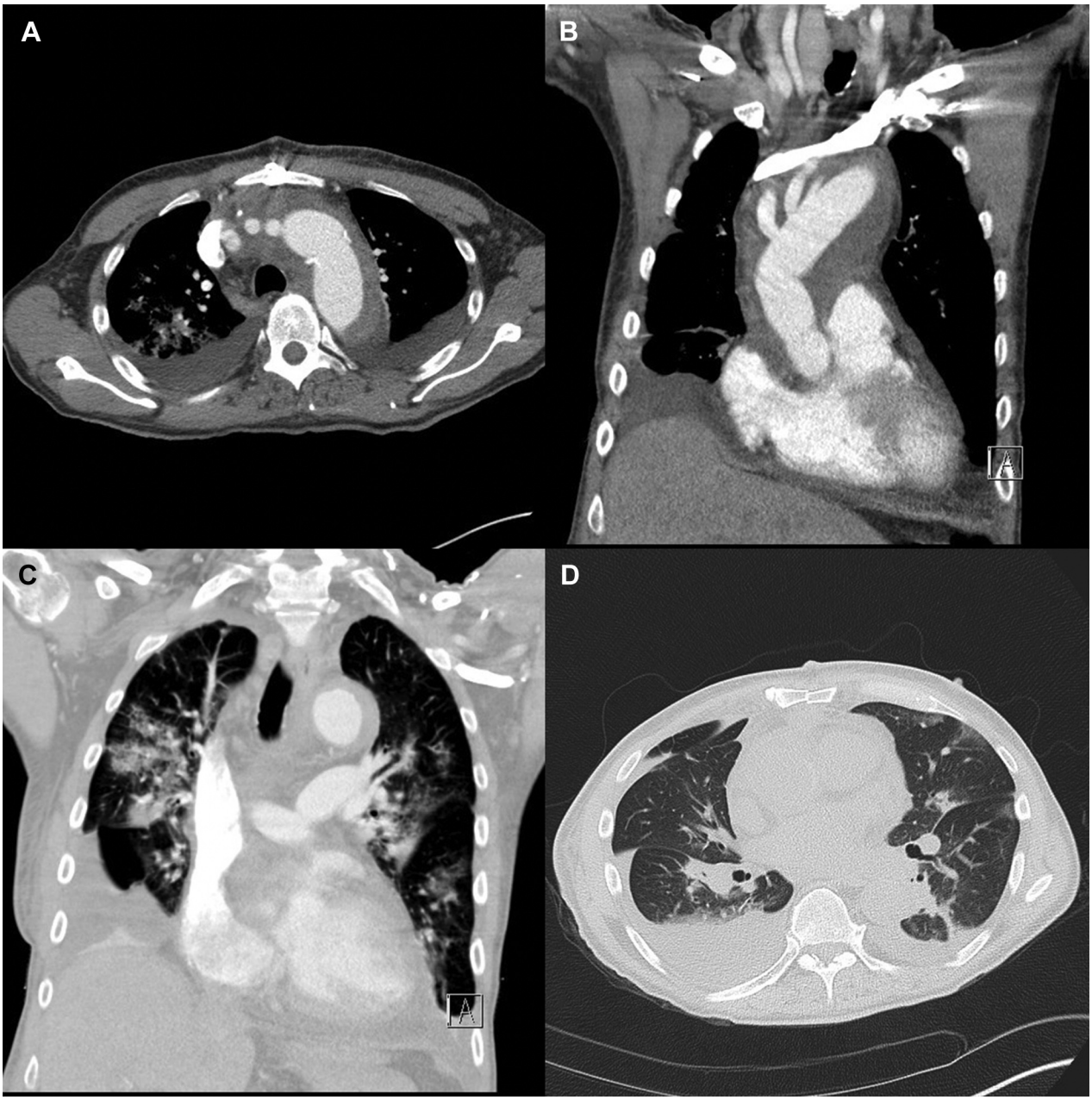

Figure 3. Computed tomography on postoperative day 9. (A) Transverse plane: prosthesis with branches, bilateral pleural fluid. (B) Coronal plane: ascending and arch reconstruction with arch branching. (C) Coronal plane: bilateral pleural effusion and infiltration. (D) Transverse plane: pleural effusion and perihilar infiltration.

described a case of aortic dissection, especially emphasizing the perioperative anesthetic precautions, without any details of the clinical course. In thoracic oncologic surgery, evidence suggests higher mortality among patients infected with SARS-CoV-2.[5]

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