

Aortic Endograft and Femoro-Femoral Bypass in A Patient with Acute Aortic Occlusion Post Covid Respiratory Disease, Atrial Fibrillation and Vocal Cord Cancer with Chronic Left External Iliac Occlusion

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1. Abstract

Respiratory infection due to COVID-19 has been associated with thrombotic events such as deep vein thrombosis, pulmonary embolism, and, to a lesser extent, arterial thrombosis. Cases of acute aortic occlusion in COVID-19 patients have been previously described in the literature. Acute aortic occlusion has been associated with a 30-day mortality rate of 20%, an overall mortality rate of 60%, morbidity ranging from 30% to 74%, and a 30% risk of limb loss. Historically, surgical treatment has included aorto-bifemoral bypass, extra-anatomic bypass (axillo-bifemoral), bilateral inguinal thrombectomy, pharmacomechanical thrombectomy, and thrombolysis. Endovascular techniques provide new tools and therapeutic options, particularly for patients at high surgical risk. In selected cases, these may represent the only therapeutic option. However, optimal surgical management has not been standardized. We report a 64-year-old patient with bilateral acute ischemia caused by aortic occlusion in the context of COVID-19 pneumonia, new-onset atrial fibrillation, and a history of vocal cord cancer. The patient underwent a hybrid procedure under local anesthesia: femoral embolectomy, aortic endograft placement, and femorofemoral bypass due to chronic left external iliac occlusion. This approach is safe, effective and applicable to patients at high surgical risk and/or those contraindicated or unable to undergo intubation.

2. Introduction

Respiratory infection by the COVID-19 virus has been shown to be a risk factor for thromboembolic events [1]. It has been associated with episodes of deep vein thrombosis (DVT), pulmonary embolism (PE), and to a lesser extent, arterial thrombosis [2]; Acute Aortic Occlusion (AAO) cases and series have been described in the literature in COVID-positive patients, showing a high morbidity and mortality rate [1,3]. Recent developments and refinements in endovascular techniques and devices have introduced a new therapeutic option that is now regarded as both acceptable and the preferred treatment in selected cases [4]. We present the case of a 64-year-old patient with bilateral acute ischemia due to Acute Aortic Occlusion, in the context of bilateral COVID-19 pneumonia, new-onset Atrial Fibrillation (AF), and a medical history of vocal cord cancer. Treated by a hybrid procedure under local anesthesia: bilateral femoral embolectomy, Aortic Endograft and right to left femorofemoral bypass resulting from a chronic occlusion of left external iliac artery (LEIA)

3. Case Report

A 64-year-old patient, an active smoker with a history of one pack per day, Type 2 Diabetes Mellitus (T2DM), and a recent diagnosis of squamous cell carcinoma of the vocal cords, presented to the emergency department with odynophagia and fever. He was diagnosed with bilateral pneumonia due to

COVID-19 without clinical or laboratory alarm signs and was discharged with symptomatic treatment. He presented to the emergency department 5 days later with pain, paralysis, and bilateral anesthesia of the lower limbs (LL) of 3 hours' duration, presenting with pulselessness at any level, with cutaneous lividity in the abdomen and both thighs on physical examination. The ECG showed new-onset atrial fibrillation, and the aorta CT scan reveals complete acute occlusion of the infrarenal aorta and bilateral iliac arteries, along with chronic occlusion of the left external iliac artery (LEIA) Figure 1. This case took place during the COVID pandemic and our center lacked access to ventilators. Added to the patient's respiratory condition, the procedure was performed under local anesthesia and deep sedation. The patient underwent right transfemoral embolectomy and unsuccessful attempts at left transfemoral embolectomy due to chronic occlusion of the left external iliac artery (LEIA). Given the possibility of isolating thrombotic debris from the infrarenal aorta and both iliac axes, Aortic Endograft (Medtronic 16x10) was implanted, extending to the right common iliac artery (RCIA) with a Gore Viabahn VBX 8x79 stent-graft, a right-to-left femorofemoral bypass using 8mm ringed PTFE to restore vascularization to the left leg, and

bilateral fasciotomies of the anterior and posterior compartments. During surgery, sinus rhythm was restored. The patient was extubated in the operating room, with bilateral pedal pulses, and was transferred to the Intensive Care Unit (ICU) on anticoagulant therapy (Low Molecular Weight Heparin 80 mg every 12 hours) and single antiplatelet therapy (ASA 100 mg), without the need for vasopressor medications. During the postoperative period, the patient required a 5-day stay in the ICU due to renal function deterioration resulting from rhabdomyolysis (elevated CPK, creatinine, and urea levels), which necessitated hydration and monitoring of urine output, along with the recovery of respiratory function. The patient was transferred to the hospital ward and discharged on the 8th postoperative day, with closed fasciotomies and preserved bilateral pedal pulses. During the hospitalization, a follow-up CT scan for his bilateral pneumonia showed a patent endograft without leaks (Figure 2). Two months later, he received treatment for his vocal cord carcinoma from the otolaryngology department through radiotherapy. In the most recent outpatient follow-up a year ago, he maintained distal pulses, and ultrasound evaluation showed the endograft without Leaks and patent femorofemoral bypass.

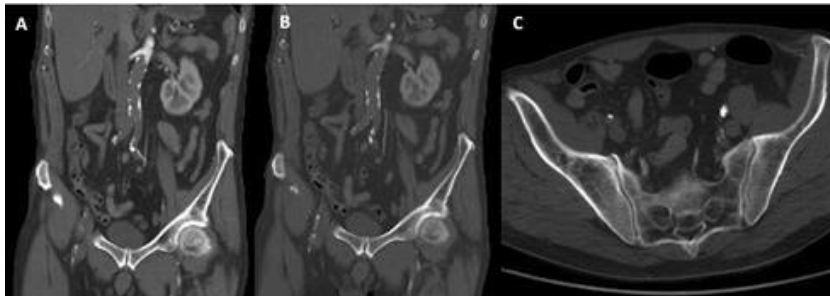


Figure 1. A thoracoabdominal CT scan reveals, in coronal view, acute occlusion of the infrarenal aorta (A & B) and chronic occlusion of the left external iliac artery (LEIA) (C) in sagittal view.



Figure 2. Post-surgical abdominal aorta CT. (A) Coronal view shows well-positioned, patent aortic endograft without leaks. (C) and (D) Axial sections reveal a thrombus-free endograft with persistent thrombotic occlusion of the left common iliac artery (LCIA). (B) The femorofemoral bypass (right-to-left) is patent.

4. Discussion

It is known that a high percentage of patients with respiratory infections due to COVID-19 experience complications related to thrombotic events, primarily venous (deep vein thrombosis and pulmonary embolism) and, to a lesser extent, arterial [2]. In our center, during the COVID pandemic, we published a series of three patients with arterial thrombosis in the infrapopliteal territory, as part of a cohort of 14 patients with thrombotic events. These events included acute coronary syndromes and cerebrovascular events related to their respiratory infection [5]. Since the onset of the COVID-19 pandemic, cases of acute aortic occlusion due to acute thrombosis related to the infection have been reported [1,3], with an incidence of 2.7 to 5 cases per million persons-year [4].

Acute aortic occlusion is one of the most dramatic diagnosis in a vascular surgical practice. The acute interruption of blood flow to the infrarenal aorta leads to ischemia of the lower limbs, possible visceral ischemia, spinal cord ischemia and renal failure if the occlusion propagates proximally. It carries a high morbidity and mortality rate, as well as a significant risk of limb loss which can reach up to 30% [6]. Contemporary case series report morbidity rates between 30% and 74%, an in-hospital mortality rate of 20% within 30 days, and an overall mortality rate of up to 60% [7]. The most common presenting symptom is limb pain, followed by motor or sensory loss (18-86%). Renal failure and/or visceral ischemia can occur in 12-24% of patients. Overall, the most common etiology tends to be thrombotic, occurring in 35% to 84% of patients, with embolic events being less frequent (8%-75%). Furthermore, the incidence of embolic events has shown a decreasing trend in recent years due to better control of embolic causes, such as atrial fibrillation, cardiomyopathies, and the use of safer and more effective anticoagulant therapies [6]. In this scenario, the origin of the acute occlusion is unclear, as the patient has a predisposition to both embolic (recent atrial fibrillation diagnosis) and thrombotic etiologies (tumoral, COVID infection and chronic LEIA occlusion). Among the historically preferred surgical treatments for these patients are aorto- bifemoral bypass, extra-anatomic bypass (axillo-bifemoral), bilateral thromboembolectomy, as well as pharmacomechanical thrombectomy and thrombolysis [8,9]. The development and refinement of endovascular techniques provide us with new tools and therapeutic options, particularly for patients at high surgical risk. In some selected cases, these may represent the only therapeutic option. As a result of the above, the mortality rate has been reduced by 15.5% over the past 7 years [10]. Despite this, and due to the limited case series reported in the literature, there is no consensus on the preferred surgical technique for this type of pathology, as it depends on various factors, including age, comorbidity, degree of urgency, and anatomical disposition.

5. Conclusions

In cases of acute aortic occlusion treated with bilateral embolectomy, where thrombectomy of one of the axes is not

feasible and thrombotic debris persists in the infrarenal aorta, a hybrid approach with an aortic endograft and femorofemoral bypass represents a viable and safe option. This strategy is particularly applicable to patients at high surgical risk and/or those contraindicated or unable to undergo intubation, as demonstrated in this case.

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