

Clinical Case Reports

Arterial and venous thrombosis in a patient with Covid-19: A unique presentation

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ABSTRACT

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection not only affects the respiratory system but also induces coagulation abnormalities and thrombosis. We report a middle-aged woman who presented during the Covid-19 pandemic with sudden-onset acute left upper limb ischaemia of short duration, with no history of dry cough, breathlessness or fever, and tested positive on TrueNAT for SARS-CoV-2. Later, she developed deep venous thrombosis of the right lower limb during isolation in the hospital.

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INTRODUCTION

The occurrence of upper limb ischaemia has been less common compared to lower limb ischaemia. Most patients treated conservatively remain unidentified; hence, the incidence of upper limb ischaemia comes from a surgical series.¹ McCarthy *et al.*² reported an incidence of acute ischaemia of the upper limb as <5% of all acute extremity ischaemia. The aetiology of upper limb ischaemia has been more varied; emboli have been common, followed by atherosclerotic disease, arthritis, connective tissue disorders, occupational injuries and vasospastic diseases.³ A middle-aged woman, who presented with sudden-onset of acute left upper limb ischaemia of short duration, with no history of dry cough, breathlessness or fever, was found to be nasopharyngeal swab TrueNAT test positive for Covid-19. We report this unusual presentation of Covid-19.

THE CASE

A 55-year-old woman presented with constant dragging pain in the left upper limb for 3 days and progressively increasing discolouration of the fingers for a day. The pain was in the mid-

arm and radiated down to the fingers, and was associated with tingling and numbness. Before reaching our hospital, she had visited a few other hospitals where she was not given any treatment. She did not have any history of dry cough, difficulty in breathing or fever. She was not a known patient of diabetes mellitus or hypertension. On examination, her pulse rate was 89 per minute, blood pressure was 124/80 mmHg, temperature was 97.4 °F and oxygen saturation (SpO₂) was 99% while breathing room air. Examination of the chest, cardiovascular system and abdomen was unremarkable. The left upper limb was cold distally from just above the elbow with decreased strength and disturbed motor function of the hand and fingers with bluish discolouration. The axillary arterial pulsations were present whereas the brachial, radial and ulnar pulses were absent. A duplex scan revealed total occlusion of the proximal portion of the brachial artery with no distal flow to the brachial, radial and ulnar arteries. Her computed tomography angiogram of the left upper limb (Figs 1 and 2) showed normal opacification of the left subclavian artery and left axillary artery. There was non-opacification of the left brachial artery with faint opacification of the radial and ulnar arteries through the collaterals suggestive of acute-on-chronic limb ischaemia.

The initial laboratory evaluation showed elevated inflammatory markers as were the white blood cell (WBC) count, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). There was elevation in the levels of D-dimer, lactate dehydrogenase, alanine transaminase and aspartate transaminase. She was in a hypercoagulable state. Arterial blood gas analysis did not show any hypoxaemia or acidosis. Chest X-ray was normal. Electrocardiogram had a normal sinus rhythm, rate of 88 per minute. Echocardiography revealed a normal left ventricular (LV) function with a LV ejection fraction of 65% with no evidence of clot or thrombus within the cardiac chambers.

Anticoagulation and antibiotics were started. Her Covid-19 nasopharyngeal swab TrueNAT test report was awaited. As there was worsening of the ischaemic signs, she underwent thrombo-embolectomy through the brachial route under general anaesthesia. The procedure was performed with protective gown and face cover.

This approach used a lazy S incision in the antecubital fossa, which was extended distally, curving towards the radius to expose the brachial bifurcation. The embolectomy was performed distally into the radial and ulnar arteries with good returns using a no. 3F Fogarty embolectomy catheter (Edwards Lifesciences, Irvine, CA 92614, USA). A long length of thrombus was extracted from the proximal portion in the brachial artery, using a 4F Fogarty embolectomy catheter (Edwards Lifesciences, Irvine, CA 92614, USA; Fig. 3) with a good proximal flow. It was at this stage that the patient's TrueNAT test for Covid-19 was reported positive. Post-procedure, as her respiratory efforts were poor and signs of desaturation were present, she was shifted to isolation on ventilatory support and extubated after 2 days. She was started on antibiotics, anticoagulation (unfractionated heparin injection 5000 i.u. 6 hourly), anti-platelets, cilostazol, statins and pain-killers.

The blood culture was sent on postoperative day 1 and was found to grow *Staphylococcus hominis*, and appropriate antibiotics were replaced.

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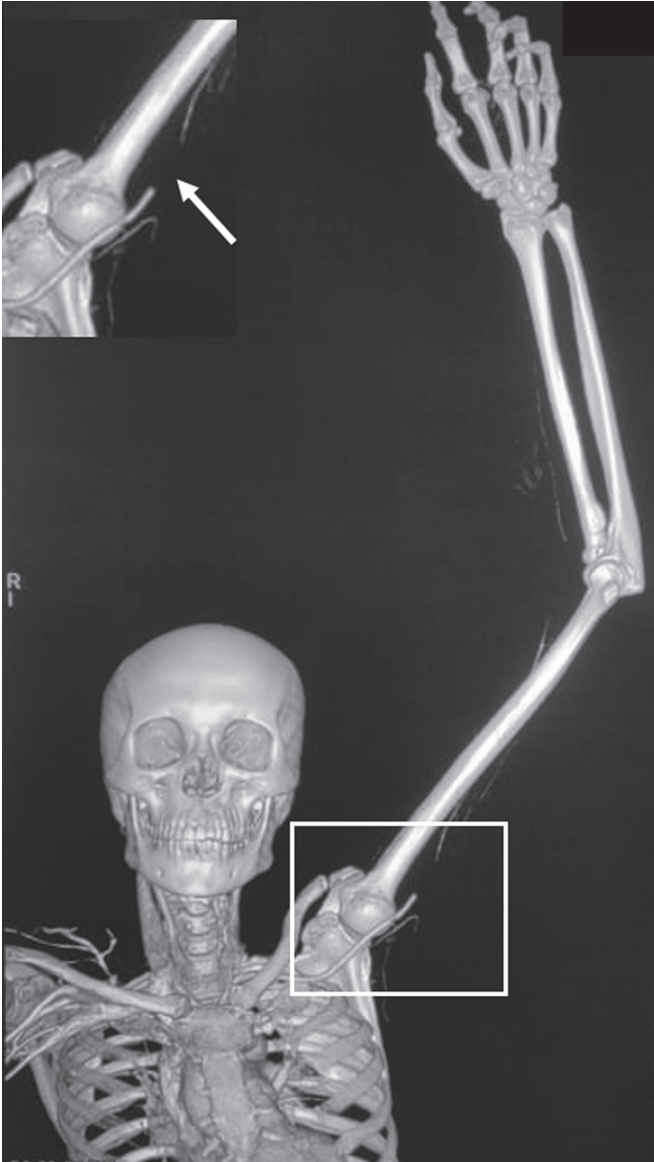


FIG 1. Spiral computed tomography angiography (coronal section) showing normal opacification of the left subclavian artery and the axillary artery and non-opacification of the left brachial artery (arrow)

On postoperative day 6, she developed pain and swelling in the right lower limb, despite the anticoagulation (prothrombin time [PT] test 26.2 seconds [11–16 seconds], international normalized ratio [INR] 2.01). The Doppler study revealed subcutaneous oedema and deep venous thrombosis in the right lower limb. The patient was managed with compression stockings, and low molecular weight heparin (FRAGMIN®, Pfizer) 2500 i.u. subcutaneously twice daily was given in addition to the unfractionated heparin. Within the next 10 days, the patient’s pain and oedema settled and she became ambulatory. Repeat test for Covid-19 at the third and the fourth weeks was negative, and the patient was discharged. On discharge, she was advised antibiotics, antiplatelets, oral anticoagulation, cilostazol, statins, pain-killers and multivitamins. She was followed up telephonically and seen after 4 months and was found to be doing well. She regained her motor function well.



FIG 2. Spiral computed tomography angiography reconstruction showing normal opacification of the left subclavian artery and the axillary artery and non-opacification of the left brachial artery (white square; inset, arrow) with faint opacification of the radial and ulnar arteries through the collaterals

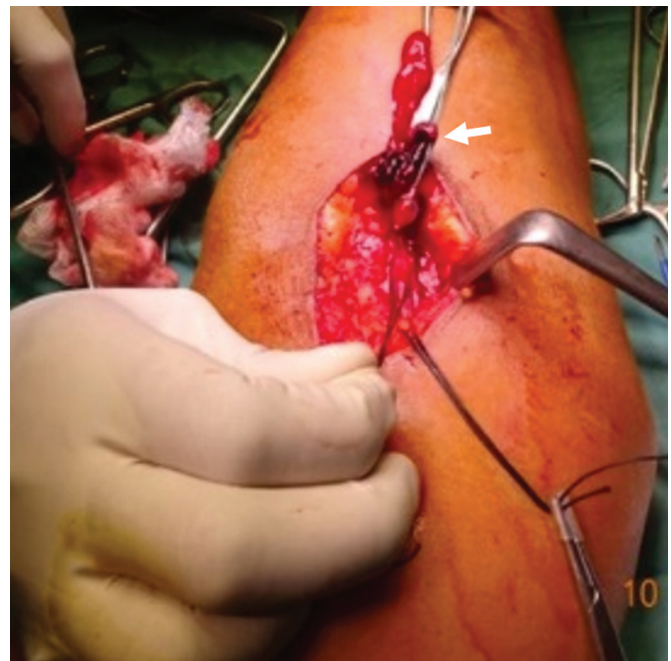


FIG 3. Operative photograph showing a long length of thrombus (arrow) being extracted through the left brachial route using a 4F Fogarty embolectomy catheter

DISCUSSION

SARS-CoV-2 infection has been known to predispose to arterial and venous thrombo-embolism. However, there have been limited published data regarding thrombosis in Covid-19, and this has generated interest among the treating doctors. Various studies have shown that patients with severe Covid-19 infection develop thrombosis with fulminant activation of the coagulation and consumption of coagulation factors. Acute upper limb ischaemia is a rare clinical entity that requires immediate evaluation and treatment. In a majority of patients, emboli from the heart could be the cause of obstruction of the brachial artery. This possibility was ruled out in our patient with echocardiography. Atherosclerosis with acute thrombosis is the main cause of arm ischaemia. Such pathologies usually remain asymptomatic for long due to collaterals, and manifest when thrombosis occurs; similar was the presentation in our patient. The disease becomes more fulminant in the setting of diabetes and possibly the presence of SARS-CoV-2. Potential risk factors, such as tobacco chewing, hypertension, diabetes, were not present in our patient. The pre-gangrenous and gangrenous changes depend on the duration of the symptoms and the extent of the thrombosis.

The association of coagulopathy with Covid-19 has been a subject of interest. A meta-analysis⁴ found altered PT and elevated D-dimer levels in patients with severe Covid-19. Our patient had an elevated D-dimer level but had been asymptomatic except for complaints in the upper limb. Her inflammatory markers were elevated as were the WBC count, ESR and CRP. There was also elevation in the levels of lactate dehydrogenase, alanine transaminase and aspartate transaminase. She was in a hypercoagulable state based on the level of D-dimer. A similar case of upper limb ischaemia with florid Covid-19 infection has been reported.⁵ Our patient was different as her presentation was with just upper limb ischaemia and no respiratory symptoms. Bellosta *et al.*⁶ have studied the association of limb ischaemia with Covid-19 infection and found that these patients had a hypercoagulable state and suggested that the use of long-term systemic heparin might improve the results of surgical treatment, and improve the limb salvage rate and overall survival.

Several papers⁷⁻⁹ have reported that elevated D-dimer levels in critically ill Covid-19 patients had a prognostic significance. D-dimer level could be elevated in several other clinical conditions such as pregnancy, cardiac diseases, malignancy, inflammation, trauma and hepatic diseases, which need to be excluded.

In the outbreak of SARS-CoV-2, bleeding and thrombosis have become an issue of concern. A retrospective study,¹⁰

found that D-dimer was associated with a poor prognosis. They found an association between markers of inflammation such as elevated CRP in Covid-19 patients and the D-dimer level. They observed that as the patient improved, the markers of inflammation and the D-dimer levels declined. They found a low correlation between thromboembolism and the D-dimer levels, and the role of D-dimer in predicting venous thrombosis. It is proposed that with abnormal levels of D-dimer and elevated inflammatory markers, anticoagulation may be required. Our patient had both arterial and venous thrombosis, which was successfully managed with thrombo-embolectomy and anticoagulation. As her condition improved, there was a decline in the inflammatory markers.

We present this case to emphasize the unique presentation of thrombosis and thromboembolic phenomenon associated with Covid-19.

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Conflicts of interest. None declared

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