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Case Report

A rare case of thoracic-abdominal aortic aneurysm in conjunction with bilateral superficial femoral artery occlusion, documented with computed tomography angiography ☆

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ABSTRACT

Aneurysms represent bulging of the weakened blood vessel area, as a result of cystic medial degeneration. Aneurysms chance of rupturing increases over time, resulting in bleeding and death. Therefore, patients with aortic aneurysms require frequent monitoring with magnetic resonance and computed tomography angiography, as well as undergoing open repair surgery and endovascular aneurysm repair.

We present a case of ruptured thoracic aortic aneurysm in conjunction with bilateral superficial femoral occlusion, as incidental findings in Covid-19 positive patient.

The patient, a 62-years-old female, presented with cough, shortness of breath, fever and leg claudication. Doppler ultrasonography of the lower limbs was conducted to rule out thromboembolism, revealing bilateral superficial femoral arteries occlusion. The patient was administered high doses of parenteral anticoagulants.

Hemoptysis ensued, prompting an MSCT scan, that showed right pleural effusion, atelectasis, and right active perihilar infiltrates with inter-lobar pleurisy. Due to inflammatory changes on the lung parenchyma, the patient got tested for Sars-Cov-2, and resulted positive.

Contrast-enhanced MSCT also revealed thoracic-abdominal aortic aneurysm with its highest diameter measuring 10 cm, and massive per-aortal thrombus and/or hematoma

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of 5 cm, which was further ruptured and patient died untreated in the fourth day of hospitalization.

Questions arise whether Covid-19 was the primary cause of bilateral superficial femoral artery occlusion and whether high doses of parenteral anticoagulants were the primary cause of thoracic aortic aneurysm rupture.

Thus, a careful balance must be made between the detrimental and protective contributions of anticoagulants in the patients presenting with Covid-19 and thoracic-abdominal aortic aneurysm.

Background

Aneurysms represent bulging of the weakened blood vessel area, mostly as a result of cystic medial degeneration, where smooth muscle cell dropout and elastic fiber degenerate.

Thoracic and abdominal aortic aneurysms are the 15th leading cause of deaths in patients' older than 55 years-old [1–3].

Sixty percent of thoracic aortic aneurysms occur in the root of ascending aorta, 40% in the descending aorta, 10% in the arch and 10% in the thoracic-abdominal aorta.

Thoracic aortic aneurysms can be broadly divided into true aneurysms, containing all 3 layers of the aortic wall, and false aneurysms or pseudo-aneurysms [4–7].

Thoracic aortic aneurysms are mostly caused by degenerative diseases, genetic diseases (Marfan and Turner syndrome, or familiar thoracic aortic aneurysm syndrome), bicuspid aortic valve, atherosclerosis, syphilis, aortic arteritis, aortic dissection and trauma [7–11].

Thoracic aortic aneurysms are becoming increasingly common, owing to an aging population and more frequent imaging [5,11,12].

Aneurysms have a significant risk of rupture or dissection over time, resulting in bleeding and death. As a result, patients with thoracic aortic aneurysms need frequent MRA or CTA monitoring, strict risk factor management, continuous use of antihypertensive medications and statins, open repair surgery, or endovascular aneurysm repair [13–20].

We, herein, present a very uncommon case of ruptured thoracic aortic aneurysm in conjunction with bilateral superficial femoral arteries occlusion, as incidental findings in Covid-19 positive patient Figs. 1-4.

Case report

A 62-years-old female, chronic smoker, hypertensive, presents at emergency room with cough, shortness of breath, fever, muscle aches and leg claudication.

She was conscientious, timely and spatially oriented, her blood pressure measured 100/80 mm Hg, had a body temperature of 37.3°C, while her blood saturation measured 93%.

Except for a high CRP of 163.7 mg/L, other blood biochemistry values were normal.

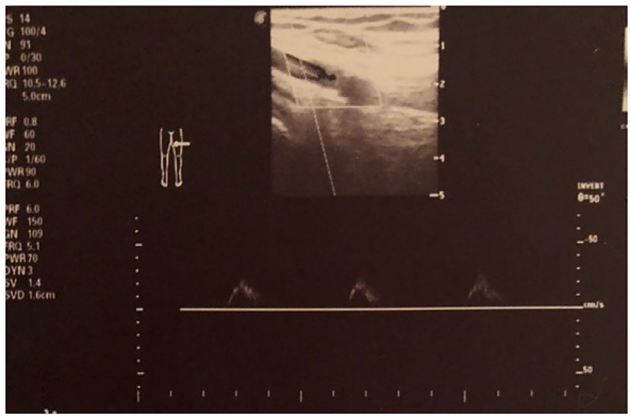

Fig. 1 – Doppler ultrasonography showing superficial femoral artery occlusion.

Due to leg claudication, a thromboembolic event was suspected, thus Doppler ultrasonography was immediately performed, showing a post-occlusive curve.

Further, CTA was performed, confirming the bilateral superficial femoral artery occlusion.

Accordingly, the patient was immediately administered high doses of parenteral anticoagulants. Yet, patient's clinical condition worsened with hemoptysis, clinicians assumed a bleeding peptic ulcer, and a gastroscopy was conducted promptly, with completely normal findings.

Due to gastroenterologists' suspicion, that the bleeding had a respiratory origin; the patient was referred for thoracic and abdominal multi-slice computed tomography-MSCT.

MSCT findings showed right pleural effusion followed with atelectasis, and right active perihilar infiltrates with interlobar pleurisy. Due to inflammatory changes on the lung parenchyma, the patient got tested for Sars-Cov-2, and resulted positive. Despite the fact that Covid-19 vaccine was available at the time, the patient was not vaccinated.

Contrast-enhanced MSCT also revealed thoracic-abdominal aortic aneurysm with its highest diameter measuring 10 cm, with extravasation and massive per-aortal thrombus and/or hematoma of 5 cm.

As the patient's clinical state deteriorated, the pulmonologist drained 700 mL of hemorrhagic exudate from the right lung under ultrasonography guidance, which was then sent for histopathological analysis.

Fig. 2 – Coronal, sagittal and axial computed tomography angiography showing bilateral superficial femoral arteries occlusion (marked red), followed with arterial mural calcifications (Color version of the figure is available online.)

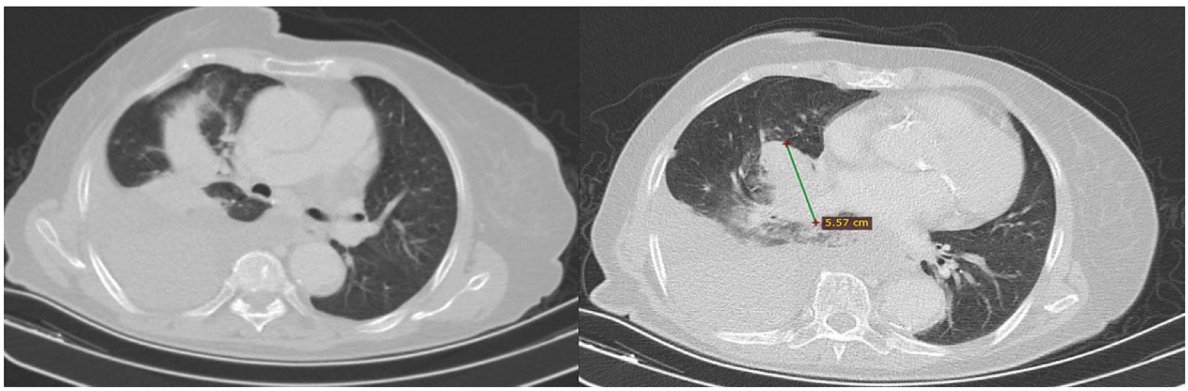

Fig. 3 – MSCT images showing right pleural effusion, atelectasis, right active perihilar infiltrates and inter-lobar pleurisy.

Fig. 4 – Axial, coronal, and sagittal projections showing thoracic-abdominal aortic aneurysm.

Despite the fact that the patients' PT, INR, PTT, TT, and D-dimer levels were normal, high anticoagulant doses were continued. In addition, intravenous saline, antibiotics, analgesics, and anxiolytics were given to the patient.

Despite the fact that the patient remained hospitalized for 4 days and was controlled by 6 subspecialists, including gastroenterologists, radiologist, pulmonologist, cardiologist, psychologists and vascular surgeon, she was not treated with open repair surgery or endovascular aneurysm repair, and thus died. Due to the unwillingness of family members, an autopsy was not performed.

Discussion

The clinical course of the patient raises numerous unsolved questions, such as whether the Covid-19 cough was the primary cause of the thoracic aorta rupture, or whether the ruptured thoracic aneurysm caused respiratory distress.

In addition, there is a further point for discussion, if Covid-19 was responsible for the bilateral superficial femoral arteries occlusion, and where high doses of parenteral anticoagulants truly needed for patient's leg claudication, thus potentially advancing the thoracic aneurysm to rupture.

So far, studies reveal that Covid-19 triggers thrombosis and disseminated intravascular coagulation, mostly progressing to thromboembolic events, ischemic strokes, and specifically leading to arterial thrombosis. Aggravated platelet aggregation, increased blood viscosity, expression of von Willebrand coagulation factors, increased fibrinogen and D-dimer, in addition with ageing, obesity, systematic inflammation, fever and immobility, are thought to be the main precipitating factors of decreased peripheral blood flow, resulting in arterial thrombosis in Covid-19 patients [21–25].

Despite high doses of parenteral anticoagulation as prophylactic therapy in Covid-19, 40% of the patients developed thromboembolic events [26,27].

Anticoagulants, on the other hand, increase the risk of bleeding in the event of a rupture, making them unsuitable for treatment in patients with aneurysms [28,29].

Given the existent evidence, the decision to begin anticoagulant medication in the setting of an aortic aneurysm should be made on a patient-by-patient basis, taking into account aortic wall injury, stability, and intramural thrombus growth rate.

Although the thrombus contributes to the size, growth, and proteolytic injury of the arterial wall, it may decrease mechanical stress on the aortic wall and maintain aortic aneurysm stability.

As a result, while antithrombotic and anticoagulant medication may minimize proteolytic injury, it may also reduce aneurysm mechanical stability, resulting in aneurysm rupture and negative patient outcomes.

Thus, a careful balance must be made between the deleterious and protective contributions of the thrombus to aneurysm progression, before starting anticoagulants in the patients presenting with comorbidities as Covid-19, and already diagnosed with thoracic-abdominal aortic aneurysm.

Patient consent

Oral and signed consent was obtained from patients concerned. The study was conducted anonymously.

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