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Adductor canal compression syndrome in an 18-year-old female patient leading to acute critical limb ischemia: A case report

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ABSTRACT

BACKGROUND: Adductor canal compression syndrome is a rare non-atherosclerotic cause of arterial occlusion and limb ischemia.
PRESENTATION OF CASE: The patient is an 18-year-old healthy female who presented to the emergency department with acute left lower extremity ischemia. Her symptoms began as sudden onset mild foot pain approximately two months ago. Over the 72 h prior to presentation, she developed severe pain, pallor, paralysis, loss of pedal pulses, paresthesia, and poikilothermia. Due to her advanced ischemia, she was taken immediately to the operating room for angiography and intervention. Initial angiography demonstrated distal superficial femoral and popliteal artery occlusions along with lack of tibial or pedal artery blood flow. She underwent percutaneous mechanical thrombectomy and initiation of catheter directed thrombolysis. After 48 h of catheter directed thrombolysis and repeat mechanical thrombectomy, computed tomography (CT) was performed and demonstrated external compression of the superficial femoral artery in the adductor canal and residual chronic thrombus. Echocardiography and CT of the thoracic aorta was also performed, and were negative, therefore excluding other potential sources of arterial embolism. She next underwent surgical exploration, division of an anomalous musculotendinous band compressing the left superficial femoral artery and thromboendarterectomy of the distal left superficial femoral artery. The patient recovered well without any post-operative complications and could return to her daily activities 3 weeks following surgery.
CONCLUSION: Knowledge of rare non-atherosclerotic vascular disorders, such as adductor canal compression syndrome, is paramount when treating patients who present with limb ischemia and lack traditional risk factors.

1. Introduction

Adductor canal compression syndrome is a rare, non-atherosclerotic cause of lower extremity arterial insufficiency. This disorder primarily effects young, healthy, physically active patients and was initially described by Eduardo Palma in early 1950′s [1–3]. The pathophysiology of this condition involves chronic external compression of the superficial femoral artery within the adductor canal that ultimately leads to vessel injury, in-situ thrombosis, limb ischemia and potential limb loss [4–6]. The precise source of the external compression varies from case-to-case but published reports have described “embryologic” fibrous bands [5,7], an anomalous musculotendinous band arising from the adductor magnus muscle [4] and hypertrophied adductor magnus or vastus medialis muscles [8]. Treatment is always surgical with some combination of musculotendinous release followed by an arterial revascularization procedure. Here, we report successful limb salvage in a healthy 18-year-old female who presented with advanced acute limb ischemia due to adductor canal compression syndrome.

2. Presentation of case

The patient is an 18-year-old female who presented to our emergency department with acute left lower extremity ischemia. Her past medical history was unremarkable except for oral contraceptive use for irregular menstruation. Her symptoms began as sudden onset moderate foot pain approximately two months prior to presentation. For her foot pain, she was evaluated in the outpatient setting by her primary care physician. It was thought that her symptoms were due to an overuse musculoskeletal injury related to participation in a competitive high school marching band. She continued along with her activities and controlled her symptoms with ibuprofen as needed. Over the 72 h immediately prior to her ED visit, she developed severe pain, pallor, loss of pedal pulses, paresthesia, and poikilothermia. On physical examination in the emergency department, her temperature, pulse and

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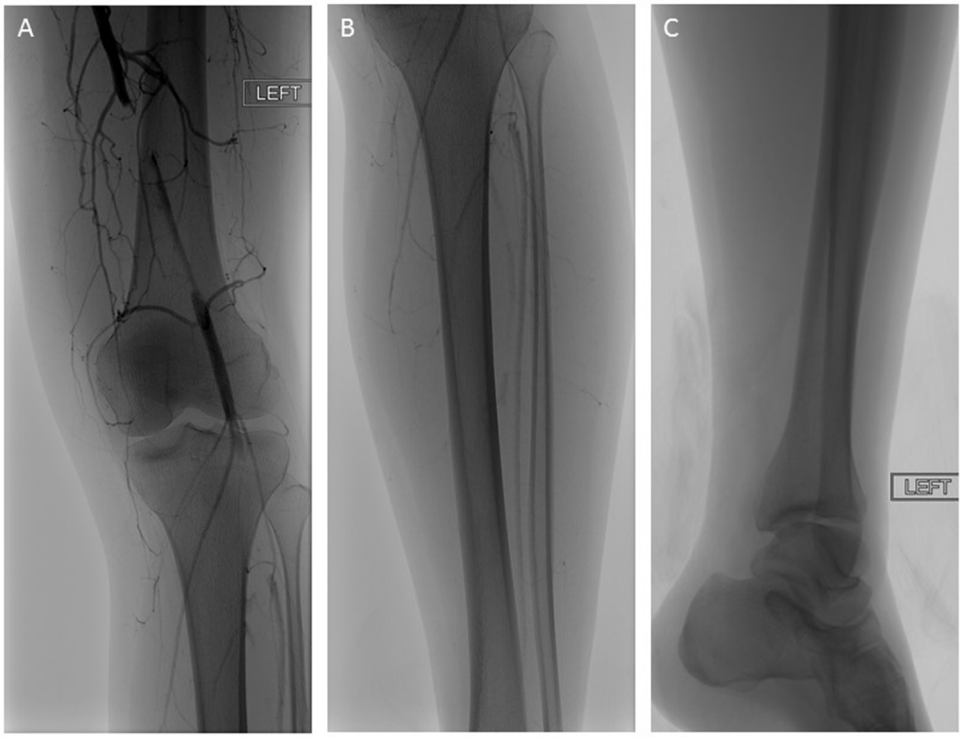

Fig. 1. Initial angiography demonstrates thrombosis of the superficial femoral artery at the level of the adductor canal (A). More distal angiographic images demonstrate subacute distal embolization with minimal reconstitution of the anterior tibial artery (B) and no arterial flow to the foot (C).

blood pressure were normal. Pulse examination revealed normal right lower extremity pulses and a normal left common femoral artery pulse. Left popliteal and pedal artery pulses were absent. Moreover, her left foot and distal leg were pale and cool to the touch. She also had diminished sensation on both the dorsal and plantar aspect of her forefoot. Due to her advanced ischemia, she was immediately anticoagulated with intravenous heparin and taken to the operating room for angiography and intervention. After satisfactory anesthesia, we accessed her right common femoral artery under ultrasound guidance and placed a 4 French sheath. We next obtained contralateral femoral access through a series of standard maneuvers and performed left lower extremity angiography. Initial angiography demonstrated thrombosis of the distal superficial femoral artery at the level of the adductor canal (Fig. 1A). More distal angiographic images demonstrated subacute distal embolization with minimal reconstitution of the anterior tibial artery (Fig. 1B) and no arterial flow to the foot (Fig. 1C). In preparation for our therapeutic interventions, our 4 French sheath was upsized to a 45 cm long 6 French sheath (Pinnacle Destination Sheath, Terumo Medical Corporation, Somerset, NJ). Using a 0.035 inch stiff angled hydrophilic coated Glidewire and Navicross support catheter (Terumo Medical Corporation, Somerset, NJ), we could traverse the thrombosed segments. We next exchanged our guidewire for a Hi-Torque Versacore guidewire (Abbott Vascular, Santa Clara CA) and performed mechanical thrombectomy with an Angiojet Solent Omni device (Boston Scientific, Marlborough, MA). Due to residual thrombus on follow-up angiography, a Fountain infusion catheter (Merit Medical Systems, South Jordan UT) was placed and catheter directed thrombolysis began with instillation of Alteplase (recombinant tissue plasminogen activator). The patient returned to the operating room 24 h later. At this second procedure, there was notable improvement in the superficial femoral and popliteal arteries but significant residual thrombus in the tibial and pedal vessels. Mechanical thrombectomy of left peroneal, anterior tibial and dorsalis pedis arteries was performed with both an Angiojet Solent Dista device (Boston Scientific, Marlborough, MA) as well as with the Penumbra Indigo aspiration system (Penumbra, Inc. Alameda, California). Once again, catheter directed thrombolysis was continued due to residual thrombus. After an additional 24 h of catheter directed thrombolysis, the patient returned for repeat angiography. Angiography (Fig. 2A) demonstrated a much-improved result but residual thrombosis within the left superficial femoral artery at the level of the adductor canal. Thrombolytic therapy was stopped. Catheter and sheath were removed. The next day following cessation of thrombolytic therapy, the patient underwent transesophageal echocardiography (TEE) and computed tomography angiography (CTA) of the chest, abdomen and lower extremities were performed. TEE and CTA of the chest and abdomen were normal. CTA of the lower extremities demonstrated external compression of the superficial femoral artery in the adductor canal along with the residual chronic thrombus within the superficial femoral artery at this level (Fig. 2B). The following day, the patient was taken to the operating room for her last surgery. A standard medial thigh approach was used (Fig. 3A). The area of arterial occlusion was identified and adjacent to this focal occlusion there was an impinging anomalous musculotendinous band compressing the left superficial femoral artery (Fig. 3B). This band appeared to arise from the adductor magnus muscle. The anomalous musculotendinous band was divided using electrocautery (Fig. 4A). At this point, the patient was systemically heparinized. Proximal distal control was secured with silastic vessel loops. A longitudinal arteriotomy was made. Thromboendarterectomy of the distal left superficial femoral and above knee popliteal artery was performed (Fig. 4B & C). After flushing and backbleeding, a bovine pericardial patch was sewn in place using a 6-0 Prolene suture (Fig. 4D). Hemostasis was obtained and a standard surgical closure performed. The patient recovered well without any postoperative complications and could return to her daily activities