Med & Health Jun 2023; 18(1): 248-254 https://doi.org/10.17576/MH.2023.1801.23

CASE REPORT

Critical Digital Ischemia Secondary to Ulnar Artery Thrombosis in Suspected Antiphospholipid Syndrome

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ABSTRAK

Sindrom antifosfolipid (APS) ialah salah satu punca arteri tersumbat yang boleh menyebabkan iskemia anggota badan yang teruk dan mengakibatkan kehilangan anggota badan dan juga kematian. Kami melaporkan seorang wanita berumur 45 tahun yang mempunyai iskemia digital yang teruk yang disyaki akibat APS. Wanita tersebut dihantar ke Jabatan Kecemasan (ED) buat kali ketiga dengan kesakitan berulang dan kebas di hujung jari kiri dan jari kelengkeng biru. Dia mempunyai arteri ulna yang lemah semasa palpasi, jari kelengkeng kiri yang sejuk, sianosis, masa isi semula kapilari yang berpanjangan (CRT) dan isyarat SpO2 yang tidak boleh dibaca. Angiografi dan ultrasound menunjukkan trombus arteri ulnar proksimal. Trombektomi dijalankan dua kali kerana trombosis arteri graf berlaku dalam pembedahan pertama. Pasukan reumatologi merawatnya sebagai sindrom antifosfolipid dengan antiplatelet. Kami berharap laporan kes ini akan meningkatkan kesedaran doktor kecemasan tentang pengesanan awal dan dapat menjalankan rawatan yang berkesan.

Kata kunci: arteri ulna, iskemia anggota badan, sindrom antifosfolipid, trombosis, trombektomi

ABSTRACT

Antiphospholipid syndrome (APS) is known to cause critical limb ischemia leading to limb loss or death from arterial occlusion. We reported a 45-year-old woman with critical digital ischemia and was suspected secondary to APS. This woman presented to the Emergency Department (ED) for the third time because of recurrent pain and numbness in the fingertips of her left hand with bluish discoloration of the left little finger. Her ulnar artery became faint on palpation, and her left fifth finger

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was cool, cyanotic, with prolonged capillary refill time (CRT) and unrecognised signal in SpO2. Angiography and ultrasound showed proximal thrombosis of the ulnar artery. Thrombectomy was performed twice because graft thrombosis had occurred during the first operation. The rheumatology team treated her as APS and administered antiplatelet drugs. We hope this case report will raise awareness among emergency physicians for early recognition and provide optimal treatment.

Keywords: antiphospholipid syndrome, limb ischemia, thrombosis, thrombectomy, ulnar artery

INTRODUCTION

Critical limb ischemia (CLI) is caused by a sudden decrease in blood flow to the limbs, usually due to embolic or thrombotic vessel occlusion and results in clinical symptoms such as claudication and discoloration (Damay et al. 2019). It is a critical form of peripheral arterial disease and a medical emergency with considerable mortality and morbidity. Prompt diagnosis is essential because timely treatment must be initiated to restore blood flow to the extremity. The initial suspicion is primarily clinical and a missed diagnosis can have serious consequences for the patient, including amputation of the limb or even death. An emergency physician must be able to recognise such a condition immediately and consult a vascular surgeon for definitive treatment to avoid complications (Santistevan 2017). Antiphospholipid syndrome (APS) is a well-known aetiology for arterial obstruction leading to CLI. It is a systemic autoimmune disease which is characterised by recurrent vascular thrombosis. Overall, venous and arterial thromboses account for 70% and 30%, respectively. Thromboembolic manifestations can be diverse, reflecting the heterogeneity of the syndrome (Grossman et al. 2008). An obstructive atherosclerotic lesion involving the forearm arteries which leads to critical ischemia of the hand is a rare entity that has been treated with open surgery (Cremonesi et al. 2009). In this case report, we described a case of upper extremity arterial thrombosis associated with APS.

CASE REPORT

A 45-year-old Malay woman with bronchial asthma and gastroesophageal reflux disease (GERD) frequently visited the Emergency Department (ED) for pain and numbness in the fingertips of her left hand and a bluish discoloration of her left little finger (Figure 1). It was the third visit with a similar complaint. She was discharged from the ED for the previous two visits within the past three weeks as the symptoms resolved within minutes after oral analgesia (nonsteroidal anti-inflammatory drugs). She was given an outpatient orthopedic appointment to work out on ulnar tunnel syndrome,

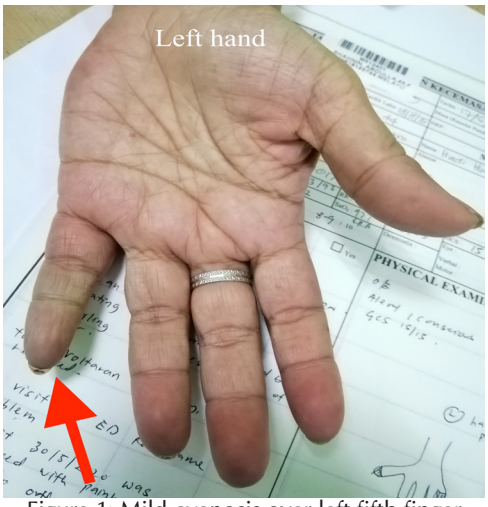

Figure 1: Mild cyanosis over left fifth finger

but the symptom worsened before the date.

Further history revealed that the patient had undergone a plasma donation three months ago with difficulty collecting the plasma and cannulation on her left arm. Since then, she had recurrent numbness in her left hand. The pain was unbearable during this visit, unrelieved with analgesics and did not triggered by the cold environment. She is a non-smoker, had no miscarriage or problems in a previous pregnancy, had no family history of connective tissue or autoimmune disease, had no constitutional symptoms, and was not taking any conventional medications.

During physical examination, her vital signs were within normal range, blood pressure 134/67 mmHg, heart rate 64 bpm, SpO2 98%, temperature 36.4°C and pain score of 5/10. She was fully awake, conscious and oriented, while the systemic examination was unremarkable. Her left fifth finger felt cool; she had mild cyanosis, capillary refill time (CRT) was 3 seconds, and SpO2 was unremarkable. Otherwise, no cyanosis on the other digits (Figure 2), CRT less than 2 seconds and SPO2 96-98%. Sensation on all digits and hands were intact. Palpation of peripheral pulses was normal in brachial and radial arteries but faint in the ulnar artery. Doppler examination of the ulnar artery showed a monophasic flow indicating significant disease.

The patient was admitted to the surgical ward for digital ischemia over the left fifth finger. She was treated with T aspirin 150 mg OD. Digital

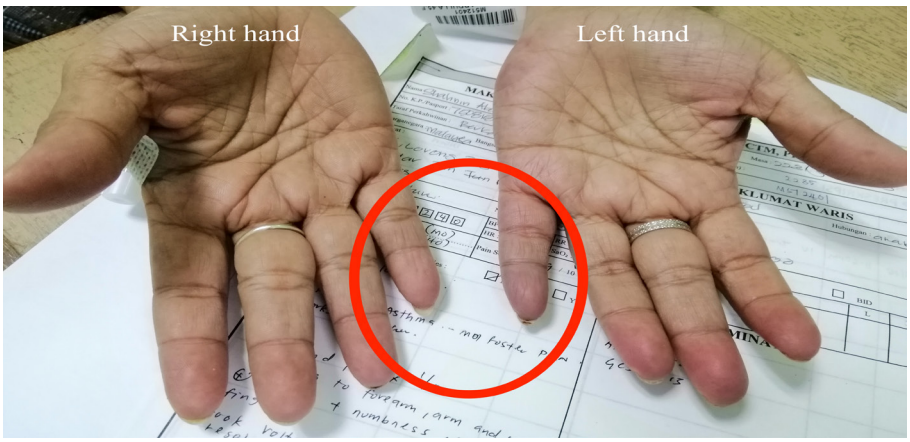

Figure 2: Comparison between both hands. No cyanosis in other fingers except for the left fifth finger

subtraction angiography (DSA) of the left upper extremity revealed a short segmental thrombus of the proximal ulnar artery immediately after the branch of the brachial artery. There was a focal irregularity/stenosis of this ulnar artery segment (Figure 3). An ultrasound of the left upper extremity was also performed, which confirmed the filling defect of the proximal ulnar artery and revealed a thrombus. She underwent an open thrombectomy of the left ulnar artery and a left brachial-ulnar artery bypass. Postoperatively, numbness and pain disappeared, but the left hand felt cool, the radial pulse was slightly diminished, and the ulnar pulse was feeble. An ultrasound investigation was carried out and revealed thrombosis of the cephalic vein graft as the cause of the symptoms. The second surgery (open thrombectomy and angiogram on the table) was uneventful, and the patient received an IV heparin infusion for five days.

The rheumatology team treated the patient as suspected APS. The thrombotic event in a young woman is a common initial manifestation of APS. However, laboratory analysis results were normal, such as coagulation profile, C3, C4, erythrocyte sedimentation rate (ESR), antineutrophil cytoplasmic antibody (ANCA) and even thrombophilia screening. An echocardiogram showed a good ejection fraction (70%), normal valves, and did not clot. Although all relevant investigation results were negative, she was treated as APS, given clinical evidence of recurrent thrombosis. She was hospitalised for twelve days and discharged well with dual antiplatelet therapy.

DISCUSSION

This case report involved a middle-aged lady diagnosed with APS based

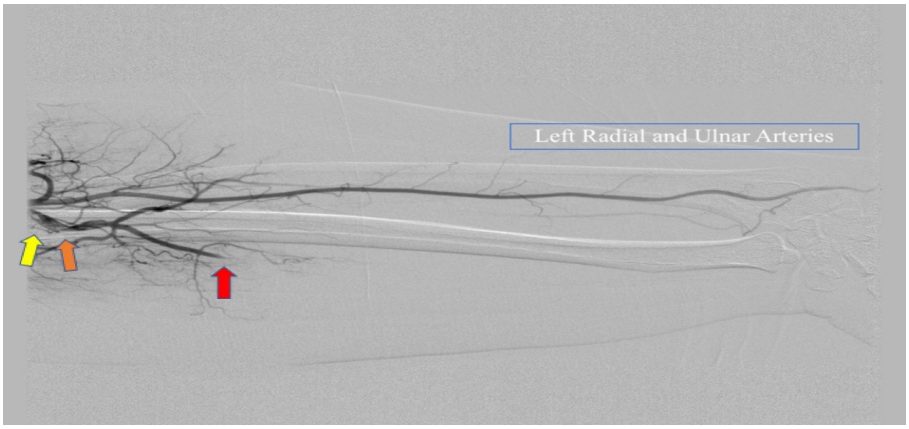

Figure 3: DSA Left Upper Limb. Findings: A short segment filling defect was noted at the proximal ulnar artery immediately after the brachial artery bifurcation (yellow arrow). It was associated with irregularity and focal stenosis of this ulnar artery segment (orange arrow). The ulnar artery only opacified until the proximal segment, which then tapered (red arrow). The radial artery was well opacified throughout its entire length. Impression: Short segment thrombus of the proximal ulnar artery and focal irregularity/stenosis.

on clinical evidence of a recurrent thrombotic event. She presented to the ED with symptoms of critical digital ischemia. The initial challenge in diagnosis was the recurrent symptom without the apparent risk factor. Digital subtraction angiography (DSA) of the left upper extremity detected a short-segment thrombus in the proximal ulnar artery. Invasive management with open thrombectomy and arterial bypass combined with pharmacological treatment (antiplatelet and heparin) were done. Many studies described the association between APS and CLI or peripheral vascular disease (PVD). However, few case reports had been published recently on the upper limb or digital ischemia in APS compared with other autoimmune disorders such as systemic sclerosis and Systemic Lupus Erythematosus (SLE), or even in COVID -19 (Saraiva et al. 2019; Schultz & Wolf 2020; Sharp et al. 2016).

It is critical to distinguish between acute and chronic limb ischemia. Acute limb ischemia (ALI) is described as an abrupt reduction in blood flow that threatens limb viability within two weeks of symptom starts and is caused by arterial embolism, most commonly from the heart or thrombosis (Norgren et al. 2007). Thrombosis is attributed to atherosclerosis progression, hypercoagulability, Burger disease, dehydration and trauma. Some may also result from vascular problems (Suzuki et al. 2016).

In contrast, chronic limb ischemia is caused by peripheral arterial occlusive disease (PAD). The situation evolves into CLI when the arterial blockage develops. The CLI patients will develop pain at rest or imminent limb loss caused by severe limb blood flow impairment due to obstruction of PAD, embolism, vasculitis, and in-situ thrombosis. The pathology is attributed to hypercoagulable conditions, vasospasm, compartment syndrome and trauma. The metabolic demands of the distal tissue bed are not supplied by resting perfusion, resulting in resting discomfort or tissue loss such as ulceration or gangrene (Santistevan 2017).

In the ischemic limb, the more extended period of the oxygen deprivation, the greater the likelihood of cell death and irreversible damage. The peripheral nerve is the most sensitive tissue to ischemia, followed by skin, subcutaneous tissue and skeletal muscle. It took about six hours in acute arterial occlusion before irreversible damage occurred (Santistevan 2017). However, the presence and extent of collateral vessels influence the time frame (Henke 2009). Fortunately, this patient had only a short segmental thrombus in the proximal ulnar artery, which had a collateral supply to the distal ulnar artery and manifests mainly in the little fingers.

In this case, prior history of cannulation and intermittent ischemic digital symptoms support the evidence of CLI related to thrombosis. A normal cardiovascular examination and echocardiography revealed that no clots in the ventricle ruled out an embolic event. Thrombosis is the primary aetiology, with pathology caused by hypercoagulability, most likely related to APS. Vascular damage and increasing atherosclerotic

constriction in the peripheral arteries culminate the thrombus development until the narrowing reaches severe subsequently, results in acute arterial occlusion.

Antiphospholipid syndrome is a systemic autoimmune disease characterised by arterial and venous thrombosis and recurrent foetal loss. It is frequently accompanied by laboratory thrombocytopenia and positive antiphospholipid antibodies (Gómez-Puerta & Cervera 2014). A growing number of studies had shown that patients with clinical symptoms of APS may have transitory positive or consistently negative aPL titers in some cases. The term "seronegative APS" (SN-APS) has been proposed for these individuals, but it is a diagnosis of exclusion (Pignatelli et al. 2020). Primary APS can occur regardless of the underlying disease (Suzuki et al. 2016), while secondary APS can emerge from SLE or, less typically, other autoimmune illnesses. Arterial APS is less prevalent than venous thrombosis. It has several forms, including cerebral ischemia (the most common), ischemic heart disease, peripheral ischemia of the upper and lower limbs, mesenteric ischemia, splenic infarction, renal infarction and aortitis (Soo Hoo et al. 2017). In this case, the patient was suspected of having APS given her young age, female gender and recurrent thrombosis event. A negative thrombophilia screening result did not rule out APS and may indicate seronegative APS.

Critical ischemia affects the upper limb less commonly than the lower limb. The forearm arteries are less typically affected than the subclavian, axillary and brachial arteries (Chang et al. 2003). The treatment between small vessel disease versus large vessel disease is quite different. Most therapy for upper extremity big vessel ischemia is surgery (Mcnally & Univers 2018). In small vessel disease of hand ischemia, a conservative approach is satisfactory. Revascularisation may be therapeutic for certain people whose debilitating pain compromises their quality of life (Namdari et al. 2007).

Perioperative anticoagulation is critical to prevent graft thrombosis in individuals with primary APS (Lauvao et al. 2008). The destroying effect of the immune complex on the vessel's endothelial lining makes it to be fragile and promotes micro bleeding. At the same time, a thrombus can form an inflammatory-induced hypercoagulable condition. Anticoagulants and antiplatelet medications avoid this condition (Damay et al. 2019). Good prognosis in treatment includes a proper surgical technique, an autogenous graft and perioperative anticoagulation.

Physicians play an essential role in the evaluation of patients with hypercoagulable states. Uncommon arterial manifestations without apparent risk factors are challenging in diagnosis. The undiagnosed hypercoagulable state must be suspect in those young women with few vascular risk factors. However, APS should be evaluated in arterial or venous thrombosis (Johnson et al. 2005). Its recognition is essential to adopt the most appropriate anti-thrombotic strategy to reduce the rate of recurrences. Early diagnosis

and appropriate treatment reduce the morbidity and mortality associated with these arterial manifestations.

CONCLUSION

Digital ischemia is a dangerous complication of APS that must be treated immediately. The risk factor, intermittent ischemic digital pain with evidence of vascular insufficiency, lead to the diagnosis. A multidisciplinary approach is required to achieve an optimal outcome. An invasive strategy and medications such as antiplatelet agents and anticoagulants are the treatment of digital ischemia.

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Received: 22 Feb 2022
Accepted: 25 Nov 2022