

A popliteal artery aneurysm presenting with *ab extrinseco* popliteal vein occlusion and compartment syndrome



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A case report

Guido Bajardi, Felice Pecoraro, Gaetano Vitale, Giuliana La Rosa, Mario Bellisi, Umberto Marcello Bracale

Vascular Surgery Unit (Dir.: Prof. G. Bajardi), University of Palermo, Palermo, Italy

A popliteal artery aneurysm presenting with *ab extrinseco* popliteal vein occlusion and compartment syndrome. A case report

INTRODUCTION: *Aneurysms of popliteal artery are the most frequently reported aneurysm after abdominal aorta. An unusual presentation is compression to adjacent structure.*

CASE PRESENTATION: *A 67 years old caucasian man presenting deep vein thrombosis signs to the right leg including functional impotence was admitted in emergency setting to Vascular Surgery Unit. A pulsing mass was present in the popliteal cave at inspection. The computed tomography angiography demonstrated a 53.2 mm popliteal artery aneurysm causing an *ab extrinseco* compression of the popliteal vein and a dislocation of popliteal nerve. A surgical open reconstruction with a reinforced Dacron graft was performed via a posterior approach. Patient was discharged on the fourth postoperative day with no functional impotence. At three and six months Doppler ultrasound followup both popliteal arterial graft and popliteal vein were patent.*

CONCLUSION: *An unusual presentation of a popliteal artery aneurysm can be a popliteal compartment syndrome, especially in large aneurysms. Deep popliteal vein compression and/or popliteal nerve dislocation signs can rarely represent the clinical symptoms. The popliteal artery aneurysm repair is generally required to avoid a distal embolization and rupture. Through a surgical open repair was possible to achieve both popliteal cave decompression and the popliteal artery aneurysm repair.*

KEY WORDS: Aneurysm, Artery, Compartment syndrome, Popliteal, Thrombosis, Vein.

Introduction

Aneurysm of the popliteal artery is reported as the most common localization after abdominal aorta; it represents more than 80% of peripheral aneurysms¹. An unusual clinical presentation of popliteal artery aneurysm (PAA) with *ab extrinseco* deep vein occlusion is reported.

Case Report

A 67 year old Caucasian male was admitted to Vascular Surgery Unit due to right leg pain. Pain appraisal was referred as continuous and ingravescence since one week before admission, a functional impotence was referred in the last 24 hours. Numbness sensation and tingling were reported in previous months. At inspection, an oedematous swollen leg with bluish skin discoloration was present. At physical examination tibial arterial pulses were palpable as well as a pulsing mass in the popliteal cave. At duplex ultrasound (DUS), a PAA of 53.2 mm of maximal transverse diameter in the right popliteal region was diagnosed with no rupture signs. Moreover no residual lumen of right popliteal vein and omolateral hypoplastic great saphenous vein (GSV) was detectable.

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Correspondence to: Umberto Marcello Bracale, MD, Vascular Surgery Unit, University of Palermo, Via Liborio Giuffrè 5, 90127 Palermo, Italy (e-mail: umbertomarcello.bracale@unipa.it)

The computed tomography angiography (CTA) confirmed DUS findings showing the PAA ab extrinseco compression and dislocation of the popliteal vein and the popliteal nerve (Fig. 1). Upon diagnostic findings, popliteal vein occlusion was managed as a deep vein thrombosis with full heparinization to avoid potential risk of pulmonary embolism. Patient was scheduled for PAA repair by open treatment. Briefly a posterior approach with a 'S-shaped' incision² was chosen to have full control of both PAA and popliteal vein. At popliteal fascia incision, a sudden PAA partial dislocation outside the popliteal cave was observed due to high pressure in the popliteal cave (Fig. 2). After isolation, PAA was excluded with an interposition-reinforced 8mm Dacron graft (Fig. 3). At arterial stage completion, popliteal vein was found to be patent and compressible under direct palpation. At inspection, the popliteal nerve regained a physiologic course without additional surgical manoeuvres. Closure consisted of aneurysm wall suture around prosthetic graft; fascial planes were not sutured and popliteal cave closure was done directly with only skin. The postoperative course was uneventful. Patient was discharged at fourth day after surgery with no functional impotence. At three and six months DUS followup both popliteal arterial graft and popliteal vein were patent; no numbness or tingling were reported.

Discussion

It is estimated that PAAs aneurysms occur in less than 15% of patients with abdominal aortic aneurysm (AAA)

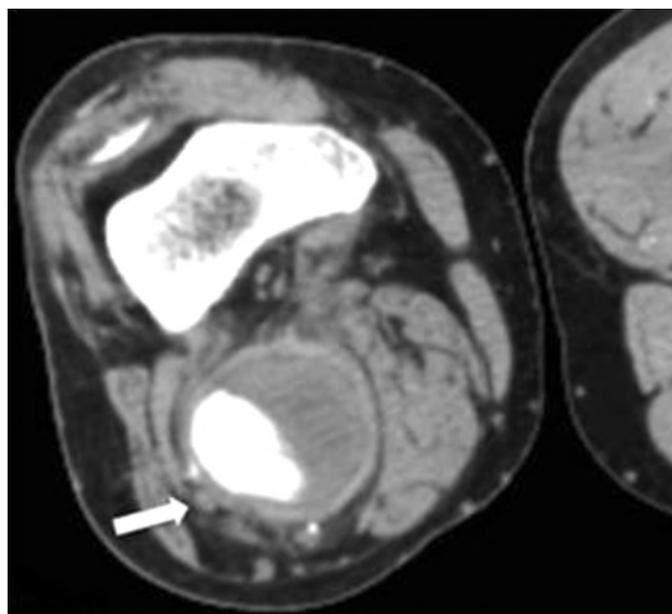


Fig. 1: Computed tomography angiography: popliteal artery aneurysm with a maximal transverse diameter of 52.3mm; ab extrinseco compression and dislocation of the popliteal vein (arrow) and the popliteal nerve.

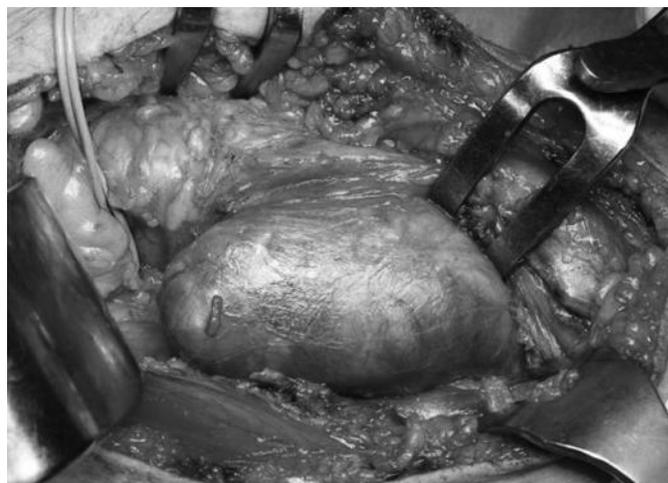


Fig. 2: Surgical popliteal posterior approach. Popliteal artery aneurysm dislocation outside the popliteal cave at fascia incision due to popliteal cave high pressure.



Fig. 3: Popliteal artery aneurysm repair with 8 mm reinforced Dacron graft.

and an AAA is present in about one-third of the patients with a PAA^{3,4}. In addition, PAAs occur bilaterally 45-68% of cases⁵. Atherosclerotic PAA pathogenesis is reported in most cases; less common origins are inflammatory or collagen diseases, bacterial infection and blunt or penetrating trauma³. PAA are usually diagnosed if a complication occurs and two-thirds are asymptomatic at diagnosis⁶. Rupture is a potential lethal PAA complication, however it is reported in less than 3% of cases⁵. A thrombosis with acute onset is a common PAA presenting symptom and it requires urgent treatment. Chronic thrombosis and subsequent

distal embolization is the most frequent PAA manifestation. It can manifest clinically with claudication, rest pain, blue toe syndrome or gangrene. As in the present report, an unusual presentation due to compression on the adjacent popliteal vein leads to typical symptoms of deep vein thrombosis. Moreover symptoms related to nerve dislocation and compression were also registered⁷. In the present report PAA was diagnosed due to the related symptoms of compression on popliteal vein and popliteal nerve. When a PAA manifests a surgical repair is required. The gold standard for PAA treatment is open reconstruction with a femoro-popliteal bypass⁸. In the present case a synthetic graft was employed for PAA repair as right GSV was hypoplastic and left GSV has been already employed for aorto-coronary bypass grafting. More recently the endovascular treatment has been reported as alternative to open PAA repair with slightly inferior outcomes compared to surgery. The advantages of endovascular approach are a less invasiveness and a reduced in hospital length of stay, and it has been reported to be the treatment of choice in some centres⁹. However, in the present case, an endovascular treatment was not considered due to popliteal compartment syndrome and PAA compression to the adjacent popliteal vein and nerve. By surgical approach, both PAA repair and decompression in the popliteal cave were achieved with the same procedure. The popliteal cave, enclosed by bones, muscles and tendons, is a region with increased risk of compartment syndrome. In such confined space, also a slight compression to popliteal structure can lead to a compartment syndrome. The reported patient presented typical findings of compartment syndrome as pain, numbness, tingling and functional impotence¹⁰. Although intra-compartmental pressure system can be employed to confirm diagnosis, in this case decision was taken in consideration of the clinical and diagnostic findings (DUS and CTA). The PAA was the cause of the increased pressure within the popliteal cave by compromising both popliteal vein and nerve function. By posterior surgical PAA repair the popliteal cave was decompressed. Moreover by this surgical maneuver a popliteal vein decompression and a popliteal nerve correct reposition were achieved.

Conclusion

An unusual presentation of a PAA can be a popliteal compartment syndrome, especially in large diameter aneurysm. It can manifest clinically with deep popliteal vein compression and/or popliteal nerve dislocation signs. The PAA repair is generally required to avoid a potential fatal complication such as rupture. By the surgical open repair is possible to achieve both a decompression of the popliteal cave and the PAA repair.

Riassunto

INTRODUZIONE: L'arteria poplitea è la più comune sede di localizzazione aneurismatica dopo l'aorta addominale. Una presentazione clinica non comune dell'aneurisma dell'arteria poplitea è la compressione sulle strutture adiacenti.

CASO CLINICO: Un uomo di 67 anni con segni di trombosi venosa profonda all'arto inferiore destro inclusa impotenza funzionale, è stato ricoverato presso la Unità di Chirurgia Vascolare in emergenza. Nel corso dell'esame obiettivo è stata rilevata una massa pulsante in corrispondenza del cavo popliteo. L'angio-tomografia computerizzata ha mostrato un aneurisma di 53.2mm dell'arteria poplitea responsabile di una compressione ab extrinseco della vena poplitea ed una dislocazione del nervo popliteo. Attraverso un approccio posteriore è stato resecato l'aneurisma popliteo e confezionato un innesto protesico in Dacron armato. Il paziente è stato dimesso in quarta giornata postoperatoria con regressione dell'impotenza funzionale. Al controllo postoperatorio doppler ultrasonografico, sia la protesi arteriosa che la vena poplitea risultano pervie.

CONCLUSIONE: Una presentazione non comune dell'aneurisma dell'arteria poplitea è la sindrome del compartimento popliteo, tale condizione è relativamente più frequente in aneurismi di grosse dimensioni. Essa può manifestarsi con segni di trombosi venosa profonda dell'arteria poplitea e/o dislocazione del nervo popliteo. Lo scopo del trattamento degli aneurismi dell'arteria poplitea è quello di prevenire complicanze quali la trombosi e conseguente ischemia e la rottura. Attraverso il trattamento chirurgico open è stato possibile eseguire contestualmente sia una decompressione del cavo popliteo che la riparazione dell'aneurisma dell'arteria poplitea.

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